

Seton Hall University

## eRepository @ Seton Hall

---

Seton Hall University Dissertations and Theses  
(ETDs)

Seton Hall University Dissertations and Theses

---

Spring 4-12-2024

# Assessing Higher Order Thinking in the New Jersey Social Studies Standards for Grades K-8 by Using Artificial Intelligence (AI)

Connie Sanchez

connie.sanchez@student.shu.edu

Follow this and additional works at: <https://scholarship.shu.edu/dissertations>



Part of the [Adult and Continuing Education Commons](#), [Adult and Continuing Education Administration Commons](#), [Bilingual, Multilingual, and Multicultural Education Commons](#), [Curriculum and Instruction Commons](#), [Curriculum and Social Inquiry Commons](#), [Early Childhood Education Commons](#), [Educational Assessment, Evaluation, and Research Commons](#), [Educational Leadership Commons](#), [Educational Methods Commons](#), [Elementary and Middle and Secondary Education Administration Commons](#), [Elementary Education Commons](#), [Elementary Education and Teaching Commons](#), [Gender Equity in Education Commons](#), [Holistic Education Commons](#), [Other Educational Administration and Supervision Commons](#), [Other Teacher Education and Professional Development Commons](#), and the [Pre-Elementary, Early Childhood, Kindergarten Teacher Education Commons](#)

---

### Recommended Citation

Sanchez, Connie, "Assessing Higher Order Thinking in the New Jersey Social Studies Standards for Grades K-8 by Using Artificial Intelligence (AI)" (2024). *Seton Hall University Dissertations and Theses (ETDs)*. 3201.

<https://scholarship.shu.edu/dissertations/3201>

Assessing Higher Order Thinking in the New Jersey Social Studies Standards  
for Grades K-8 by Using Artificial Intelligence (AI)

Connie L Sánchez

Dissertation Committee

Dr. Monica Browne

Dr. Daniel Gutmore

Dr. Charles Rowan

Submitted in partial fulfillment of the  
requirements for the degree of  
Doctor of Education

In the Department of Education Leadership, Management and Policy

Seton Hall University  
2024

© 2023 Connie L Sanchez  
All rights reserved



**COLLEGE OF EDUCATION AND HUMAN SERVICES  
DEPARTMENT OF EDUCATION LEADERSHIP MANAGEMENT & POLICY  
APPROVAL FOR SUCCESSFUL DEFENSE**

Connie L. Sánchez has successfully defended and made the required modifications to the text of the doctoral dissertation for the Ed. D. during this Spring Semester, 2024.

**DISSERTATION COMMITTEE**

Dr. Monica Browne	03/12/2024
<hr/>	
Mentor	Date
Dr. Daniel Gutmore	03/12/2024
<hr/>	
Committee Member	Date
Dr. Charles Rowan	03/12/2024
<hr/>	
Committee Member	Date

## **Dedication**

This work is dedicated to the pillars of my life, whose compassion, integrity, and spirit of endless learning have illuminated every page of this journey. To my beloved husband, your unwavering support and belief in me have been the bedrock upon which I've built my aspirations. No matter the decisions I've made or the dreams I've pursued, you've been there, not just as my support but as my utmost friend and unfaltering guiding light. You are, and will forever be, my person.

To my wonderful children, you have taught me to marvel at all the beauty the world has to offer, reminding me of the magic and wild hope that learning can unearth. The depth of curiosity, the desire to understand, and the great sense of wonder I see through your eyes remind me of the boundless awe the journey of learning unveils. You've reignited my yearning for wisdom and my passion for education more than anyone else in this world.

To my intrepid parents, when you first set foot on this land in 1975, with a dream knotted together with hope and all of \$32 to your name, you instilled in my brother, my best friend, and I a monument to resolve and great courage. Armed with only a primary education, your guardianship and unwavering love still propels us to never cease in our learning, to never falter in our procession, and to always immerse ourselves within the fascinating boundlessness of curiosity.

Throughout my life there have been luminaries who've not only lightened the path but have also been the architects of the bridges I've crossed. This dissertation is not merely a reflection of my endeavors, but a mosaic crafted with the wisdom, inspiration, and guidance of those who dedicate their lives to the noble cause of education. It is to these torchbearers, my teachers, mentors, and educators at every level, that I dedicate this work

## **Acknowledgements**

To my mentors, Dr. Browne, Dr. Gutmore, and Dr. Rowan, thank you for your support throughout this dissertation process. You believed in me and pushed me to explore beyond the horizons of comfort and familiarity. Your dedication to my growth as a scholar is appreciated.

To the educators around the world, whose names I may never know but whose spirits are intertwined with the essence of this journey: Your sacrifices do not go unnoticed. You are the unsung heroes of our times, the architects of the future, and the guardians of the flame of knowledge. Your passion, commitment, and unwavering belief in the transformative power of education inspire countless souls and kindle the fires of change across generations.

This dissertation stands as a testament to the collective wisdom, love, and perseverance of all educators. It is a humble tribute to your unwavering spirit and an acknowledgment of the boundless impact you have on the lives of your students. You have not only taught us to aspire and achieve but have also shown us the beauty of dreaming and the virtue of kindness.

Finally, to my comm*Unity*... Thank you! You will forever be in my heart. #OGs

## Table of Content

Dedication .....	iv
Acknowledgements .....	v
List of Tables .....	x
List of Figures .....	xi
Abstract .....	xiii
Chapter I: Introduction.....	1
Background .....	1
Statement of the Problem.....	3
Intent and Spirit .....	4
Mission.....	5
Purpose of the Study .....	5
Research Questions .....	6
Significance of the Study .....	7
Theoretical Framework.....	7
Definition of key Terms.....	9

Assumptions.....	11
Limitations .....	11
Delimitations.....	12
Organization of the Study .....	12
Chapter 2: Literature Review.....	13
Literature Search Strategy .....	17
Overview of Current Literature .....	18
Theoretical Framework.....	20
Key Concepts and Definitions .....	20
Integrating the Three.....	28
Methodology .....	30
Review of Social Studies Standards .....	34
John Dewey.....	36
Paulo Freire.....	40
Overview of Social Studies Standards.....	42
Role of AI in Education .....	46



Chapter 3: Methodology .....	47
Research Questions .....	47
Research Design and Methodology .....	48
Hess' Cognitive Rigor Matrix .....	56
Using Webb's DOK and Hess' Cognitive Rigor Matrix Together .....	57
Reliability Assurance in Qualitative Data Analysis .....	58
Role of ChatGPT .....	58
Coding Reliability .....	59
Validity .....	61
Participants and Sampling .....	61
Data Sources and Collection .....	61
Data Analysis .....	62
Validity and Credibility .....	63
Limitations .....	63
Chapter 4: Data Analysis and Results .....	65
Findings .....	69

Question 2 Findings .....	71
Question 3 Findings .....	76
Error Finding: .....	77
Coding Confirmation .....	79
Findings Summary .....	84
Conclusion .....	86
Chapter 5: Summary, Conclusions, and Recommendations .....	89
Purpose.....	90
Discussions and Implications.....	93
Suggestions for Future Research .....	94
Considerations for Policymakers .....	96
References .....	99
Appendix A: Researcher Verification of AI Classification of Tasks by Depth of Knowledge (DOK) Levels.....	108
Appendix B: Classification of Tasks by Depth of Knowledge (DOK) Levels.....	165

## **List of Tables**

Table 1. Frequency Table Grades K-2 .....	82
Table 2. Frequency Table Grades 3–5 .....	83
Table 3. Frequency Table Grades 6-8.....	84

## **List of Figures**

Figure 1. Theoretical Framework .....	9
Figure 2. Hess' Cognitive Rigor Matrix (CRM) for Reading and Listening.....	23
Figure 3. Hess' Cognitive Rigor Matrix (CRM) for Writing and Speaking.....	234
Figure 4. Bloom's Taxonomy .....	26
Figure 5. Webb's Depth of Knowledge Levels .....	27
Figure 6. John Dewey's Theory of Structure.....	38
Figure 7. Framework Method and Mayring Step Model Process .....	50
Figure 8. Sequence Mapping for Coding Standards .....	52
Figure 9. Webb's Depth of Knowledge .....	54
Figure 10. Webb's DOK Question Stems.....	56
Figure 11. Social Studies Standards by Grade Levels .....	62
Figure 12. Framework Method Steps.....	68
Figure 13. NJ Student Learning Standards in Grades K-8 by DOK Level.....	71
Figure 14. NJ Student Learning Standards in Grades K-2 by DOK Level .....	73
Figure 15. NJ Student Learning Standards in Grades 3-5 by DOK Level .....	74
Figure 16. NJ Student Learning Standards in Grades 6-8 by DOK Level .....	75
Figure 17. NJ Student Learning Standards in Grades K-8 by DOK Level.....	77

Figure 18. AI Error Message ..... 78

## **Abstract**

New Jersey consistently ranks as one of the top-performing states in the country when it comes to education. Most recently, it was ranked third in the nation. A look at the state's standards in any subject shows the state works diligently to vertically align standards while also challenging students in order to better prepare them for the future and to be able to live in a global society. It is evident in looking at the New Jersey Department of Education's standards that the planning they do is performed with an eye toward the future. The social studies standards are no exception. New Jersey has written social studies standards that look to help students develop the critical thinking skills they will need to solve the unknown problems of the future. This dissertation takes a look at the New Jersey student learning standards for social studies in Grades K–8. It assesses whether these standards, written with a mission and vision of promoting global thinking, actually accomplish this goal. The standards are assessed by using Hess' cognitive rigor matrix. They are assessed with the assistance of artificial intelligence (AI). Artificial intelligence was used as a coder, as well as a mentor assistant for the researcher. Together, the standards were reviewed to see if, in fact, when executed in the classroom, students' critical thinking and problem-solving skills were being developed, giving them the skills to be global thinkers.

This mixed-methods study first utilized AI, specifically ChatGPT, to code the standards based on Webb's depth of knowledge in Levels 1 through 4. The standards were then reviewed by the researcher using the framework method and the Mayring step model. The findings reveal a purposeful progression in higher-order thinking and cognitive complexity. This approach ensures that New Jersey's students while sitting in a social studies class, do not simply absorb facts. These standards, when effectively delivered by educators and mastered by students,

prepare them to engage with and contribute to solving local, regional, national, and global issues. However, the review process was not without its challenges. The study captured some differences between AI and itself as well as the human coder. While not disparate, it does highlight the nuances of interpreting educational standards. The conclusion, nonetheless, was clear: The New Jersey social studies standards are more than an academic requirement; they are a blueprint for cultivating informed, thoughtful, and proactive global citizens. As students progress from kindergarten to eighth grade, they are encouraged to view the world through a critical lens. They are tasked with asking meaningful questions and creating solutions that look beyond their local borders. This educational approach is ambitious both in scope and vision. It requires teachers to develop lessons that are more cognitively complex and allow students to engage with content using high-order thinking skills. If these standards are taught effectively and mastered by students, they promise to equip them with the intellectual tools necessary to face an ever-changing global landscape. To meet the challenges of a globalized world, this study advocates for policies, practices, and funding that support educational innovation. Only through this proactive three-pronged approach can educators bridge learning gaps that were exacerbated by the pandemic. The study is a call to action for educators, policymakers, and society in general to foster a generation capable of leading with empathy, critical thinking, and a deep understanding of their role in a global society.

## **Chapter I: Introduction**

### **Background**

On June 3, 2020, the New Jersey Board of Education adopted new social studies standards that were to inform education for all public-school students in grades kindergarten through grade twelve. The social studies standards were created to prepare students because:

Today's challenges are complex, have global implications, and are connected to people, places, and events of the past. The study of social studies focuses on a deep understanding of concepts that enable students to think critically and systematically about local, regional, national, and global issues. The authentic learning experiences that enable students to apply content knowledge, develop social studies skills, and collaborate with students from around the world prepare New Jersey students for college, careers, and civic life (New Jersey Department of Education, 2020).

This purposeful shift meant that the New Jersey Department of Education recognized that the world was becoming more interconnected and that students in New Jersey needed to prepare for a more interconnected and interdependent future. Against this background, this study arises. The researcher's decision to employ Hess' Cognitive Rigor Matrix for evaluating higher-order thinking in K–8 social studies standards, with the assistance of artificial intelligence (AI), was influenced by her background as a science educator who implemented the next-generation science standards (NGSS). Through her tenure teaching science, she witnessed firsthand the transformative effect of the NGSS in enhancing educational rigor and fostering critical thinking abilities among students. This experience prompted her to question whether the social studies standards could achieve a comparable level of cognitive complexity. By examining the cognitive demands inherent in the social studies standards, this study aimed to uncover the extent to which



these standards equipped students to navigate the intricacies of a globally interconnected world, in line with the objectives outlined by the New Jersey Department of Education.

The education of children has traditionally been a national enterprise, designed primarily to socialize and prepare individuals for participation in local communities and in autonomous nation-states (Suárez-Orozco & Qin-Hilliard, 2004). However, the world is now radically interconnected and challenged by social, economic, and environmental problems that spill across political and geographic divides (Hull & Hellmich, 2018). Fostering international mindedness has long been a goal of specialized international schools (Hill, 2012). If public school students are to remain competitive, then public education must also shift to a more international-minded approach to teaching. This requires educators to give students the ability to think globally, which means they must think critically in order to understand their role in an interconnected world.

The 2020 intent, spirit, and mission for the New Jersey social studies standards align with the United Nations' sustainable development goals (SDGs), specifically targeting Goal 4: Education (Goal 4). The SDGs emphasize the importance of inclusive and quality education as a means to empower individuals and promote social justice. Additionally, the key to implementing sustainable development goals is a commitment to ensuring systems thinking is embedded in all levels of education (Stafford-Smith et al., 2016). This shows a commitment to giving students agency and the tools they need to navigate the world effectively. By helping students understand the complex interconnections between concepts, the state of New Jersey's Department of Education is promoting a more holistic and nuanced approach to problem-solving and critical thinking.

As schools continue to educate children and prepare them for an uncertain future, educators and students are confronted with the reality of an interconnected global society. A society that will require students to see themselves beyond their local community and one that requires them to understand how decisions made locally have an impact thousands of miles away and across geo-political lines. This context calls for a profound transformation in education. Educators are tasked with nurturing global, critical thinking, and social consciousness in the hearts and minds of learners. Paulo Freire, a pioneering advocate for social justice in education, saw education as the foundation of politics. He promoted education as a foundational tool to guide political decisions. To him, critical thinking should be used to make pedagogy relevant, meaningful, and empowering.

In fact, his legacy at the present moment is prophetic and invaluable for navigating a dark time in history, a time that points to a mix of hope and despair. The intersecting crises of economics, health, climate change, politics, racism, and democracy appear apocalyptic, especially with the rise of far-right and updated versions of fascist politics emerging across the globe (Giroux, 2021). In the midst of all these big problems, the ideas from individuals such as Paulo Freire show how important education is in creating a fair and just world. By giving students the skills to think critically and be aware of the world around them, schools are not just teaching them how to deal with the world's complexity; they are preparing them to be the ones who'll make the world a better place.

### **Statement of the Problem**

The world is evolving and changing quickly. Three-quarters of American companies say they have difficulty recruiting the right people, with critical thinking among the top requirements, according to the Society for Human Resource Management (Charlton, 2019).

Entering the world of global competition, the emphasis is on the need to prepare students to be communicative, collaborative, creative, innovative, to think critically and analytically, and to be able to effectively solve real-world problems. With higher-order thinking skills, which are essential for absorbing knowledge as well as for work performance, students will become effective communicators, critical and dynamic thinkers, competent problem solvers, and career experts (Živkovića, 2016). This is important as schools have to prepare students for uncertain futures. Technological displacement of labor is predicted to be significant in the future; if left unchecked, it will lead to catastrophic societal unemployment levels (Bruun & Duka, 2018). Additionally, while it is imperative to prepare students to be successful in a changing world professionally, it is as imperative to provide them with the tools to create a just world where all people can attain success and freedom. This requires educators to encourage students to think critically (Hackman, 2005).

### **Intent and Spirit**

In New Jersey, students receive social studies instruction from Kindergarten through Grade 12. Today's challenges are complex, have global implications, and are connected to people, places, and events of the past. The study of social studies focuses on a deep understanding of concepts that enable students to think critically and systematically about local, regional, national, and global issues. The intent of the standards is to create authentic learning experiences that enable students to apply content knowledge, develop social studies skills, and collaborate with students from around the world while preparing New Jersey students for college, careers, and civic life. Additionally, it should be noted that the natural integration of technology in social studies education allows students to overcome geographic borders, apply scientific and mathematical analysis to historical questions and contemporary issues, appreciate

cultural diversity, and experience events through the examination of primary sources. The 2020 New Jersey student learning standards in social studies are also informed by national and state standards and other documents such as the college, career, and civic life (C3) framework for social studies state standards. The National Center for History Education, National Council for Social Studies, National Council for Geographic Education, Center for Civic Education, National Council on Economic Education, National Assessment of Educational Progress, and the Partnership for 21st Century Skills also influenced their creation (New Jersey Department of Education, 2020).

### **Mission**

Social studies education provides learners with the knowledge, skills, attitudes, and perspectives needed to become active, informed, and contributing members of local, state, national, and global communities (New Jersey Department of Education, 2020). If educators and school administrators are responsible for nurturing students to adopt a more global perspective, it's crucial to evaluate whether the standards that have been developed align with the desired goals.

### **Purpose of the Study**

The primary purpose of this research study was to assess the alignment of the 2020 New Jersey student learning standards for social studies with Hess' Cognitive Rigor Matrix by using artificial intelligence (AI) techniques. Although this research incorporated the use of AI, it is important to note that the AI results were reviewed and validated by the researcher. The use of AI allowed the researcher to determine if the standards promoted the expectation of high-order thinking for students. Specifically, this study looked to:

- Utilize AI-powered natural language tools to analyze the language used in the standards, identifying, and categorizing specific keywords, phrases, or concepts that align with the criteria defined in Hess' Cognitive Rigor Matrix.
- Create AI prompts, which were specific instructions or inputs provided to an AI model to generate a response or perform a task. In this study, AI was tasked with categorizing content as lower-order or higher-order thinking based on linguistic patterns and context and Webb's depth of knowledge levels.

### **Research Questions**

The study was guided by the overarching research question, which sought to investigate whether the 2020 New Jersey student learning standards for social studies in Grades K–8 aligned with the cognitive rigor matrix proposed by Hess. Do these standards effectively provide students with the necessary framework for developing the competencies required for global citizenship, specifically by examining the presence, complexity, and frequency of higher-order thinking opportunities within these standards? This study examined how the language in these standards matched up with Hess' definition of higher-order thinking. The study also assessed how cognitively complex the standards are and how many chances they give for higher-order thinking using Hess' Cognitive Rigor Matrix. The following additional questions served as a guide for this research:

Research Question 1: In what way(s) does the language found on the 2020 New Jersey student learning standards for social studies in Grades K–8 compare to Hess' Cognitive Rigor Matrix definition of higher-order thinking?

Research Question 2: How cognitively complex are the 2020 New Jersey student learning standards for social studies in Grades K–8 as defined by Hess' Cognitive Rigor Matrix?

Research Question 3: How frequently do the 2020 New Jersey Student learning standards for social studies in Grades K–8 include higher-order thinking opportunities as identified in Hess' Cognitive Rigor Matrix?

### **Significance of the Study**

This research study holds significant implications for the field of education and curriculum development. It investigates whether the New Jersey social studies standards for grades K–8 foster critical thinking and global thinking in order to better prepare students to understand and thrive in the interconnected world they live in. It also looks to explore how advanced AI technologies can enhance the evaluation of educational standards in terms of cognitive rigor, efficiency, and objectivity. By leveraging AI, this study aimed to provide valuable insights into the alignment of the standards with higher-order thinking skills, ultimately enhancing the rigor and effectiveness of social studies education. It also served to assess how AI could provide efficiency and scalability when analyzing large volumes of educational materials. AI results were then reviewed and validated by the researcher using the Framework Method and the Mayring Step Model.

### **Theoretical Framework**

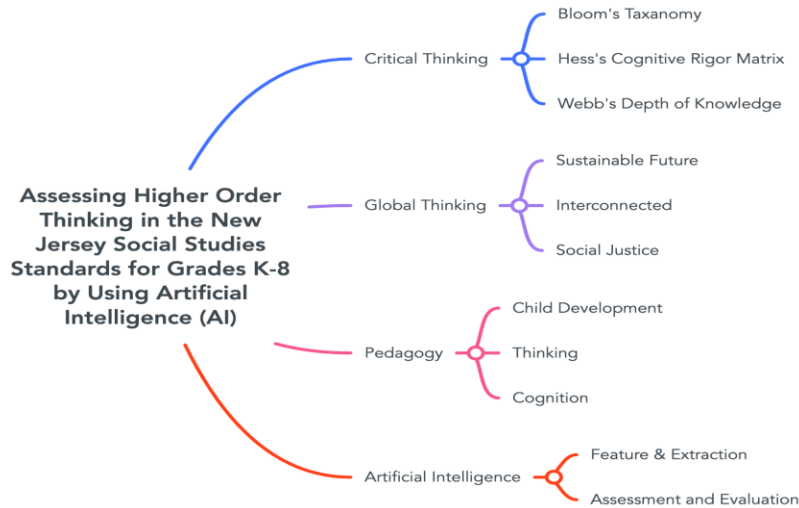
The theoretical framework of this study incorporated four prongs that guided the researcher, as evidenced in Figure 1. The researcher looked at critical thinking, global thinking, and pedagogy as interconnected concepts that play a vital role in education. Critical thinking and global thinking are essential competencies in the 21st-century education landscape. This is because critical thinkers are able to deal with ambiguity, question biases, and apply complex thought processes when they encounter a challenge. They can think of creative improvements to systems and organizations and see solutions in the context of the world around them (Weeks,

2023). In order to better understand and assess critical thinking skills, the researcher was guided by Bloom's taxonomy, Hess' Cognitive Matrix, and Webb's depth of knowledge. Global thinking was informed by research on sustainable futures, interconnectedness, and social justice. The work of Paulo Freire's *Pedagogy of the Oppressed* played a pivotal role in guiding this research. Pedagogical understanding was informed by the work of John Dewey's *How We Think*. Additional key aspects of the study were thinking as well as cognitive complexity. The works of John Dewey and Paulo Freire, in particular, offered invaluable theoretical perspectives that closely intersect with the exploration of learning, cognition, and pedagogy as they relate to learning.

The theoretical framework of the study also included the integration of AI, text analysis, natural language processing, and automated coding techniques to assess the cognitive rigor of the New Jersey social studies standards in Grades K–8. As it relates to AI, feature extraction refers to the process of identifying and isolating important pieces of data from a larger dataset. This involved using AI to evaluate student learning outcomes. These processes were then validated by the researcher, who applied the Framework Method and the Mayring Step Model to review the findings.

**Figure 1**

*Theoretical Framework*



*Note.* Theoretical Framework. Own Work.

**Definition of key Terms**

**Artificial intelligence (AI)** is defined as one of the technological innovations that happened to replace the manual work that is done by humans in various fields. Artificial intelligence is a branch of science and technology that creates intelligent machines and computer programs to perform various tasks that require human intelligence (Aghion et al., 2019).

**Artificial intelligence** refers to the general ability of computers to emulate human thought and perform tasks in real-world environments, while machine learning refers to the technologies and algorithms that enable systems to identify patterns, make decisions, and improve themselves through experience and data (*Artificial Intelligence (AI) vs. Machine Learning*, 2023).

**Automated coding** refers to AI using algorithms to automatically learn insights and recognize patterns from data (*Artificial Intelligence (AI) vs. Machine Learning*, 2023)



***Bloom's taxonomy*** addresses three domains of learning (the cognitive, psychomotor, and affective) the lower-order learning of knowledge, comprehension, and application and the higher-order learning of analysis, synthesis, and evaluation (Nentl & Zietlow, 2008).

***Cognitive complexity*** refers to the state or quality of a thought process that involves numerous constructs with many interrelationships among them. Such processing is often experienced as difficult or effortful (American Psychological Association, 2010).

***Critical thinking*** refers to reasonable, reflective thinking that is focused on deciding what to believe (Ennis, 1985).

***Global thinking*** refers to thinking routines that foster understanding and appreciation of today's complex globalized world (Mansilla, 2016).

***Hess' Cognitive Rigor Matrix*** refers to a tool that has significant potential to enhance instructional and assessment planning and practices at the classroom level (Hess et al., 2009). The CRM superimposes two different cognitive complexity measures—Bloom's taxonomy and Webb's depth of knowledge—to produce a means of analyzing the emphasis placed on curricular materials, instructional focus, and classroom assessment (Hess et al., 2009).

***Higher-order thinking*** refers to a situation in which for the individual or group concerned, one or more appropriate solutions have yet to be developed (Research Advisory Committee of the National Council of Teachers of Mathematics, 1988).

***Natural language processing (NLP)*** refers to the branch of computer science—and more specifically, the branch of artificial intelligence or AI—concerned with giving computers the ability to understand text and spoken words in much the same way human beings can. It combines computational linguistics; rule-based modeling of human language, with statistical, machine learning, and deep learning models (*International Business Machines*, 2024)

*Webb's depth of knowledge* refers to how deeply students must know, understand, and be aware of what they are learning in order to attain and explain answers, outcomes, results, and solutions. It also designates how extensively students are expected to transfer and use what they have learned in different academic and real-world contexts (Francis, 2017).

### **Assumptions**

This study made five assumptions that were carefully considered. The study assumed that education played a vital role in shaping society and that learning standards, as set forth by the New Jersey Department of Education, could assist educators and school administrators in creating learning environments where students could see themselves as part of an interconnected world. This study also assumed that critical thinking, as delineated by Hess' Cognitive Rigor Matrix, could be effectively employed to evaluate the manifestation of global thinking. Additionally, the study assumed that the work of Paulo Freire on social justice in education offers important insights for helping students understand their role in a complex and interconnected world. John Dewey's pedagogical principles were also assumed to contribute to a deeper understanding of how children learn.

### **Limitations**

The assessment of global thinking through AI and NLP techniques has not been extensively used in educational frameworks and may have limitations in capturing nuanced aspects of cognitive development. Additionally, Hess' Cognitive Rigor Matrix is used to measure cognitive complexity. It's important to note that while this matrix was created in 2009, it has not been as extensively studied as some other frameworks for assessing cognitive complexity and critical thinking.

## **Delimitations**

There were three delimitations that were considered in the context of this paper. The first is that the research concentrated on evaluating the New Jersey student learning standards for social studies, specifically targeting cognitive rigor alignment. The study also did not employ a comprehensive review of all potential pedagogical approaches to teaching global thinking. Lastly, AI and NLP were used to assess cognitive complexity and linguistic patterns using a computer-aided coding technique.

## **Organization of the Study**

A major theme of this dissertation was the issue of cognitive complexity within the New Jersey learning standards for Grades K–8. In addition, it introduced AI as a coding tool, which is in line with AI's integration across several fields. The literature review in Chapter 2 encompasses the study's theoretical framework, prior research on higher-order thinking, and four main research components. Chapter 3 examines the research design and methodology in detail while offering a detailed analysis of Artificial Intelligence's involvement in the coding process and the reliability mechanisms used to ensure it. Results, including the data discovered during the study, are presented in Chapter 4. Chapter 5 summarizes the findings, discusses their implications, and suggests future research along with potential policy recommendations.

## Chapter 2: Literature Review

Technological advancements are taking place at an alarming pace in the 21st century. These may increase exponentially as time moves forward. This rapid pace of technological progress and globalization creates a constantly shifting socio-political landscape, which future generations will be left to navigate. To be successful, children must be able to adapt, comprehend, and negotiate unprecedented complexities. This extraordinary change leading to unfettered globalization, which was supposed to bring the world together and provide greater prosperity, inevitably seems to be leading to economic inequality and globalization (Watson, 2017). Watson (2017) shared how globalization has led to an increase in international trade, investments, and technological advancements. These have created significant economic growth and even development in many parts of the world. He also made a point to discuss how this wealth has not been evenly distributed among the masses or throughout the world. Although globalization was once described as a great equalizer and an opportunity to develop previously undeveloped countries, the wealth has not been evenly distributed, what it has actually done, is to create wider economic disparities both between and within countries. Watson explained that globalization has benefited from access to highly skilled workers around the world, but low-skilled workers have faced job losses and stagnant wages due to competition from cheaper labor markets abroad. This has led to an increase in income inequality not just in developing countries but even in many developed countries. But income inequality isn't the only concern. Other concern associated with globalization include:

- **Cultural Homogenization:** Tomlinson described cultural homogenization as a trend in which different cultures begin to look like each other due to the process of globalization. Instead of varied, rich cultures, there is less cultural diversity. This leads to the loss of

local traditions. Customs lose their distinctiveness. Global media, products, and ideas are being spread across wider geographies, reaching various cultures that then look to the media-depicted ideals and begin to minimize the importance of cultural diversity. While he acknowledged how global connection could lead to the creation of an understanding, he also warned of the danger associated with the decline of diversity (Tomlinson, 2009).

- **Exploitation of Labor:** In his work, Silver (2013) explained how exploitation of labor was bad for a number of reasons. Specifically, he highlighted how it undermined human rights, how it brought inequality to society. Silver went on to talk about how it widened the gap between the rich and poor. This gap decreases consumer purchasing power, and it undermines the dignity of work and the workers (Silver, 2013).
- **Environmental Degradation:** Shiva (2000) spoke on the implications of deforestation, pollution, and industrialization, which cause deteriorating ecosystems and loss of biodiversity, as well as intensifying climate change. According to Shiva, environmental degradation does not only hurt the environment; it endangers human health and culture. Shiva emphasized the need for sustainable practices and how the world must turn to eco-friendly policies to avoid more damage and to assure the well-being of our planet and its inhabitants.
- **Loss of Sovereignty:** Held and McGrew (2009) spoke of the dangers that threaten the autonomy of individual countries through mechanisms like international corporations, trade agreements, and global governing bodies. These groups have so much power, money, and influence that they can actually challenge how democracies work. What's more, they don't always have to follow the same rules or face the same consequences as

you, as individuals. Consider how, in the United States of America, corporations are deemed people and can contribute large sums of money to elections, yet if a company is responsible for a death or the health of individuals, there are not any individuals who are criminally charged.

These threats create a sense of urgency to develop an education model that does not rely on the old agrarian model of banking information. It requires a model of learning that could empower students, that will give them greater agency. To do so, one must create learning environments that promote both critical and global thinking. A model of learning is needed that may give students agency over the content and one that can equip them to face future challenges. Considering Hess' and Bloom's perspectives on higher-order thinking, curricula must incorporate tasks that require analysis, evaluation, and invention in place of rote learning and memorization. This fosters intellectual growth and prepares students for real-world problem-solving, thereby nurturing citizens capable of ethical reasoning and constructive debate in a complex, globalized world.

Conscientização, critical consciousness, is a concept popularized by Brazilian educator and philosopher Paulo Freire (Campus Suite, n.d.). It refers to the process of gaining a comprehensive understanding of the world, which enables the perception and exposure of social and political contradictions. Through conscientização, individuals are not only aware of systemic and structural injustices, but they are also motivated to act against them. For Freire, reflection without subsequent action is meaningless. People need to reflect upon their learning in order to better understand their circumstances and act to change them. This enhanced comprehension through reflection and critical thinking ensures that subsequent actions are well-informed and effective. As a result of Freire's pedagogy, oppressed people were empowered through reflection

and practice. In Freire's view, to reach a higher level of understanding and application, it was necessary to synthesize several viewpoints and perspectives in order to reach invention and innovation. He believed that critical thinking enabled individuals to go beyond accepting information at face value by equipping them with the means to challenge dominant narratives, question authority, and seek alternatives. It was his belief that empowered individuals were in a better position to take decisive and significant action (Ko, 2024).

This mixed-methods study aimed to assess global thinking in the 2020 New Jersey student learning standards for social studies in Grades K–8. The choice to work with these grades was purposeful. In kindergarten through fifth grade, students develop their foundational skills for learning.

By middle school, students have a broader understanding of the world, and they possess more advanced cognitive abilities that allow them to build on the skills they have established in their primary years. Assessing global thinking is becoming increasingly important. Today's students will live in a more interconnected global society and a society whose technological advancements and progress are changing at alarming rates. As a result of this, students need to develop a deeper understanding of diverse cultures and global issues. These issues include the development of sustainable economics and navigating multiple perspectives. The literature review spanned several key areas, including higher-order thinking and cognitive complexity, using Hess' Cognitive Rigor Matrix, which provided a framework for evaluating the cognitive demands of learning tasks. The research examined global thinking, drawing on a wealth of previous studies and theoretical frameworks. The researcher embarked on a thorough literature review. The aim was to sift through empirical studies and theories that shed light on higher-order thinking and how global thinking is measured. This took place while exploring various

theoretical frameworks connected to these concepts. The research questions shaped the literature review. During the literature review, the definitions of higher-order thinking as they appear in both educational curricula and scholarly discussions were addressed. This was also done while addressing the concept of global thinking and how it is related to higher-order thinking and cognitive complexity, as the mission and vision of the New Jersey Department of Education's social studies standards in Grades K–12 speak to them. Particularly, the review focused on the application of higher-order thinking within the 2020 New Jersey student learning standards for social studies for Grades K–8.

### **Literature Search Strategy**

The purpose of this chapter is to examine and review previous research and literature. Boote and Beile's (2005) guidelines were the basis for the literature research procedures. According to Boote and Beile (2005), a comprehensive, sophisticated literature review is both the starting point and the source of ideas for significant, fruitful research. In addition, according to Boote and Beile (2005), for education research to be useful and meaningful, it must be cumulative; it must build on and learn from prior research and scholarship on the topic. To advance this study, the researcher set out to not only read related previous research but also review and analyze the literature. The researcher's literature review included online searches from the Seton Hall University Database, SAGE, ProQuest Databases, EBSCO, Google Scholar, New Jersey Department of Education websites, previous dissertations, and peer-reviewed articles. The search terms included *higher-order thinking*, *cognitive complexity*, *pedagogical rigor*, *global thinking*, *global awareness*, *social studies standards*, *Webb's depth of knowledge*, *Bloom's taxonomy*, *Hess' matrix*, *social justice*, and *artificial intelligence*. The criteria for inclusion of literature included, (a) peer-reviewed original research, (b) dissertations, (c)



government reports, (d) peer and non-peer-reviewed literature global thinking, (e) theoretical literature, (f) seminal works, (g) studies published within the last 50 years.

### **Overview of Current Literature**

The research in the area of how learning standards affect global thinking in students and the extent to which cognitive complexity is embedded in learning standards was limited. The first part of the literature review centered on critical thinking. Much of the research expressed the need to develop complex analytical thinking within students and emphasized a need to develop 21st century skills. 21st century skills include the 4 Cs: critical thinking, creativity, collaboration and communication. A focus was placed on better understanding Bloom's taxonomy, Hess' Cognitive Rigor Matrix, and Webb's depth of knowledge. For this reason, the literature review focused on analyzing theories to provide an understanding of higher-order thinking and cognitive complexity using Hess' Cognitive Rigor Matrix.

Global thinking was the subject of the second part of the literature review. Due to a lack of literature in the area, the researcher reviewed literature on global thinking and focused on sustainable futures, interconnectedness, and social justice. Paulo Freire's work *Pedagogy of The Oppressed* was a pivotal part of this research. The third purpose was to review the history of pedagogy, most importantly as explained and seen by John Dewey, and how it relates to child development, thinking, and cognition. The researcher also devoted time to better understanding artificial intelligence. Feature extraction was a crucial component of this research because one of the main functions of AI is to extract information and skills from a large dataset. In this case, it may be the New Jersey student learning standards for social studies for Grades K-8. Finally, this review concludes by analyzing the New Jersey student learning standards for social studies in grades K-8, their influence on curriculum, and the demand for global student thinking.

As children move from kindergarten through high school graduation, the content and organization of their education have a significant impact on their capacity to contribute to a world that is thriving and healthy (Dernbach, 2009). For this reason, it is critical to recognize that the knowledge and skills children acquire throughout their educational journey shapes their perception of the world in which they live and their potential to address urgent societal challenges.

In order to cultivate new knowledge and foster innovative ways of thinking among young people and adults, critical thinking and global citizenship are critical components. Giving students agency to achieve economic prosperity, actively participating in democratic processes, promoting justice and equity, and concurrently regenerating the health of ecosystems is the fundamental basis of all life and production (Cloud, 2005). In global citizenship, learners learn how social, economic, and environmental dimensions are interconnected and develop the tools to make informed decisions about complex global issues.

Education in system dynamics and systems thinking are crucial in this situation. Systems thinking is a comprehensive approach to viewing the world around us as parts of a whole (Arnold & Wade, 2015). This thinking allows for the analysis of the interactions between the parts of the system to better understand those interactions to live successfully within the system (Norqvist & Ärlestig, 2021). These instructional frameworks direct students to investigate both the relationships and interdependencies among discrete system components and the discrete system as a whole. Global thinking promotes holistic understanding by taking into account the complex web of connections within a system, as opposed to concentrating only on discrete elements (Dernbach, 2009). Through global thinking, students develop a more thorough

understanding of the implications of their choices on various aspects of the system and gain insight into the long-term effects of their actions.

The fundamental tenet of all ethics is that people are fundamentally a part of a global community made up of interdependent parts. Human instincts may drive competition for personal gain, but ethics motivate people to work together for the good of all (Leopold, 2015). This profound realization highlights the importance of encouraging interconnectedness and group efforts to address global issues in educational settings.

What this shows is that changes in educational pedagogy and subject matter over a child's academic career greatly impact that child's ability to contribute to a prosperous and healthy world. By incorporating global thinking into student learning standards, educators can give students the skills, foundation, and moral framework they need to handle the complex problems of our time.

### **Theoretical Framework**

Global thinking helps students understand the complex systems of power, privilege, and oppression that exist in the world (Chan & Mak, 2020). It also helps them develop empathy and understand people's perspectives from different cultures and backgrounds. Finally, it helps them develop the skills to think critically and analytically about global issues.

### **Key Concepts and Definitions**

*Global thinking* refers to the ability to understand and analyze issues from a global perspective. It involves recognizing the interconnectedness of the world, valuing cultural diversity, and considering the impact of global challenges on various scales (Cloud, 2005; Leopold, 2015).

*Cognitive rigor* refers to the level of complexity and intellectual challenge in educational tasks. It involves higher-order thinking skills, such as critical thinking, problem-solving, and analysis, which push students to engage deeply with the content and develop a deeper understanding (Hess, 2014).

*Systems thinking* involve understanding the interconnectedness and interdependencies of various components within a system. It encourages examining relationships, feedback loops, and the broader implications of actions, allowing for a holistic understanding of complex issues (Meadows & Wright, 2015).

*Global citizenship* refers to a sense of belonging and responsibility towards the global community. It involves awareness of global issues, valuing diversity, promoting social justice, and actively engaging in efforts to address global challenges (UNESCO, 2013).


Dr. Karin Hess, an expert in curriculum and assessment design, developed Hess' Cognitive Rigor Matrix. The tool was designed to evaluate cognitive demands on instructional tasks and activities (Hess et al., 2009). Educators benefit from the matrix because it allows them to examine the cognitive rigor of tasks related to global topics and perspectives. Global thinking requires an understanding of complex global challenges, the ability to evaluate information critically, and a willingness to consider diverse perspectives. Using the cognitive rigor matrix, educators can identify the level of cognitive demand required by specific tasks and ensure that students engage in higher-order thinking processes relevant to global thinking.

The matrix assesses tasks based on four dimensions of cognitive rigor: (a) recall and reproduction, (b) skills and concepts, (c) strategic thinking, and (d) extended thinking. These dimensions progressively increase cognitive complexity and demand deeper levels of thinking (Hess, 2014). The matrix was designed to aid educators in designing and assessing tasks that

align with different levels of cognitive rigor, ranging from lower-order thinking skills to higher-order thinking skills. Hess' Cognitive Rigor Matrix consists of four quadrants that categorize tasks based on two dimensions: Bloom's taxonomy and Webb's depth of knowledge (DOK) (Smith & Smith, 2019). In Bloom's taxonomy, educational objectives are categorized according to levels of cognitive complexity, while Webb's DOK framework describes cognitive demands. The four quadrants of Hess' Cognitive Rigor Matrix are evidenced in Figures 2 and 3.

**Figure 2**

*Hess' Cognitive Rigor Matrix (CRM) for Reading and Listening*



<div>  <b>HESS COGNITIVE RIGOR MATRIX (READING CRM):</b>            Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions         </div>				
Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction	Webb's DOK Level 2 Skills & Concepts	Webb's DOK Level 3 Strategic Thinking/Reasoning	Webb's DOK Level 4 Extended Thinking
<b>Remember</b> Retrieve knowledge from long-term memory, recognize, recall, locate, identify	Use these Hess CRM curricular examples with most close reading or listening assignments or assessments in any content area.			
<b>Understand</b> Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion, predict, compare/contrast, match like ideas, explain, construct models	<ul style="list-style-type: none"> <li>Recall, recognize, or locate basic facts, terms, details, events, or ideas explicit in texts</li> <li>Read words orally in connected text with fluency &amp; accuracy</li> <li>Identify or describe literary elements (characters, setting, sequence, etc.)</li> <li>Select appropriate words when intended meaning/definition is clearly evident</li> <li>Describe/explain who, what, where, when, or how</li> <li>Define/describe facts, details, terms, principles</li> <li>Write simple sentences</li> </ul>	<ul style="list-style-type: none"> <li>Specify, explain, show relationships; explain why (e.g., cause-effect)</li> <li>Give non-examples/examples</li> <li>Summarize results, concepts, ideas</li> <li>Make basic inferences or logical predictions from data or texts</li> <li>Identify main ideas or accurate generalizations of texts</li> <li>Locate information to support explicit-implicit central ideas</li> </ul>	<ul style="list-style-type: none"> <li>Explain, generalize, or connect ideas using supporting evidence (quote, example, text reference)</li> <li>Identify/ make inferences about explicit or implicit themes</li> <li>Describe how word choice, point of view, or bias may affect the readers' interpretation of a text</li> <li>Write multi-paragraph composition for specific purpose, focus, voice, tone, &amp; audience</li> </ul>	<ul style="list-style-type: none"> <li>Explain how concepts or ideas specifically relate to other content domains (e.g., social, political, historical) or concepts</li> <li>Develop generalizations of the results obtained or strategies used and apply them to new problem-based situations</li> </ul>
<b>Apply</b> Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	<ul style="list-style-type: none"> <li>Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning of words</li> <li>Apply rules or resources to edit spelling, grammar, punctuation, conventions, word use</li> <li>Apply basic formats for documenting sources</li> </ul>	<ul style="list-style-type: none"> <li>Use context to identify the meaning of words/phrases</li> <li>Obtain and interpret information using text features</li> <li>Develop a text that may be limited to one paragraph</li> <li>Apply simple organizational structures (paragraph, sentence types) in writing</li> </ul>	<ul style="list-style-type: none"> <li>Apply a concept in a new context</li> <li>Revise final draft for meaning or progression of ideas</li> <li>Apply internal consistency of text organization and structure to composing a full composition</li> <li>Apply word choice, point of view, style to impact readers' /viewers' interpretation of a text</li> </ul>	<ul style="list-style-type: none"> <li>Illustrate how multiple themes (historical, geographic, social, artistic, literary) may be interrelated</li> <li>Select or devise an approach among many alternatives to research a novel problem</li> </ul>
<b>Analyze</b> Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias or point of view)	<ul style="list-style-type: none"> <li>Identify whether specific information is contained in graphic representations (e.g., map, chart, table, graph, T-chart, diagram) or text features (e.g., headings, subheadings, captions)</li> <li>Decide which text structure is appropriate to audience and purpose</li> </ul>	<ul style="list-style-type: none"> <li>Categorize/compare literary elements, terms, facts/details, events</li> <li>Identify use of literary devices</li> <li>Analyze format, organization, &amp; internal text structure (signal words, transitions, semantic cues) of different texts</li> <li>Distinguish: relevant-irrelevant information; fact/opinion</li> <li>Identify characteristic text features; distinguish between texts, genres</li> </ul>	<ul style="list-style-type: none"> <li>Analyze information within data sets or texts</li> <li>Analyze interrelationships among concepts, issues, problems</li> <li>Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to create or critique a text</li> <li>Use reasoning, planning, and evidence to support inferences</li> </ul>	<ul style="list-style-type: none"> <li>Analyze multiple sources of evidence, or multiple works by the same author, or across genres, time periods, themes</li> <li>Analyze complex/abstract themes, perspectives, concepts</li> <li>Gather, analyze, and organize multiple information sources</li> <li>Analyze discourse styles</li> </ul>
<b>Evaluate</b> Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique	<ul style="list-style-type: none"> <li>"UG" – unsubstantiated generalizations = stating an opinion without providing any support for it!</li> </ul>		<ul style="list-style-type: none"> <li>Cite evidence and develop a logical argument for conjectures</li> <li>Describe, compare, and contrast solution methods</li> <li>Verify reasonableness of results</li> <li>Justify or critique conclusions drawn</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate relevancy, accuracy, &amp; completeness of information from multiple sources</li> <li>Apply understanding in a novel way, provide argument or justification for the application</li> </ul>
<b>Create</b> Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, produce	<ul style="list-style-type: none"> <li>Brainstorm ideas, concepts, problems, or perspectives related to a topic, principle, or concept</li> </ul>	<ul style="list-style-type: none"> <li>Generate conjectures or hypotheses based on observations or prior knowledge and experience</li> </ul>	<ul style="list-style-type: none"> <li>Synthesize information within one source or text</li> <li>Develop a complex model for a given situation</li> <li>Develop an alternative solution</li> </ul>	<ul style="list-style-type: none"> <li>Synthesize information across multiple sources or texts</li> <li>Articulate a new voice, alternate theme, new knowledge or perspective</li> </ul>

© Karin K. Hess (2009, updated 2013). *Linking research with practice: A local assessment toolkit to guide school leaders*. Permission to reproduce is given when authorship is fully cited [karinhessvt@gmail.com]

*Note.* Hess's Cognitive Rigor Matrix for Reading and Listening. From Cognitive Rigor & DOK Focus Area by K.K. Hess, 2009, Karin-Hess.com ([https://www.karin-hess.com/files/ugd/5e86bd\\_1c0a13cbb2bc4f1185a558dbfeb27ffd.pdf](https://www.karin-hess.com/files/ugd/5e86bd_1c0a13cbb2bc4f1185a558dbfeb27ffd.pdf)). Copyright 2009 by Karin Hess. Reprinted with permission.

**Figure 3**

*Hess' Cognitive Rigor Matrix (CRM) for Writing and Speaking*

<div>  <b>HESS COGNITIVE RIGOR MATRIX   WRITING-SPEAKING CRM</b>  </div> Integrating Depth-of-Knowledge Levels with Bloom's Cognitive Process Dimensions				
Revised Bloom's Taxonomy	DOK Level 1 Recall and Reproduction	DOK Level 2 Skills and Concepts	DOK Level 3 Strategic Thinking or Reasoning	DOK Level 4 Extended Thinking
<b>Remember</b> Retrieve knowledge from long-term memory, recognize, recall, locate, identify	Use these Hess CRM curricular examples with most writing and oral communication assignments or assessments in any content area.			
<b>Understand</b> Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion, predict, compare-contrast, match like ideas, explain, construct models	<ul style="list-style-type: none"> <li>Describe or define facts, details, terms, principles, etc.</li> <li>Select appropriate word or phrase to use when intended meaning or definition is clearly evident</li> <li>Write simple complete sentences</li> <li>Add an appropriate caption to a photo or illustration</li> <li>Write "fact statements" on a topic (e.g., spiders build webs)</li> </ul>	<ul style="list-style-type: none"> <li>Specify, explain, show relationships; explain why, cause-effect</li> <li>Provide and explain non examples and examples</li> <li>Take notes, organize ideas or data (e.g., relevance, trends, perspectives)</li> <li>Summarize results, key concepts, ideas</li> <li>Explain central ideas or accurate generalizations of texts or topics</li> <li>Describe steps in a process (e.g., science procedure, how to and why control variables)</li> </ul>	<ul style="list-style-type: none"> <li>Write a multi paragraph composition for specific purpose, focus, voice, tone, and audience</li> <li>Develop and explain opposing perspectives or connect ideas, principles, or concepts using supporting evidence (quote, example, text reference, etc.)</li> <li>Develop arguments of fact (e.g., Are these criticisms supported by the historical facts? Is this claim or equation true?)</li> </ul>	<ul style="list-style-type: none"> <li>Use multiple sources to elaborate on how concepts or ideas specifically draw from other content domains or differing concepts (e.g., research paper, arguments of policy—should this law be passed? What will be the impact of this change?)</li> <li>Develop generalizations about the results obtained or strategies used and apply them to a new problem or contextual scenario</li> </ul>
<b>Apply</b> Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	<ul style="list-style-type: none"> <li>Apply rules or use resources to edit specific spelling, grammar, punctuation, conventions, or word use</li> <li>Apply basic formats for documenting sources</li> </ul>	<ul style="list-style-type: none"> <li>Use context to identify or infer the intended meaning of words or phrases</li> <li>Obtain, interpret, and explain information using text features (table, diagram, etc.)</li> <li>Develop a (brief) text that may be limited to one paragraph, précis</li> <li>Apply basic organizational structures (paragraph, sentence types, topic sentence, introduction, etc.) in writing</li> </ul>	<ul style="list-style-type: none"> <li>Revise final draft for meaning, progression of ideas, or logic chain</li> <li>Apply internal consistency of text organization and structure to a full composition or oral communication</li> <li>Apply a concept in a new context</li> <li>Apply word choice, point of view, style, rhetorical devices to impact readers' interpretation of a text</li> </ul>	<ul style="list-style-type: none"> <li>Select or devise an approach among many alternatives to research and present a novel problem or issue</li> <li>Illustrate how multiple themes (historical, geographic, social) may be interrelated within a text or topic</li> </ul>
<b>Analyze</b> Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias or point of view)	<ul style="list-style-type: none"> <li>Decide which text structure is appropriate to audience and purpose (e.g., compare-contrast, proposition-support)</li> <li>Determine appropriate, relevant key words for conducting an Internet search or researching a topic</li> </ul>	<ul style="list-style-type: none"> <li>Compare-contrast perspectives, events, characters, etc.</li> <li>Analyze-revise format, organization, and internal text structure (signal words, transitions, semantic cues) of different print and non print texts</li> <li>Distinguish: relevant-irrelevant information; fact-opinion (e.g., What are the characteristics of a hero's journey?)</li> <li>Locate evidence that supports a perspective-differing perspectives</li> </ul>	<ul style="list-style-type: none"> <li>Analyze interrelationships among concepts, issues, and problems in a text</li> <li>Analyze impact or use of author's craft (literary devices, viewpoint, dialogue) in a single text</li> <li>Use reasoning and evidence to generate criteria for making and supporting an argument of judgment (Was FDR a great president? Who was the greatest ball player?)</li> <li>Support conclusions with evidence</li> </ul>	<ul style="list-style-type: none"> <li>Analyze multiple sources of evidence, or multiple works by the same author, or across genres, or time periods</li> <li>Analyze complex or abstract themes, perspectives, concepts</li> <li>Gather, analyze, and organize multiple information sources</li> <li>Compare and contrast conflicting judgments or policies (e.g., Supreme Court decisions)</li> </ul>
<b>Evaluate</b> Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique	"UG"—unsubstantiated generalizations = stating an opinion without providing any support for it!		<ul style="list-style-type: none"> <li>Evaluate validity and relevance of evidence used to develop an argument or support a perspective</li> <li>Describe, compare, and contrast solution methods</li> <li>Verify or critique the accuracy, logic, and reasonableness of stated conclusions or assumptions</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate relevancy, accuracy, and completeness of information across multiple sources</li> <li>Apply understanding in a novel way, provide argument or justification for the application</li> <li>Critique the historical impact (policy, writings, discoveries, etc.)</li> </ul>
<b>Create</b> Reorganize elements into new patterns or structures, generate, hypothesize, design, plan, produce	<ul style="list-style-type: none"> <li>Brainstorm facts, ideas, concepts, problems, or perspectives related to a topic, text, idea, issue, or concept</li> </ul>	<ul style="list-style-type: none"> <li>Generate conjectures, hypotheses, or predictions based on facts, observations, evidence/observations, or prior knowledge and experience</li> <li>Generate believable "grounds" (reasons) for an opinion-argument</li> </ul>	<ul style="list-style-type: none"> <li>Develop a complex model for a given situation or problem</li> <li>Develop an alternative solution or perspective to one proposed (e.g., debate)</li> </ul>	<ul style="list-style-type: none"> <li>Synthesize information across multiple sources or texts in order to articulate a new voice, alternate theme, new knowledge or nuanced perspective</li> </ul>

© Karin K. Hess (2009, updated 2013). *Linking research with practice: A local assessment toolkit to guide school leaders*. | Permission to reproduce is given when authorship is fully cited [www.karin-hess.com](http://www.karin-hess.com)

*Note.* Hess's Cognitive Rigor Matrix for Reading and Listening. From Cognitive Rigor & DOK Focus Area by K.K. Hess, 2009, Karin-Hess.com ([https://www.karin-hess.com/files/ugd/5e86bd\\_1c0a13cbb2bc4f1185a558dbfeb27ffd.pdf](https://www.karin-hess.com/files/ugd/5e86bd_1c0a13cbb2bc4f1185a558dbfeb27ffd.pdf)). Copyright 2009 by Karin Hess. Reprinted with permission.

Bloom's taxonomy is a useful instrument for evaluating global thinking because it encompasses a variety of cognitive processes that are required for engaging with global issues. Global thinking requires higher-order cognitive abilities, including analysis, evaluation, synthesis, and creation. These skills go beyond basic recall and comprehension and require



students to apply knowledge, think critically, and consider diverse perspectives within a global context.

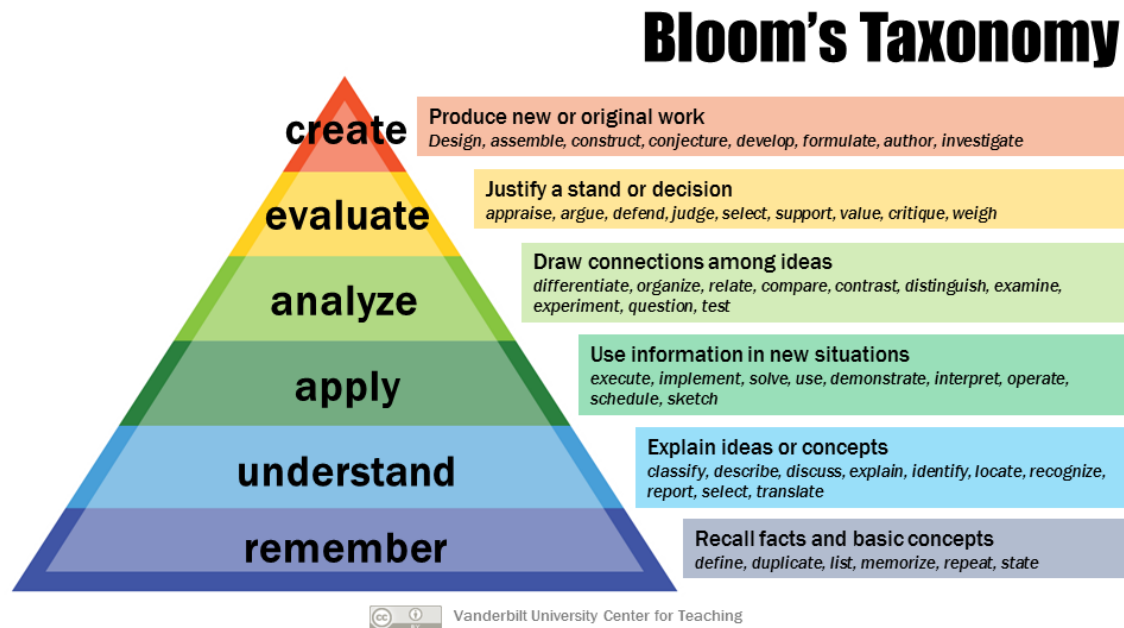
By using Bloom's taxonomy, educators can design learning activities and assessments that target specific levels of cognitive complexity aligned with global thinking. Assessing global thinking using Bloom's taxonomy allows educators to evaluate students' ability to analyze global problems, evaluate the implications of different perspectives, synthesize information from multiple sources, and generate creative solutions to global challenges.

Bloom's taxonomy categorizes educational objectives according to their cognitive complexity (Bloom et al., 1956). The Bloom taxonomy was developed by Benjamin Bloom and a group of educators in the 1950s to assist educators in the design of instruction and assessment of learning results. It consists of six levels, each representing a progressively higher level of cognitive engagement:



**Figure 4**

*Bloom's Taxonomy*

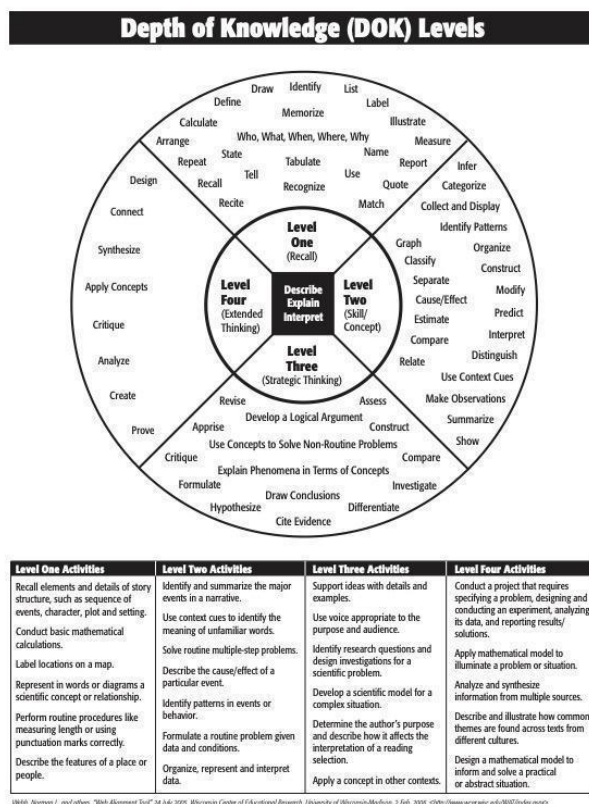


*Note.* Bloom's levels of learning. From Bloom's Taxonomy, by P. Armstrong, 2010, Vanderbilt University Center for Teaching (<https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>). CC BY-NC 4.0 DEED.

Webb's depth of knowledge (DOK) is a framework for assessing and planning instruction that categorizes cognitive complexity, as shown in Figures 4 and 5. The DOK system was developed by Norman L. Webb and ranks tasks based on their cognitive demand and depth of understanding (Webb, 2002).

**Figure 5**

*Webb's Depth of Knowledge Levels*



*Note.* Levels of learning based on Webb's Depth of knowledge. From The Idea Book: Webb's Depth of Knowledge, by the University of Saskatchewan,

n.d. (<https://openpress.usask.ca/ideabook/chapter/webbs-depth-of-knowledge/> CC BY-NC 4.0

DEED.

Silver (2013) argued that educators need to integrate rigorous learning experiences that promote critical thinking, problem-solving, and a deep understanding of global issues so that students can cope with the challenges of the globalized world. In his article, he drew a connection between cognitive rigor and global thinking, emphasizing the importance of rigorous

learning experiences that develop critical thinking skills and a deep understanding of global issues. Teachers can prepare students for active participation in a globalized society by integrating global perspectives and designing assessments that reflect cognitive rigor.

By applying Hess' Cognitive Rigor Matrix to the New Jersey student learning standards, one can determine the alignment of cognitive rigor, which has been linked to global thinking. Also, it is possible to identify potential gaps in the cognitive demands required by the standards.

### **Integrating the Three**

In order to appropriately assess global thinking and the goals of the New Jersey Department of Education's social studies goals, the teachings of Paulo Freire, John Dewey and Benjamin Bloom were used as source materials. Paulo Freire's work focuses on empowering students to question and transform the society they live in through critical thinking. John Dewey believed in learning by doing. For Dewey, education is seen as a hands-on experience that prepares students for active participation in democracy. Benjamin Bloom's taxonomy organizes learning objectives from simple recall of facts to complex analysis and creative thinking. He organizes these ideas through various levels.

When these approaches are blended together, students are not just taught to memorize dates, formulas, or definitions but they are encouraged to understand why these ideas, thoughts, concepts and skills matter in the bigger picture. For example, when students learn about history, they are not just memorizing events; they are analyzing cause and effect, considering different perspectives, and understanding the impact on today's world.

Teaching and learning in this style allows students to make connections to the real world. As students explore big ideas and abstract concepts, they are encouraged to think deeply about how these apply to their lives. Employing John Dewey and Paulo Freire's approach, teaching

through the advanced tiers of Webb's Depth of Knowledge framework enhances the significance of educational content and boosts engagement, moving away from mere memorization of facts. This allows students to see the links between what they learn in the classroom and what they experience in life.

Consider how climate change, social inequality, and the pace of technological change can be understood by students if presented as abstract, complex concepts. It can become overwhelming, and students may see these problems as unsolvable and too complicated to consider. By using an approach that allows students to not just learn about these issues in isolation but to see how they connect to their lives, and if they are allowed to create solutions in an authentic manner, they can understand how interconnected these challenges are to their lives. When using Freire, Dewey, and Bloom as educational inspiration, students are aided in becoming more aware of the complexities of the world, and they are also given the opportunity to see themselves as problem-solvers. In this manner, students are empowered to contribute to the global dialogue by asking questions, getting involved, and adding their voices.

In this manner, students are prepared to do more than simply process and be part of academic subjects. Additionally, they are prepared to navigate and contribute to a world they are a part of. Giving students agency by teaching critical thinking and global thinking teaches them to lead, how to innovate, and how to make a difference so that they are ready to take on the challenges of a global community. The goal of this holistic approach is to prepare students for life in a fast-paced, ever-changing world, not just for state assessments but to know that preparing them in this manner may allow them to succeed on assessments that test application, logic, and reasoning skills.

When Freire's, Dewey's, and Bloom's ideas are integrated harmoniously in classroom practice, they have the potential to generate a multifaceted learning experience for students, characterized by richness, depth, and diversity. The goal here is not just to fill students' heads with facts. In order for them to make an impact on global conversations, educators need to spark curiosity and challenge them to see things in new ways. Students need to be engaged with material, ideas, and concepts in order for them to ask questions about the world in which they live. This type of thinking and learning prepares students to be stewards of the planet and advocates for humanity. It should be noted that this type of learning requires educators to be properly prepared and supported to deliver education at such a high level, and students need to master these skills, not simply be exposed to them.

By blending the insights and theories of these educational philosophers, a learning journey is being crafted that is designed to prepare students for the realities of a world which is more connected than ever. It is about moving beyond seeing students as recipients of information and viewing them as capable beings able to make sense of information so that a sense of global awareness and responsibility is fostered in them. This kind of education prepares them to navigate the complexities and seize the opportunities of a shared global community.

### **Methodology**

A content analysis approach was used in this study's research design, which focused on how New Jersey social studies standards for Grades K–8 assessed global thinking. Finding patterns, themes, and relationships in textual data through content analysis, is a systematic and objective process. The cognitive rigor matrix, created by Hess in 2009, was used in the study as the framework for evaluating higher-order thinking in the identified standards.

The study focused on higher-order thinking because findings suggested that if teachers purposely and persistently practiced higher-order thinking strategies— dealing in class with real-world problems, encouraging open-ended class discussions, and fostering inquiry-oriented experiments—there was a statistically significant improvement in critical thinking skills (Miri et al., 2007).

- **Data Collection Methods:** The standards for social studies in New Jersey for Grades K–8 were examined in order to gather the data for this study. The official website of the New Jersey Department of Education was used to access the standards document. The standards served as the main information source for the content analysis.
- **Data analysis procedures:** The data analysis procedures required several steps to apply the cognitive rigor matrix and evaluate global thinking in the NJ social studies standards. The following steps were taken:
  - **Familiarization:** In order to understand the document's content and structure, the researcher carefully examined the NJ social studies standards. The standards were read multiple times, and potential questions were noted on the margins.
  - **Identification of relevant standards:** The researcher highlighted particular verbiage in the standards that related to cognitive complexity and Webb's depth of knowledge.
  - **Application of the cognitive rigor matrix:** The researcher applied the cognitive rigor matrix, developed by Hess in 2009, to analyze the identified standards. The matrix consists of four categories (know, apply, analyze, and evaluate) and two dimensions (content complexity and cognitive demand). Each standard was evaluated and assigned a rating based on its alignment with the categories and dimensions of the matrix. The ratings were determined through a systematic coding process.

- Coding process: The coding process drew upon established content analysis methods, as outlined by Krippendorff (2018), Neuendorf (2017), Elo and Kyngäs (2008), and Hsieh and Shannon (2005). It involved systematically examining each standard and applying the cognitive rigor matrix to assign appropriate codes. Specific words or phrases within the standards that required higher-order thinking skills, critical analysis, or global perspective were circled as indicators of global thinking.
- Application of cognitive rigor matrix: The AI model applied Hess' Cognitive Rigor Matrix, categorizing each standard based on cognitive complexity and demand.
- Automated coding: ChatGPT systematically analyzed the standards, assigning codes based on indicators of global thinking.
- Data interpretation: After completing the coding process, the data were analyzed. The researchers looked for how the standards were categorized based on Webb's depth of knowledge verbiage. This verbiage and type of categorization was tied to global thinking. The findings were also interpreted in relation to the research objectives.
- Verification and reliability: To ensure accuracy, the AI-generated codes were reviewed manually and compared with Hess' Cognitive Rigor Matrix by the researcher using the framework method.

By integrating the coding procedures and principles outlined by Krippendorff (2018), Neuendorf (2017), Elo and Kyngäs (2008), and Hsieh and Shannon (2005), the study ensured a rigorous and systematic approach to the content analysis process. This included steps such as familiarization, identifying relevant standards, applying the cognitive rigor matrix, coding, data verification, and data interpretation.

Using artificial intelligence to categorize depth of knowledge (DOK) levels in social studies standards provided multiple benefits. Artificial intelligence is an emerging technology that is being used more and more across multiple disciplines and industries. One would suspect it will soon become mainstream in curriculum development. Here is an explanation supported by research-backed data:

**Efficiency and Accuracy in Data Processing:**

- Research insight: AI algorithms, particularly those used in advanced language models, can process and analyze large volumes of textual data efficiently and accurately (Mayika et al., 2022).
- Application in DOK categorization: Using AI to analyze social studies standards allows for quicker categorization into appropriate DOK levels. The expectation is also that it can ensure a consistent and objective analysis. This can be particularly valuable given the scope of this research, which looks to review and categorize 264 standards.

This study used Hess' Cognitive Rigor Matrix to evaluate how the New Jersey social studies standards for Grades K–8 prepare the students with the ability to be global thinkers. By reviewing these standards, the researcher assessed if these standards provided the proper guidance for educators to challenge students and engage them in thinking more critically. It assessed higher-order thinking and critical thinking in Grades K–2, 3–5, and 6–8. The research examined the extent and regularity with which Hess' Cognitive Rigor Matrix and Webb's depth of knowledge are applied in these grade levels. This study evaluated whether the standards offered sufficient opportunities for students to engage in comparative analysis, citation of evidence, creation, and other analytical activities.



Consistency in educational standards is crucial for ensuring equitable learning opportunities (Darling-Hammond, 2010). This assures all students have the same chances to learn and grow, no matter where they are. Using AI and ChatGPT to look at these standards helped to accomplish this in a more efficient manner. It takes away personal biases when looking at the various standards. It should be noted that while it may take away personal biases, AI is not without its own biases. While AI can help identify and reduce the impact of human biases, it can also make the problem worse by baking in and deploying biases at scale in sensitive application areas (Manyika et al., 2022).

Leaning on systematic analysis, Hess' Cognitive Rigor Matrix was used to assess the standards that allowed for the identification of specific indicators of higher-order thinking present within the New Jersey social studies standards for Grades K–8.

AI provides a standardized approach to categorizing DOK levels, reducing subjective biases, and ensuring uniformity across different standards and curricula. Furthermore, this method supports a data-driven, research-aligned approach to curriculum development, ensuring that educational standards are rigorous, comprehensive, and aligned with the global thinking goals that the New Jersey Department of Education set forth in its mission and vision. To minimize AI bias, the researcher used factual prompts that integrate Webb's depth of knowledge to categorize the standards.

### **Review of Social Studies Standards**

New Jersey student learning standards for social studies (New Jersey Department of Education, 2020) emphasized the progressive nature of the standards and their inherent requirement for global thinking in their mission and vision statements. The mission statement highlights the goal of social studies education to develop informed and contributing members of

local, state, national, and global communities (New Jersey Department of Education, 2020). This distinction prioritizes an understanding beyond the local community and one that seeks to give students agency in their understanding of their role in an interconnected world.

Global thinking is further supported by the vision statement within the NJ student learning standards. It outlines several key attributes that students should possess:

- civic-minded, globally aware, and socially responsible;
- Exemplify fundamental values of democracy and human rights through active participation in local, state, national, and global communities;
- Make informed decisions about local, state, national, and global events based on inquiry and analysis;
- Consider multiple perspectives, value diversity, and promote cultural understanding;
- Recognize the relationships between people, places, and resources as well as the implications of an interconnected global economy;
- Apply an understanding of critical media literacy skills when utilizing technology to learn, communicate, and collaborate with diverse people around the world and
- Discern fact from falsehood and critically analyze information for validity and relevance (New Jersey Department of Education, 2020).

The mission and vision of the NJ student learning standards for social studies clearly indicate that they are progressive and explicitly require global thinking. By accessing and mastering the standards, students may gain a better understanding of global issues and a greater engagement with local and global affairs communities, think critically about diverse perspectives, and apply their knowledge in an interconnected world.

The mission and vision of both the NJ student learning standards for social studies and the National Council for the Social Studies (NCSS), demonstrate a shared emphasis on global thinking and civic engagement. The NCSS (National Council for Social Studies, n.d.) emphasizes the promotion of civic competence and the importance of educating students who are committed to democratic values. They speak to the goal of having students possess knowledge about their community, nation, and world, as well as the ability to apply inquiry processes, analyze data, collaborate, make decisions, and solve problems. The NCSS also acknowledges the significance of global connections and the need for students to understand diverse global societies.

Both the NJ student standards for social studies and the NCSS standards aim to promote civic engagement, global awareness, and an understanding of the interconnectedness of our world. Developing informed and active citizens is emphasized in both sets of standards. They both address the importance of citizens being able to analyze information critically, consider multiple perspectives, and contribute to their communities, both locally and globally.

### **John Dewey**

In today's fast-moving world, technology is changing daily life quicker than ever. Technological advancements affect science, how businesses work, and how individuals interact with the world on a daily basis and throughout their day. The world is getting smaller because individuals can talk to each other in real time, share news, and get information any time of the day with very minimal effort. However, unlike in the recent past, humans are no longer simply receiving information now; everyone has the ability to create their own content, not just look at what others have made. Technology companies have not just made technology easily accessible,

but they are also monetizing individuals' interactions with it. To succeed in this connected world, individuals must become tech-savvy and adaptable.

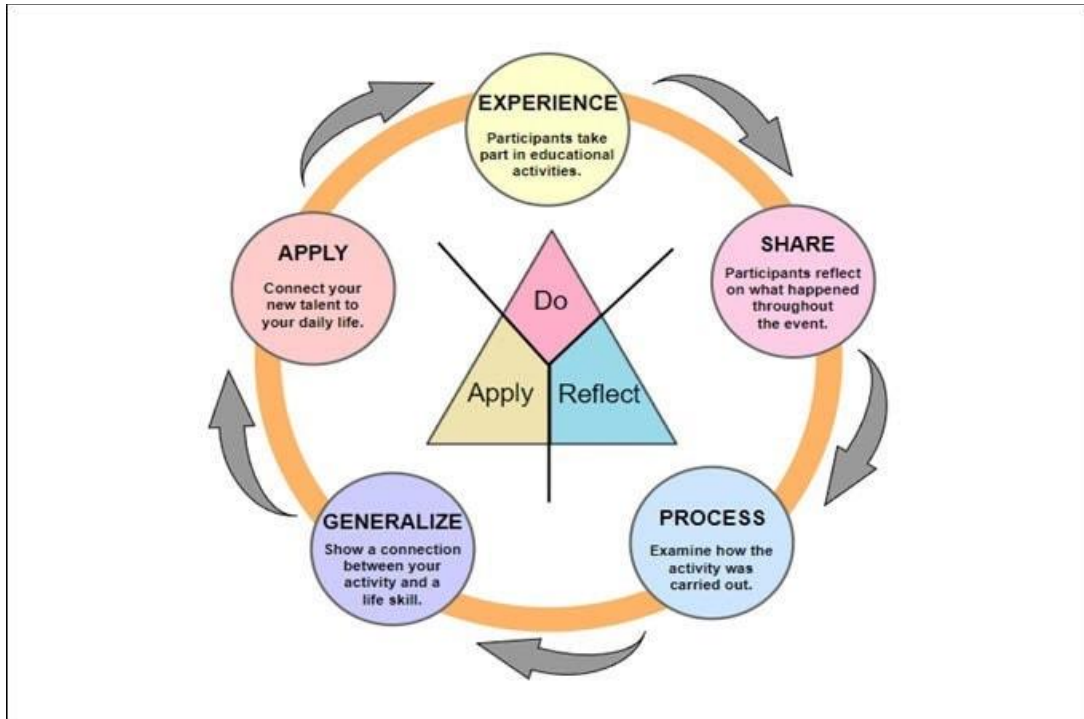
In the information age, knowledge and skill are power, but creativity and adaptability reign supreme. The advancements and changes will inevitably lead to a greater need for sophisticated knowledge and skills in the workplace. This means that there will be a demand for students to learn how to process information in order to develop more advanced skills at a younger age. Thus, American students are reaching a critical point in their education where they can only absorb a certain amount of advanced content before their cognitive limits are reached.

To address this, it is necessary to modify the approach. Instead of trying to expand the capacity of knowledge, like enlarging a cup, which ultimately has its limits, the focus should be on changing the content within the cup. Altering the content can increase the density of knowledge without overwhelming students. John Dewey was an influential American philosopher, psychologist, and educational reformer who greatly contributed to the field of education. His work emphasized the importance of education as a means of fostering democratic values and active participation in society. Dewey believed that education should be student-centered and focused on the needs and interests of learners rather than being solely content-driven.

He believed education should be experiential and hands-on, allowing students to engage in practical and meaningful activities that promote critical thinking, problem-solving, and inquiry-based learning (Dewey, 2015). As a progressivist, Dewey emphasized the integration of academic subjects with real-life experiences, as well as the development of social skills and moral character, as seen in Figure 6.

**Figure 6**

*John Dewey's Theory of Structure*



Note. John Dewey's theory of learning. From John Dewey's Theory, by P. Main, 2023, Structural Learning.). (<https://www.structural-learning.com/post/john-deweys-theory>). Structural-Learning Blog. Copyright 2023 by Paul Main. Reprinted with permission.

According to Ornstein, in progressivist thought, these skills include problem-solving and scientific methods. Schools should nurture cooperation and self-discipline and transmit the society's culture. Because reality is constantly changing, Dewey saw little need to focus on a fixed body of knowledge. Progressivism emphasizes how to think, not what to think (Ornstein & Hunkins, 2018). Progressivism, as argued by Sahu (2002), asserts that teaching should evolve alongside societal changes, emphasizing adaptability to new advancements rather than adhering

rigidly to past methodologies. Here, learning is based on children's innate curiosity in trying to make sense of the world by accessing a cognitively rigorous curriculum.

Considering the limitations on the quantity of content that can be covered within a school year, it is essential to prioritize learner-centered approaches to education more than ever before. Today's kindergarteners, for example, will not solely need to memorize facts and details or recall the chronological order of U.S. Presidents. Instead, they will need to possess the skills to adapt effectively to rapidly changing circumstances and to generate innovative solutions for problems that are currently unknown to the world.

This shift highlights the importance of cultivating higher-order thinking skills and global thinking abilities. By fostering critical thinking, problem-solving, and creativity, students may be better equipped to navigate an ever-evolving world. Education should give students agency over what they are learning. It should provide them with opportunities to think critically, analyze complex situations, consider multiple perspectives, and apply their knowledge to real-world challenges. By placing the learner at the center, schools can provide opportunities for students to perform more effectively in a future world with more dynamic demands.

Researchers believe that students learn best by diving into content that is tailored to them, and students are expected to learn in a group and from each other in a constructivist manner. Learning happens best when it is done by solving real-world problems and using new ways to find information. This real-world application is where students are able to apply what they learn in a more authentic manner. This student-centered approach focusing on real issues that need creative solutions equips students with the necessary skills to think critically and logically. Learning should take place for the purpose of understanding and making sense of the world in a dynamic and interactive manner, which happens at the higher levels in Webb's depth of

knowledge framework. Education should not be seen as a tool to simply get a job but as an opportunity to develop the necessary skills to contribute to the world in a purposeful and positive manner. This means education needs to be more about active participation and collaboration rather than just memorizing facts. Learning that involves recalling and remembering occurs at the lower levels of Webb's depth of knowledge framework, where critical thinking is less developed.

The researcher sees education as the most powerful tool in shaping a future where learning and society change and grow together for the betterment of the planet and all its inhabitants. By embracing this change, education becomes a force for making a difference. When education is interactive and constructive, it helps students find their own understanding of what learning means. This approach not only transforms students but also prepares them to tackle the complex challenges of sustainability.

### **Paulo Freire**

According to Freire, critical consciousness and transformative education are tools that can be used for liberation and social change (Freire, 1970). A traditional education system treats students passively by transferring knowledge to them. Instead, Freire advocated for an approach to education that encourages critical thinking, dialogue, and active engagement with the world, which requires a cognitively rigorous curriculum.

Critical thinking is an essential component of Freire's educational philosophy. It involves the ability to analyze, evaluate, and question information and ideas in a systematic and reflective manner. Rather than accepting information passively, critical thinkers engage in deep reflection, consider multiple perspectives, and assess the credibility and relevance of the information

presented to them, which places it at Bloom's highest level, "evaluate" "create" and Webb's DOK Level 3 and Level 4.

Freire argued that education should not simply transmit established knowledge and societal norms but ought to enable students to critically examine and challenge them (Mahmoudi et al., 2014). Students gain agency over their learning when they make sense of the information they are introduced to. By gaining agency through critical thinking, students can also have a deeper understanding of the world. They can identify social injustices, take action to bring about positive change and work toward making the world a better place.

Through critical thinking, education becomes a dynamic process that engages students in questioning the status quo. It provides them the skillset to identify and challenge oppressive structures while also engaging in dialogue and collaboration with others. As students engage actively with the world, they develop critical consciousness. They become aware of social and political issues. They recognize power dynamics and imagine possibilities for social change. Living in a global society and recognizing systems of oppression requires a global perspective. This global perspective leads to an understanding of interconnectedness, interdependence, and the complex issues that go beyond national borders. It involves recognizing global challenges, valuing diversity, and considering multiple perspectives (Mundy, 2002). People who engage in global thinking consider issues such as social justice, human rights, and environmental sustainability beyond their immediate context.

*Pedagogy of the Oppressed* by Paulo Freire and global thinking are closely linked because both emphasize critical consciousness, dialogue, and social transformation, all of which need to be supported by standards that promote global understanding. Freire's approach challenges oppressive systems and encourages individuals to critically analyze their social



reality, question dominant narratives, and work toward social justice (Freire, 1970). By doing so, it encourages an understanding of international social, cultural, and political issues.

Global citizens can be nurtured by cultivating critical consciousness and a deeper understanding of power dynamics through the *Pedagogy of the Oppressed*. It aligns with the principles of global thinking by encouraging individuals to critically examine and challenge existing structures and to promote social equality and solidarity on a global scale (Mundy, 2002).

*Pedagogy of the Oppressed* and global thinking are interconnected and mutually reinforcing concepts that promote critical awareness, social justice, and active engagement with the world.

### **Overview of Social Studies Standards**

In 2020, the New Jersey Department of Education released the new student learning standards for social studies (NJSLS-SS). NJSLS-SS were progressive and forward-thinking; they were created with three overarching standards: U.S. History: America in the World, World history/global studies, and active citizenship in the 21st century. These new standards have a greater focus on depth over breadth, with a strong emphasis on developing learners who are civic-minded, globally aware, and socially responsible (New Jersey Department of Education, 2020). The mission and vision sections provide a vivid description of what NJ social studies aspires to foster and provide for student learners. The NJ DOE encouraged teachers that the content did not need to be linear. The central goal was to create interdisciplinary units that were evidence-based action and solution-oriented (Hanna, 2021). Many of the performance expectations deliberately called for collaboration, deliberation, reflection, and questioning key attributes within social-emotional learning. These also emphasize higher-order thinking skills and support students in building those critical SEL skills (Hanna, 2021).

## **The Case for Integrating Global Thinking in Social Studies Standards**

PISA, which stands for the Programme for International Student Assessment is a worldwide study by the Organisation for Economic Co-operation and Development (OECD) in member and non-member nations intended to evaluate educational systems by measuring students' performance in mathematics, science, and reading literacy every three years. Their framework for global student learning outcomes offers a comprehensive process for integrating global perspectives and skills in education. PISA offers a framework for “global competence assessment which measures students’ capacity to examine local, global and intercultural issues, to engage in open, appropriate and effective interactions with people from different cultures, and to act for collective well-being and sustainable development.” (OECD, 2020). According to the framework, students need to understand key ideas like cultural diversity, global systems and issues, and global citizenship to become globally competent (OECD, 2020). These ideas give students a foundation on which to explore and comprehend the complexity of the world. In addition to offering a set of fundamental questions, the framework also provides a set of directives for researching and examining global issues (OECD, 2020). The framework encourages students to examine world issues, consider multiple viewpoints, and broaden their knowledge of the world. Additionally, PISA offer a codebook developed in partnership with Global Cities, Inc. Global Cities, Inc. is part of a program with Bloomberg Philanthropies. They offer a codebook which is a “tool for evaluators and teachers interested in determining how well students are demonstrating global learning in any program or classroom” (OECD, 2020). They highlight the importance of incorporating a variety of viewpoints and resources. They speak to the value of fostering collaborative and inquiry-based learning opportunities (OECD 2020).

Reviewing the framework was critical as it included a crucial component that evaluated global competence (OECD, 2020). It suggested several methods, such as performance-based evaluations, projects, and reflections, to gauge students' knowledge, abilities, and attitudes in relation to global education. These skills align directly with Hess' Cognitive Rigor Matrix, specifically on the higher order side of the matrix. When students are encouraged to examine world issues and consider multiple viewpoints, as suggested by the framework, they are engaging in higher-order thinking skills. These skills are the same as detailed in Hess' Cognitive Rigor Matrix and Webb's DOK. The framework's emphasis on stimulating, culturally sensitive learning environments, incorporation of diverse viewpoints, and fostering collaborative and inquiry-based learning directly aligns with the higher levels of cognitive rigor and depth of knowledge that these educational frameworks advocate.

To ensure the integration of global education, the framework also acknowledges the need for supportive systems and policies (OECD, 2018), which the researcher used to provide further recommendations. To advance global education, policymakers, and academic leaders are urged to create opportunities for professional growth, provide adequate funding, and form alliances. In general, the framework for global education provides policymakers and educators with a roadmap for incorporating global perspectives, abilities and understanding into the curriculum. By incorporating global perspectives into the social studies curriculum, students can better understand and address global issues. Additional scholarly sources further support the imperative for a global education. These findings align with the framework proposed by the OECD (2018), emphasizing the need for comprehensive systems and policies to support the integration of global perspectives into education.

- Examining global interconnections: This framework suggests there should be a focus on helping students understand how the world is interconnected (OECD, 2013). Educators should guide students in exploring the connections and influences between societies, cultures, economies, and environments (OECD, 2013).
- Analyzing global systems and challenges: Students should be encouraged to analyze global issues, such as economic interdependence, environmental sustainability, political, and social justice (Cornell University, n.d.). Through discussion and investigation, teachers can help students evaluate these complex issues critically.
- Investigating cultural diversity: The New York State Education Department puts a focus on cultural responsiveness and states that, “having high expectations and delivering rigorous instruction for all students regardless of identity markers, including race, gender, sexual orientation, language, ability, and economic background,” creates a welcoming and affirming environment. By exposing students to a variety of cultures, traditions, beliefs, and practices, teachers can inspire their students to respect and value different points of view and ways of living (NYSED, n.d.).
- Developing global citizenship: Is stressed as part of the Universal Declaration of Human Rights, first drafted in 1948 after World War II. This includes understanding one's rights and responsibilities in the global community (Israel, 2015). According to the framework, developing global citizenship entails being aware of one's obligations to the world community (Israel, 2015).

In line with these perspectives, it is evident that the inclusion of global education in the curriculum is not merely a pedagogical option but a necessity for preparing students to thrive in an interconnected world. For this reason, policymakers and academic leaders must prioritize

initiatives that promote global competence, including professional development opportunities, adequate resource allocation, and collaborative partnerships. Through intentional integration of global thinking within the social studies curriculum, educators can empower students to critically engage with complex global issues and contribute meaningfully to a more interconnected and interdependent world.

### **Role of AI in Education**

The development of artificial intelligence has had a significant impact on modern society. Modern society is changing as a result of it. It is making a significant impact in businesses and individuals' daily lives. AI can make work way more efficient and help with new ideas. AI allows work to get done better and quicker. Writing an email or letter for mass distribution in the past could have taken hours. Now with the proper prompt it can be done in minutes.

Analyzing articles could take days or weeks; now, it can be done in minutes. It is estimated that 80% of the world's data is unstructured, and a significant proportion of them are text-heavy. In order to find insights among unstructured text, text analytics techniques are employed to transform the text into data that can be used for further analysis (Papadopoulos & Charalabidis, 2020). The researcher chose to integrate AI in order to extract information from the dataset more quickly and efficiently.

Extraction refers to the process of identifying and isolating important pieces of data from a larger dataset. In this case, AI extracted specific verbiage from the New Jersey social studies standards for Grades K–8 that is aligned with Hess' Cognitive Rigor Matrix and Webb's depth of knowledge framework in order to identify cognitive complexity within the standards. This allowed AI to evaluate student learning outcomes. These results were then validated by the researcher who applied the framework method to review the findings.

### **Chapter 3: Methodology**

In 2020, the New Jersey Department of Education updated the New Jersey student learning standards for social studies with the mission that: Social studies education provides learners with the knowledge, skills, attitudes, and perspectives needed to become active, informed, and contributing members of local, state, national, and global communities.” These goals align with the United Nations' global sustainability goals, which state, “Ensure inclusive and quality education for all and promote lifelong learning, which includes global citizenship as one of its targets, (United Nations, n.d.). As a result, students can gain a deeper understanding of the world by learning about world events through global citizenship. While the goals created by the New Jersey Department of Education are progressive and forward-thinking, do they set forth the framework for students to develop the competencies to become global citizens?

#### **Research Questions**

The study was guided by the overarching research question, which sought to investigate whether the 2020 New Jersey student learning standards for social studies in Grades K–8 aligned with the cognitive rigor matrix proposed by Hess. The research question sought to know if the standards effectively provided students with the necessary framework for developing the competencies required for global citizenship, specifically by examining the presence, complexity, and frequency of higher-order thinking opportunities. In this study, the researcher looked at how the language used in these standards matched Hess' definition of higher-order thinking. The researcher assessed how cognitively complex the standards were and how many chances they gave for higher-order thinking using Hess' Cognitive Rigor Matrix. The following additional questions served as a guide for this research:

- Research Question 1: In what way(s) does the language found on the 2020 New Jersey student learning standards for social studies in Grades K–8 compare to Hess' Cognitive Rigor Matrix definition of higher-order thinking?
- Research Question 2: How cognitively complex are the 2020 New Jersey student learning standards for social studies in Grades K–8 as defined by Hess' Cognitive Rigor Matrix?
- Research Question 3: How frequently do the 2020 New Jersey student learning standards for social studies in Grades K–8 include higher-order thinking opportunities as identified in Hess' Cognitive Rigor Matrix?

### **Research Design and Methodology**

The study used a mixed-methods approach. The qualitative aspect involved conducting a qualitative content analysis of the language used in the New Jersey student learning standards for Grades K–8. The content analysis was meant to better understand the standards' language, higher-order thinking requirements, and alignment with the desired outcomes for global thinking. Qualitative content analysis is a research approach for the description and interpretation of textual data using the systematic process of coding (Assarroudi et al., 2018). Additionally, “qualitative research allows asking questions that cannot be easily put into numbers to understand human experience. Getting at the everyday realities of some social phenomenon and studying important questions as they are really practiced helps extend knowledge and understanding” (Cleland, 2017, p. 61).

Due to the nature of this study, the researcher chose to combine the framework method and the Mayring step model. In doing so, the researcher was able to leverage the structural benefits of the framework method, which is used for data organization and thematic analysis. The Mayring step model allows for detailed textual analysis. This approach is particularly useful

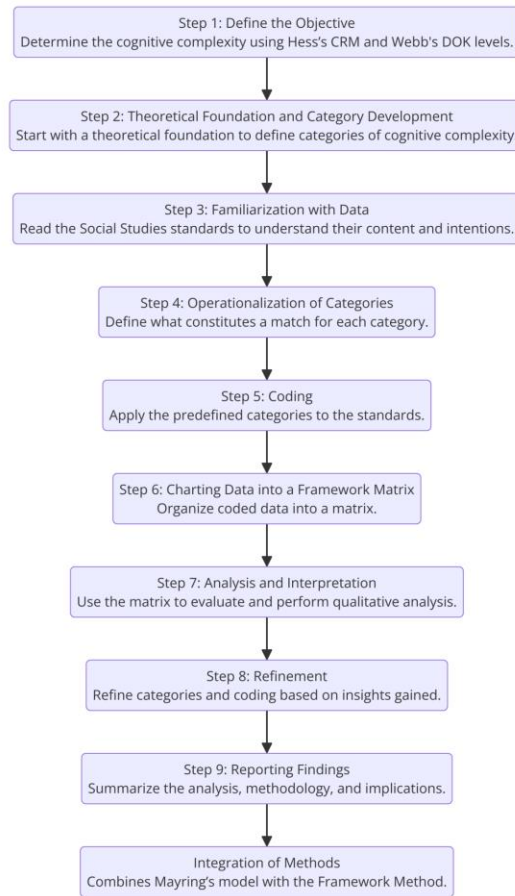
in mixed-methods research, where both broad thematic insights and detailed text interpretations are based on a predetermined coding scheme (Mayring, 2000). The framework method was used to help organize the standards and for the researcher to become more familiar with the dataset, the New Jersey social studies standards for Grades K–8. The standards were organized and shared with AI so that a detailed analysis could be applied by grade level. This allowed the researcher to more easily categorize the dataset, understand the data, and find patterns. The standards were inputted into AI, starting from Grades K–2 first, then 3–5 and finally 6–8.

The researcher coded the dataset twice with AI, on two separate days on two separate computers and then used the Mayring step model to refine the thematic analysis as well as enhance validity and reliability. The Mayring step model allowed the researcher to review the standards more deeply using Webb’s depth of knowledge framework. When there were disagreements between AI and the researcher, the researcher, as the educator, made the final decision on the categorization of the standards, as shown in Figure 7.



**Figure 7**

*Framework Method and Mayring Step Model Process*



*Note.* Synthesis of the Mayring Step Model and Framework Method. Adapted from “Using the framework method for the analysis of qualitative dyadic data in health research” by N. Collaço, R. Wagland, O. Alexis, A. Gavin, A. Glaser, & E. K. Watson, 2021, *Qualitative Health Research*, 31(8) (<https://doi.org/10.1177/10497323211011599>) and “Qualitative Content Analysis” by P. Mayring, 2000, *Forum Qualitative Sozialforschung*

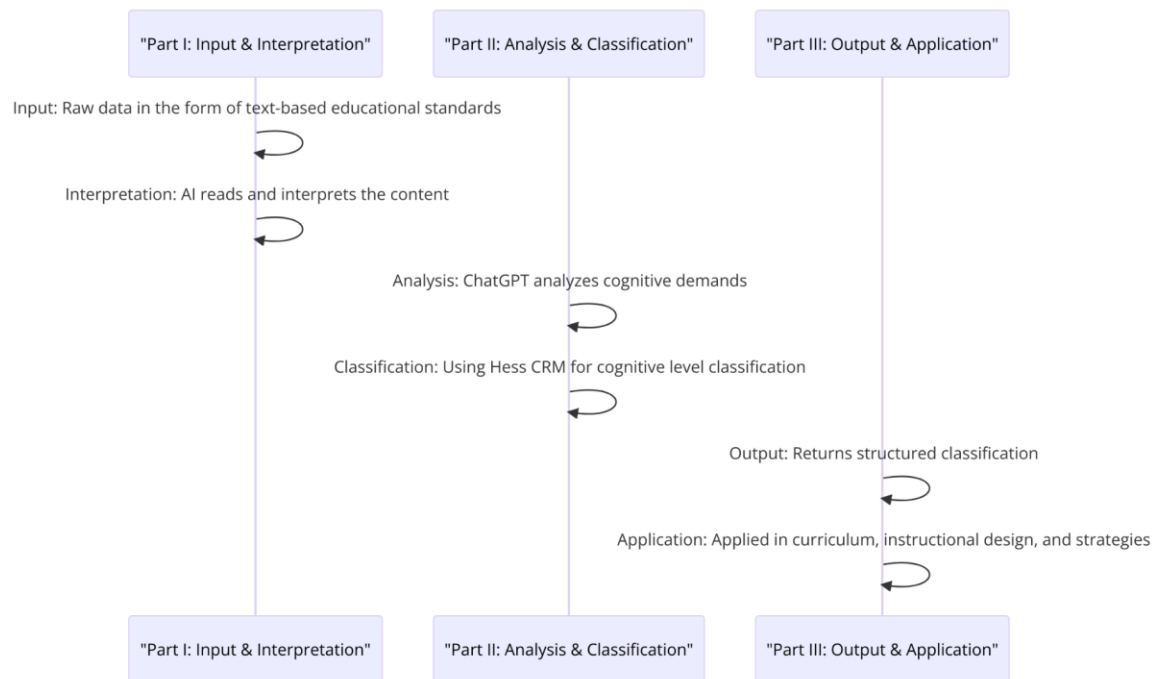
1(2) ([https://www.researchgate.net/publication/215666096\\_Qualitative\\_Content\\_Analysis](https://www.researchgate.net/publication/215666096_Qualitative_Content_Analysis)). Both articles licensed under CC BY 4.0.

The quantitative part of the research highlighted the use of artificial intelligence (AI) and natural language processing (NLP) as essential tools for data analysis. These advanced AI technologies were vital for evaluating the New Jersey student learning standards and aligning them with Hess' Cognitive Rigor Matrix framework, Webb's depth of knowledge, and Bloom's taxonomy.

This research utilized AI tools, particularly the Chat GPT model, to categorize and organize the language within the standards. Through prompting, the AI model was trained to identify specific keywords, phrases, or concepts related to different levels of cognitive complexity, as defined by Hess' Cognitive Rigor Matrix. As part of the methodology, the prompts were provided to replicate the study. These helped to better understand how AI connected the identified keywords, phrases, or concepts to established cognitive frameworks, such as Hess' Cognitive Rigor Matrix, Webb's depth of knowledge, and Bloom's taxonomy. This mapping process provided a structured way to assess the standards based on their alignment with these frameworks, as shown in Figure 8.

**Figure 8**

*Sequence Mapping for Coding Standards*



*Note.* Sequence Diagram of AI-Assisted Analysis and Classification of Educational Standards.

This diagram illustrates the three-part process of input and interpretation of raw educational standards, analysis and classification. Own Work.

Part 1 required the researcher to input the prompt and then upload the data and standards into AI, ChatGPT. The standards were copied and pasted right into AI, allowing it to read and begin interpreting them. Part 2 involved ChatGPT analyzing the cognitive demands and classifying the standards based on Webb's depth of knowledge levels. Finally, in Part 3 ChatGPT returned the standards in a table that included the standard as well as the Webb's depth of knowledge Level, 1–4.

The AI and NLP were used because of their efficiency and consistency in the analysis. AI was able to quickly and consistently process large amounts of text data and reduce the risk of human bias and error. It should still be noted that bias can creep into algorithms in several ways. AI systems learn to make decisions based on training data, which can include biased human decisions or reflect historical or social inequities, even if sensitive variables such as gender, race, or sexual orientation are removed (Manyika et al., 2022). Incorporating AI and NLP into the research design represented an innovative approach to educational assessment. By using this method, the New Jersey student learning standards could be analyzed with greater objectivity and reliability. To ensure the validity of the study, the researcher used the framework method in conjunction with the Mayring step model to review the findings.

In education, the strength of quantitative research is that the findings are derived from finding exact facts; that is, the same research methods are applied, and the results are generalized (Hara, 1995). In contrast to mono-method research, mixed-methods research often produces superior results due to its methodological pluralism and eclecticism (Johnson & Onwuegbuzie, 2004).

Using the mixed methods approach allowed the research to identify categories, themes, and patterns related to the distribution and frequency of high-order thinking in the 2020 New Jersey student learning standards for social studies in Grades K–8, based on Hess' Cognitive Rigor Matrix. The mixed-methods approach allowed for comparing, analyzing, and categorizing the language of higher-order thinking found within the standards.

Webb's depth of knowledge (DOK) and Hess' Cognitive Rigor Matrix are tools used together to help understand the cognitive demands and complexity of educational standards. Educational materials are designed using both frameworks to ensure they align with the intended

cognitive rigor level. Here is a detailed explanation of how these two frameworks can work together.

### **Webb's Depth of Knowledge (DOK)**

Webb's DOK framework, as shown in Figures 8 and 9, categorizes tasks and standards into four levels based on the cognitive complexity required to complete them:

DOK Level 1 (recall and reproduction): These tasks are considered to be the simplest.

They ask students to recall information or reproduce facts or procedures. It doesn't involve much thinking. Asking a student the title of a book or at what temperature water boils would fall into this level.

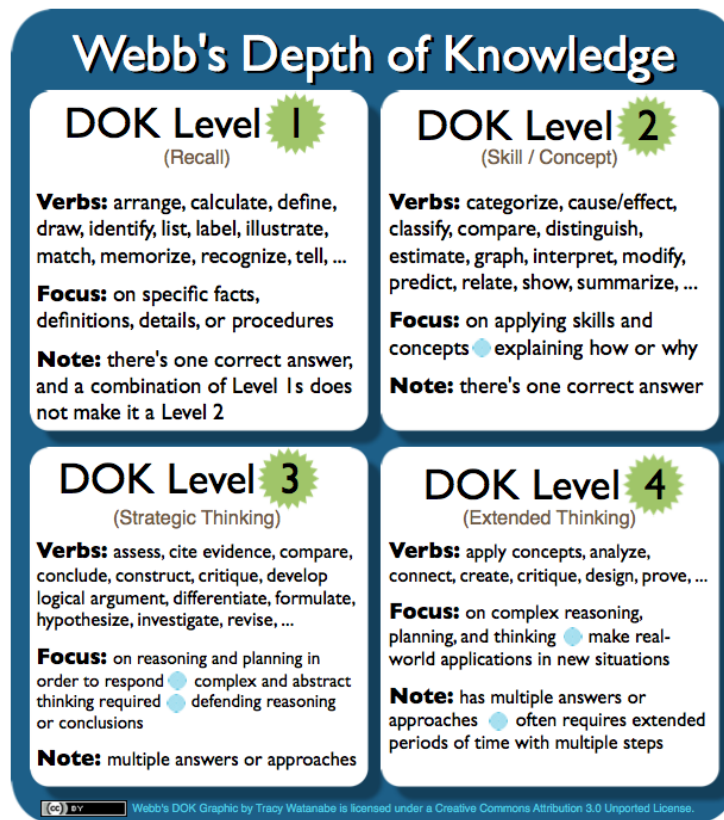
DOK Level 2 (basic application of concepts and skills): These require students to apply knowledge and skills to solve simple problems or perform routine tasks. Asking a student to contrast or classify would fall into this level.

DOK Level 3 (strategic thinking and complex reasoning): These tasks demand more complex thinking from students and require them to use reasoning skills. Here, students are expected to analyze, synthesize, and draw conclusions from information they are presented.

DOK Level 4 (extended thinking and complex reasoning): These tasks are considered to represent the highest cognitive demand. They require students to think critically, analyze multiple sources of information, make connections across subjects. These types of tasks allow student to think more authentically and develop their own idea.

### **Figure 9**

*Webb's Depth of Knowledge*



*Note.* Depth of knowledge learning levels. From *Striving for Higher-Order Thinking and Depth of Knowledge*, by T. Watanabe, 2013, [www.watanabe \(https://gccu.uconn.edu/2017/11/14/building-classroom-dialogue-using-webbs-depth-of-knowledge/\)](https://gccu.uconn.edu/2017/11/14/building-classroom-dialogue-using-webbs-depth-of-knowledge/) CC BY-NC 4.0 DEED.

**Figure 10**

*Webb's DOK Question Stems*

DOK Level	Question Stems
Level 1: Recall	Who, What, When, Where, Why?
	How would you define...?
	Can you recall...?
Level 2: Skill/Concept	Can you explain why...?
	How would you use...?
	What might you infer from...?
Level 3: Strategic Thinking	Can you formulate a theory for...?
	What is your interpretation of...?
	How would you solve...?
Level 4: Extended Thinking	How would you design a plan to...?
	What evidence can you present for...?
	How can you prove/disprove...?
These are just examples and the list can be expanded depending on the subject and the learning objectives.	

*Note.* Levels of learning based on Webb's Depth of knowledge. From Webb's Depth of Knowledge, by P. Main, 2023, Structural Learning. (<https://www.structural-learning.com/post/webbs-depth-of-knowledge>) Copyright 2023 by Paul Main. Reprinted with permission.

### **Hess' Cognitive Rigor Matrix**

Hess' Cognitive Rigor Matrix categorizes educational standards and tasks into four levels similar to Webb's DOK but uses slightly different terminology which focus more on the product of the task.

Level 1 (recall): At this level, the focus is on whether students are able to remember factual information. It involves tasks like remembering dates of events.

Level 2 (skill/concept): At this level the focus is on if students are able to apply knowledge and skills to solve problems or perform tasks. An example would be tasks requiring students to understand cause and effect.

Level 3 (strategic thinking): At this level, there is a demand for more complex cognitive skills. Students need to analyze information and think critically to solve problems.

Level 4 (extended thinking): This is the level with the highest cognitive demand. Students are having more complex thoughts.

### **Using Webb's DOK and Hess' Cognitive Rigor Matrix Together**

While the two frameworks complement each other and both frameworks have four levels. Webb's Depth of Knowledge has a greater focus on the cognitive processes involved in a task and emphasizes how students engage with and approach the task. Hess' Cognitive Rigor Matrix on the other hand tends to have a greater focus on the expected outcome of the task. It focuses on what students should be able to demonstrate as a result of their learning process.

It should be noted that there is a wide range of perspectives and discourses regarding what the term global citizenship means. Its definition can be seen as undefined and even abstract.

Nussbaum (2017) argued that global citizenship requires an ability to think as a citizen of the whole world, not just some local region or group. This view of global citizenship is closely aligned with that of (Haigh, 2014), whose aspiration and vision is that future graduates (who they remind us will be both our future leaders and neighbors) will be able to solve the problems of the future, to care for those who cannot care for themselves, to defend the social values that we believe in, to protect the environment for those who will follow and to help set the world on a sustainable course. This type of social consciousness and problem-solving ability requires intercultural intelligence, the ability to solve problems, comprehensive communication, and



compassion, which is achieved through cognitive engagement with complex rigor, which aligns more readily with Hess' Cognitive Rigor Matrix framework.

### **Reliability Assurance in Qualitative Data Analysis**

Reliability is a cornerstone of rigorous research, ensuring the consistency and dependability of data analysis procedures. The qualitative phase of this research looked at the content language of the 2020 New Jersey student learning standards for social studies in Grades K–8. The dataset were also run through AI twice. In both cases, the researchers run the three different sessions to input the standards by grade level. The researcher then integrated the framework Method and the Mayring step model to analyze the data.

### **Role of ChatGPT**

Artificial intelligence was used to perform the content analysis to ensure reliability in qualitative analysis. The research employed the use of ChatGPT. ChatGPT played an important role in coding the standards using Hess' Cognitive Rigor Matrix and Webb's depth of knowledge. Here's a breakdown of ChatGPT's role in the process:

### **Content Analysis and Categorization**

ChatGPT was employed to analyze the text of the New Jersey social studies standards for Grades K–8. Its primary task was to read, understand, and categorize each standard based on Hess' Cognitive Rigor Matrix and Bloom's taxonomy. The AI model was able to identify key phrases and concepts within the standards that corresponded to different levels of cognitive demand, from basic recall to higher-order thinking skills.

## **Efficiency and Scalability**

The volume of standards and the complexity of their content required an efficient tool for analysis. Using ChatGPT allowed for a quick and seamless process that reviewed all pages of the standards in a small amount of time. Using ChatGPT allowed the standards to be analyzed objectively, helping to avoid mistakes and unfairness. This helped to stay consistent, avoids biases, and unfair slants. The software stuck to a strict set of rules from the cognitive rigor matrix, so every standard gets judged by the same high bar.

## **Coding Reliability**

To further strengthen the reliability of the qualitative analysis the researcher assessed the results of ChatGPT. In these checks, the researcher independently coded the data and then compared the results with that of ChatGPT. Errors were analyzed and documented. Where cases existed and there was a significant departure from AI coding and researcher opinion, discrepancies were analyzed and reviewed, and compared to established literature.

## **Transparent Reporting of Methodology**

To assure transparency, the prompts inputted into AI were provided to allow replication of the study.

Additionally, the researcher clearly documented the version of the AI tool used, how the data were inputted, and any limitations or challenges encountered.

As a single researcher conducting coding for this research, ensuring inter-coder reliability was important to ensure the validity of the finding. For this reason, the following is a step-by-step guide on how the researcher reviewed the AI ChatGPT findings.

## ***Clear Coding Guidelines***

- ChatGPT was provided with the prompt to code the standards. The prompts and outputs were shared in Appendix B of this research.
- The standards were assessed by ChatGPT twice using the same prompts.
- The standards were assessed in separate sessions. First, it assessed starting from Grades K–2, then 3–5, and finally 6–8.
- The researcher provided the findings of all coding findings in this Appendix
- The researcher made the final determination on the classification.

### ***Codebook Creation***

- The researcher used Webb’s depth of knowledge graphic by Tracy Watanabe and depth of knowledge – *Descriptors, Examples, and Question Stems for Increasing Depth of Knowledge in the Classroom* Developed by Dr. Norman Webb and Flip Chart developed by Myra Collins to review AI, ChatGPT findings.
- Discrepancies were highlighted. The researcher also provided a reason for the discrepancies.

### ***Reflection and Revision***

- The researcher reflected on and reviewed coding decisions periodically.
- The researcher consulted the coding guidelines when unsure.

### ***Code Comparison and Documentation***

After the researcher completed the coding, a reliability check was conducted. Discrepancies were documented. Throughout the coding process, challenges and errors were documented and reviewed.

## **Validity**

Enhancing the validity of a study that utilizes AI, such as ChatGPT, for analyzing educational standards involved several key strategies. These strategies were designed to ensure that the research findings accurately reflected the reality they intended to represent. This study used multiple data sources, methods, or theories to cross-verify the results. This study combined AI analysis and a human conducting manual coding. Additionally, the researcher used multiple prompts to introduce AI to Hess' Cognitive Rigor Matrix Webb's depth of knowledge, and Bloom's taxonomy. AI tested the standards with the same prompts to provide consistency.

## **Participants and Sampling**

This study did not use any participants or population sampling.

## **Data Sources and Collection**

The data gathered were retrieved from a public website containing the New Jersey student learning standards (NJSLS) in social studies, which is reviewed and revised every 5 years. The 2020 NJSLS in social studies was adopted by the State Board of Education on June 3, 2020 (New Jersey Department of Education, 2020). The data can be collected at any time. As the NJSLS was developed in 2020, new standards will not be developed until 2025. The data were copied and pasted directly from the New Jersey Department of Education and pasted onto a Google Doc before being inputted into the AI program. The standards are posted on the New Jersey Department of Education website by grade level. It is provided in Grades K–2 (54 standards), 3–5, (100 standard), and 6–8 (109 standards). Figure 10 below summarizes the standards being analyzed by grade.

**Figure 11**

*Social Studies Standards by Grade Levels*



*Note.* Distribution of the NJ Student Learning Standards for Social Studies across various grades between K-8. Own work.

### **Data Analysis**

In order to analyze the New Jersey student learning standards in social studies, the researcher used Hess' Cognitive Rigor Matrix. Bloom's taxonomy correlates cognitive complexity with Webb's depth of knowledge, and Hess' Cognitive Rigor Matrix correlates task actions with Webb's depth of knowledge. The student's cognitive level and the type of task they are expected to perform can, therefore, be examined for each standard, allowing multiple perspectives to be explored.

Educational standards are the learning goals for what students should know and be able to do at each grade level (What are educational standards? What are educational standards? (Common Core State Standards Initiative, n.d.). Assessing the standards allowed the researcher the opportunity to identify the type of language within the standards, its cognitive complexity, and its frequency. It allowed for (a) deductive coding analysis, (b) assessment levels of rigor using Hess' Cognitive Rigor Matrix, and (c) assessment frequency using Hess' Cognitive Rigor Matrix.

Additionally, the Hess' Cognitive Rigor Matrix links the cognitive complexity of Webb's depth of knowledge and the actions of tasks categorized in Bloom's taxonomy. This allowed for each standard to be analyzed not only for the type of task that was being asked of the students but also for the level of cognition students are required to utilize, allowing each standard to be examined from multiple perspectives

### **Validity and Credibility**

Assuring the validity and credibility of the research is paramount. As Merriam (2009) pointed out, validity and reliability are closely related. Internal validity from a traditional perspective rests for some on the assumption that a study is more valid if repeated observations in the same study or replications of the entire study produce the same results. In this logic, truth is established by repetition, but people, measurements, and observations are all subject to error (Merriam, 2009). In terms of research design, Merriam (2009) suggested that reliability is a result of repeatedly studying a single reality and yielding the same results. Research reliability refers to the reproducibility of results. If repeated, will the results be replicated? Human behavior is never static, which makes reliability in the social sciences difficult. In order to ensure the validity of the research, a review of coding methods from other studies was included. The research also included two analysts in coding each of the standards and then comparing their data and findings, increasing inter-rater reliability. All standards were coded based on Hess' Cognitive Rigor Matrix coding protocol. All prompts used with ChatGPT were provided.

### **Limitations**

The study was designed to examine the New Jersey social studies standards in Grades K–8. The analysis did not cover the standards for high school. Higher-order thinking and cognitive

complexity are measured in multiple ways. A clear, definitive connection between cognitive complexity, higher-order thinking, and global thinking has not been established.

While there are strengths for using AI, in this case ChatGPT, to analyze the New Jersey student learning standards for social studies, it was also important to understand the limitations. These limitations could impact how the standards are interpreted. AI is proficient at repeatedly carrying out the same task, but if we want any adjustments or improvements, we must manually alter the codes. (Duggal, 2023) Additionally, AI systems can inherit biases present in their training data. These biases could influence how the standards are analyzed and categorized, potentially leading to skewed results (Mayika et al., 2022). The biggest concern was that while the researcher understood the prompts being used to initiate the coding, there was no transparency about the AI algorithm being used.

## Chapter 4: Data Analysis and Results

This study was guided by the overarching question: In what way(s) does the language found on the 2020 New Jersey student learning standards for social studies in Grades K–8 compare to Hess' Cognitive Rigor Matrix definition of higher-order thinking? In order to understand the findings of this mixed-methods study, which used artificial intelligence (AI) to assess the New Jersey student learning standards for social studies in Grades K–8, it was important to understand how AI was used and how the research was standardized. The research reviewed 263 standards. The standards were inputted into AI twice, on two different days, using two different computers. These results were then reviewed by the researcher using the framework method as well as the Mayring step method.

The researcher first used AI to assess the 263 standards, followed by the framework method and Mayring step model as coding tools for the analysis of qualitative data to review the AI findings. The framework method has been used since the 1980s (Gale et al., 2013b). The parts of the framework are as follows:

**Familiarization:** The aim of this stage of framework analysis is to get to know the data extensively (Parkinson et al., 2015).

**Identifying a framework:** The aim of this stage of framework analysis is to organize data in a meaningful and manageable way for subsequent retrieval, exploration and examination during the final mapping and interpretation stage (Parkinson et al., 2015).

**Indexing:** This involves systematically applying the framework to each interview transcript (Parkinson et al., 2015).



**Charting:** The aim of the charting stage is to organize the data into a more manageable format to facilitate data analysis in the next stage of framework analysis (Parkinson et al., 2015).

**Mapping and interpretation:** The aim of this stage of framework analysis is to move beyond data management towards understanding it (Parkinson et al., 2015).

The researcher first prompted AI, ChatGPT, with the command to begin the coding process. It required that the researcher prepare ChatGPT with the “mindset” of the work it would perform as well as how the work would be performed. The first prompt was,

*You are conducting doctoral research on the New Jersey social studies standards. I will give you about 10 standards at a time, copied from the New Jersey Department of Education website. You will use Hess' Cognitive Rigor Matrix to label the standards by level based on the verbiage or task demand. Specifically, you will use Hess' Cognitive Rigor Matrix (Reading CRM) and (writing-speaking CRM), applying Webb's depth of knowledge levels to Bloom's cognitive process dimensions. You will create a table with column one for the standards and column two for Webb's depth of knowledge classification. Do you understand?*

The complete interaction between the researcher and ChatGPT is shared in Appendix B. This prompt was able to define the framework by asking Hess' Cognitive Rigor Matrix framework. This framework contains the cognitive skills being focused on to identify higher-order thinking within the New Jersey student learning standards for social studies in Grades K–8. Using this framework allowed AI (ChatGPT) and the researcher to have a clear definition of cognitive skills, which would ensure consistent application. The researcher then inputted approximately 10 of the New Jersey learning standards into ChatGPT at a time. The researcher

also started a new session with the same prompt three times. One new session was used for each of the grade levels.

In the context of using ChatGPT, a *new session* generally refers to starting a fresh interaction with the model without any prior context or history from previous interactions. Each session is isolated, meaning that ChatGPT does not remember the conversation from past sessions. When you start a new session, it is as if you are interacting with ChatGPT for the first time, with no memory of previous questions, answers, or any other information shared in earlier sessions (OpenAI, 2024). In the first session, it reviewed the standards from Grades K–2; in the second, it was Grades 3–5, and finally, from Grades 6–8 standards. Three different sessions were used in case there were errors or disruptions so that a new session would not have to be initiated for the entire coding process. This would have been time-consuming and would not have improved the results. Inputting the standards approximately 10 at a time allowed AI to familiarize itself with the standards while getting a general sense of the content and structure.

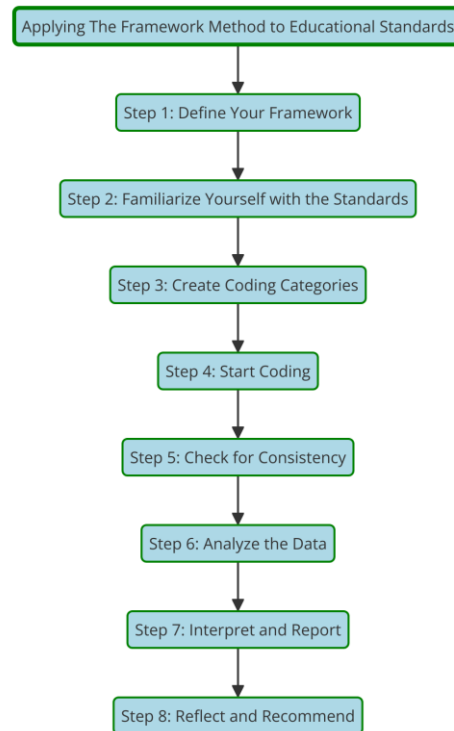
The prompt to use Hess' Cognitive Rigor Matrix framework allowed AI to categorize the cognitive skills that are within the standards based on Webb's depth of knowledge from Level 1–4. Once the standards were entered the coding process commenced and AI read through and created a table as instructed which allowed the researcher to see the standard with the corresponding Webb's depth of knowledge level.

The consistency was done by the researcher by adding approximately 10 standards at a time without any additional prompts or information to assure the same process was used for the entire coding process. No adjustments were necessary. To analyze the data, the researcher then inputted the prompt, “What is the frequency of each level. I will input all levels.” The levels were copied from the table and inputted one by one.

This allowed AI to calculate the frequency of Webb’s depth of knowledge levels for the entire Grades K–2 standards, then Grades 3–5, and finally Grades 6–8. The following Table 12 shows how steps one through six were implemented.

**Figure 12**

*Framework Method Steps*



*Note.* Applying the Framework Method to Educational Standards. Adapted from “Using the Framework Method for the Analysis of Qualitative Dyadic Data in Health Research,” by N. Collaco, R. Wagland, O. Alexis, A. Gavin, A. Glaser, & E. K. Watson, 2021, *Qualitative Health Research*, 31(8), p. 1557 (<https://doi.org/10.1177/10497323211011599>) CC BY 4.0 DEED.

Step 7, interpret and report, of the framework method, as detailed in Figure 11, was used by the coder in the review process. Step 8, reflect and recommend are used later in the chapter.

## Findings

As it relates to the overarching question, "In what way(s) does the language found on the 2020 New Jersey student learning standards for social studies in Grades K–8 compare to Hess' Cognitive Rigor Matrix definition of higher-order thinking?" The researcher found evidence of depth and complexity in the standards from kindergarten through eighth grade. The standards frequently call for analysis, evaluation, and synthesis, as shown in the frequency tables. Terms such as evaluate, analyze, compare and contrast, and use evidence, which are hallmarks of higher-order thinking, are seen throughout the standards. A distribution of depth of knowledge (DOK) levels is shown in Figure 13 for Grades K–8 standards. The chart revealed:

- DOK 1 (recall and reproduction) comprised 3.4% of the standards.
- DOK 2 (skill/concept) comprised 37.6% of the standards.
- DOK 3 (strategic thinking and reasoning) comprised 40.6.0% of the standards.
- DOK 4 (extended thinking) comprises 18.2% of the standards.

In Hess' Cognitive Rigor Matrix, higher-order thinking is characterized by complex cognitive processes, which are represented by the higher DOK levels:

- DOK 3 specifically involves strategic thinking, complex reasoning, and the ability to plan and use evidence. This level requires students to go beyond text or rote application of skills. At this level, students must be able to explain, support, or justify their thinking.
- DOK 4 requires extended thinking, complex analysis, and the ability to synthesize information from multiple sources or contexts. Students at this level engage in tasks that involve long-term investigation, research projects, and problem-solving. At this level

students spend more than one class period learning and applying information and creating authentic connection to the material they are learning.

The language of the New Jersey standards, as indicated by the pie chart, aligns well with Hess' definition of higher-order thinking. The chart evidences that there is a substantial emphasis on DOK 3 and DOK 4 levels:

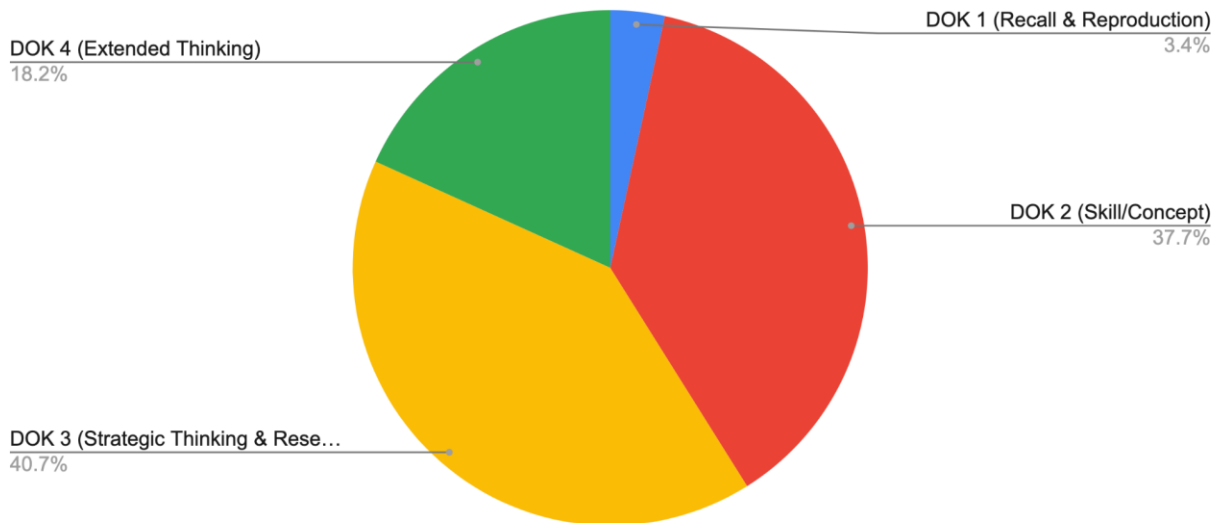
- The combined percentage for DOK 3 and DOK 4 is 58.8%, indicating that a majority of the standards aim to engage students in strategic and extended thinking activities. This suggests that the standards are designed to foster an educational environment where students are encouraged to engage in higher-order thinking.
- The time that students are expected to dedicate to DOK 1 shows a minimal focus on simple recall and reproduction, which are considered lower-order thinking skills.
- DOK 2 standards reflect a total of 37.6% of the standards. This indicates that understanding the foundational skills and concepts is necessary, but they are not the sole focus of the educational process.

Figure 13 demonstrates an alignment with Hess' Cognitive Rigor Matrix as it shows that the standards place a strong emphasis on higher-order thinking skills, which are crucial for preparing students not just for academic success but also for real-world problem-solving and decision-making in an interconnected world, where global thinking is critical.

**Figure 13**

*NJ Student Learning Standards in Grades K-8 by DOK Level*

### NJ Student Learning Standards for Social Studies Grades K-8



*Note.* How the questions are distributed based on Webb’s Depth of Knowledge between grades K-8. Own Work.

### Question 2 Findings

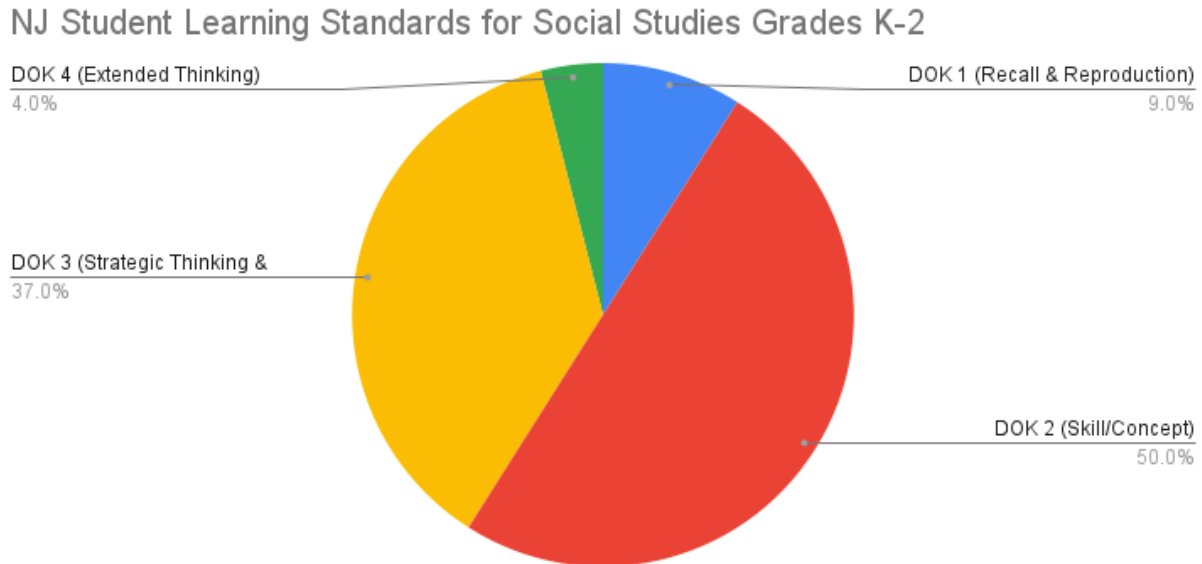
As it relates to question two, “How cognitively complex are the 2020 New Jersey student learning standards for social studies in Grades K–8 as defined by Hess' Cognitive Rigor Matrix The 2020 New Jersey student learning standards for social studies for Grades K–8, as analyzed through Hess' Cognitive Rigor Matrix, demonstrated a significant level of cognitive complexity. Hess' Cognitive Rigor Matrix combined Bloom's taxonomy with Webb's depth of knowledge (DOK) to provide a more comprehensive view of cognitive demand in educational standards and tasks. The cognitive complexity of the 2020 New Jersey student learning standards for social studies in Grades K–8 is aligned with the higher levels of Hess' Cognitive Rigor Matrix because

the standards show a strong emphasis on strategic and extended thinking. This reflects an educational approach that values critical thinking and analysis, as well as application and synthesis and research and inquiry. The expected skills and learning, when taught appropriately in schools, can prepare students not only to understand historical, civic, economic, and geographic concepts but also to apply this understanding critically and creatively in various contexts. Globally competent students can draw on and combine the disciplinary knowledge and modes of thinking acquired in schools to ask questions, analyze data and arguments, explain phenomena, and develop a position concerning a local, global, or cultural issue. Global thinking routines capture key forms of thinking embodied in global competence. They are open-ended, assuming no right or wrong answers. They are simple in design, which makes them useful for teachers of varied levels of expertise yet cognitively sophisticated, providing extensive room for growth and refinement. When teachers make these routines habitual practices—part of the way we do things here—they pave the way for the kind of learning we need to prepare our youth for our interdependence in the world (Mansilla, 2016).

Figure 14 indicates that the standards place an emphasis on foundational skills DOK 1 and DOK 2. These skills are crucial for building initial knowledge and understanding. However, it should be noted that there is a considerable emphasis, 37%, on strategic thinking, which is Webb's depth of knowledge Level 3, indicating that even at this early stage, students are being introduced to more complex cognitive tasks that require reasoning, applying knowledge, and making connections. While extended thinking, Webb's depth of knowledge in Level 4 tasks is minimal. It allows educators to begin engaging students in multi-step problem-solving and projects that require the integration of knowledge from various sources.

**Figure 14**

*NJ Student Learning Standards in Grades K–2 by DOK Level*



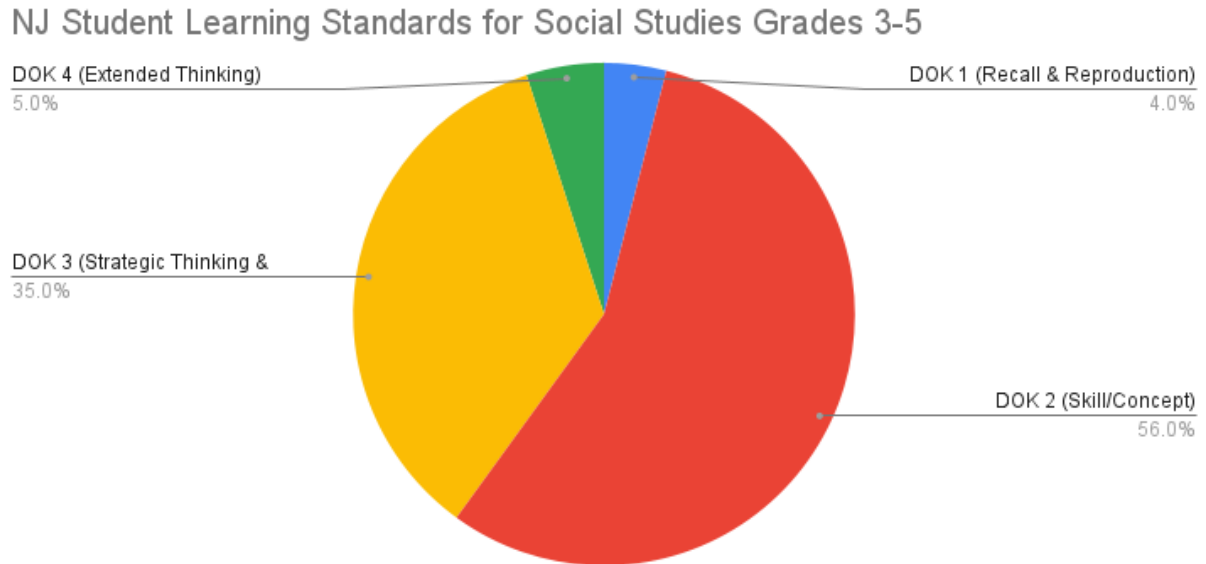
*Note.* How the questions are distributed based on Webb’s Depth of Knowledge between grades K-2. Own Work.

For Grades 3–5, as shown in Figure 14, the emphasis on basic skills and concepts, Webb’s depth of knowledge Level 2 is slightly higher, which is reflective of the need to solidify foundational knowledge as students move into more complex subject matter. However, the standards maintain a strong focus, 35%, on strategic thinking Webb’s depth of knowledge Level 3, which continues to foster students' abilities to analyze, compare, and infer. The increase in extended thinking, Webb’s depth of knowledge Level 4, indicates that there is a progression towards more demanding tasks that require extended reasoning and problem-solving.



**Figure 15**

*NJ Student Learning Standards in Grades 3–5 by DOK Level*

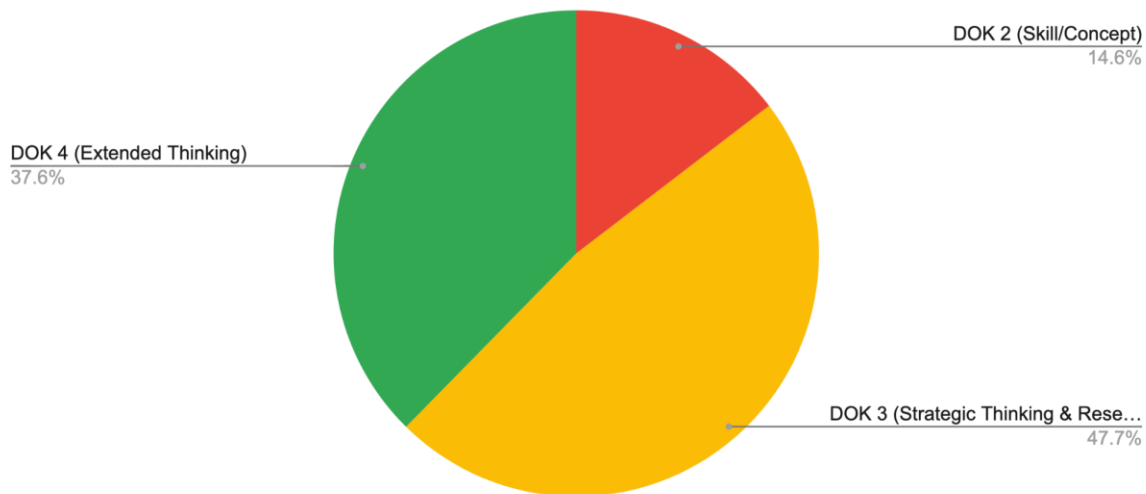


*Note.* How the questions are distributed based on Webb’s Depth of Knowledge between grades 3-5. Own Work.

**Figure 16**

*NJ Student Learning Standards in Grades 6–8 by DOK Level*

NJ Student Learning Standards for Social Studies Grades 6-8



*Note.* How the questions are distributed based on Webb's Depth of Knowledge between grades 6-8. Own Work.

As the middle school standards, Grades 6–8, are analyzed, standards make a substantial shift towards higher-order thinking skills. The majority of the standards fall into Webb's depth of knowledge Level 3 and Level 4. These tasks require more strategic and extended thinking tasks. These account for 85.3% of the standards. These standards will require a curriculum that is heavily weighted towards tasks that demand deep engagement, such as conducting research, engaging in complex reasoning, problem-solving, and synthesizing information across multiple domains. There is minimal emphasis on Webb's depth of knowledge in Level 2. There is also the absence of Webb's depth of knowledge Level 1, which is important.

This implies that with the standards, educators are expected to create learning opportunities for students who move beyond simple recall. It requires educators to teach in a manner that allows students to apply their foundational knowledge in more sophisticated ways.

When reviewing the New Jersey student learning standards for social studies in Grades K–8, it is evident that there is a progression toward increasing cognitive complexity. The standards in the early grades lay the groundwork with a strong base in foundational knowledge and skills, yet they do not shy away from introducing students to tasks that require higher-order thinking. As students progress, the focus shifts significantly towards strategic and extended thinking, aligning with Hess' CRM's definition of cognitive complexity. By the middle school years, the standards predominantly involve tasks that engage students in complex, cognitively demanding activities, preparing them for the challenges of higher education and the workforce. This progression reflects a deliberate curricular design to develop critical thinking and problem-solving skills as students advance through their educational journey.

### **Question 3 Findings**

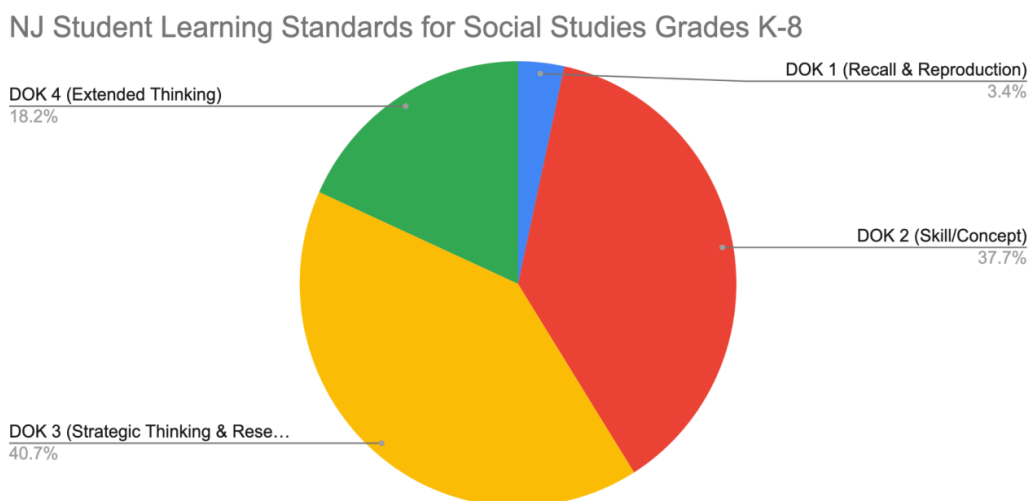
Question 3 looked at “How frequently do the 2020 New Jersey student learning standards for social studies in Grades K–8 include higher-order thinking opportunities as identified in Hess' Cognitive Rigor Matrix?” Throughout the Grade K–8 standards, students are encouraged to apply knowledge across various contexts, not just within the area of social studies. There are instances where students are asked to engage with contemporary issues, use evidence, and support arguments, and they are also tasked with understanding the impact of historical events on current society.

This cross-disciplinary application is aligned with Hess' Cognitive Rigor Matrix for higher DOK levels. As evidenced in Figure 16, only 3% of the standards are at DOK level 1, which is the lowest level of cognitive complexity in Webb's depth of knowledge framework. At least 58% of all standards in Grades K–8 are DOK level 3 or DOK level 4. DOK Level 3 standards require strategic thinking, complex and abstract thinking, and can have multiple

answers and approaches. This means the standards created if used in classrooms, can create opportunities for students to develop critical thinking, problem-solving, and decision-making skills, which have been shown to lead to global thinking. DOK Level 4 standards require students to extend their thinking and focus on complex reasoning and planning. These standards often require extended periods of time with multiple steps (Webb, 2002).

**Figure 17**

*NJ Student Learning Standards in Grades K-8 by DOK Level*



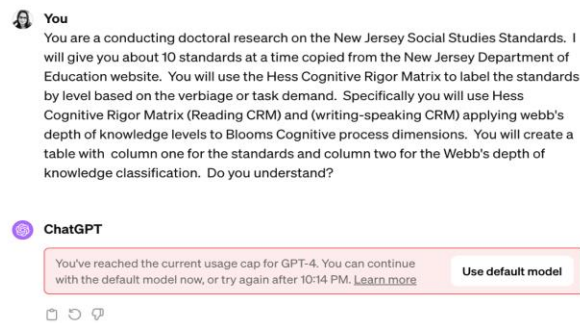
*Note.* How the questions are distributed based on Webb's Depth of Knowledge between grades K-8. Own Work.

### **Error Finding:**

It should be noted that when the researcher conducted the AI, ChatGPT analysis for the NJ student learning standards for social studies in Grades 3-5, an error message was present which was noted in Appendix A. The error is noted in Figure 17.

## Figure 18

### *AI Error Message*



*Note.* Screenshot of an interaction showing an error message for analyzing the New Jersey social studies standards in Grades 3–5, using Hess' Cognitive Rigor Matrix and Webb's depth of knowledge levels. Own Work.

The AI was asked to explain the error message for guidance and it responded as follows: “The message in the screenshot provided indicates that the user has reached the current usage cap for GPT-4 and, therefore, cannot continue using GPT-4 until a specified time when the cap resets.” Thus, it offered two alternatives:

Use the default model: This allows the user to continue interacting with the AI but with the default model provided by OpenAI, which may not be GPT-4. The default model might be an earlier version, like GPT-3 or GPT-3.5, which could potentially offer a different performance in terms of understanding and generating responses.

Try again after the specified time: This suggests that the user can wait until the indicated time when the usage cap for GPT-4 is reset. At this time, the user will be able to use GPT-4 again.

The usage cap is likely in place to manage demand and ensure fair access to the system for all users. When you encounter such a message, it affects your query by potentially limiting the complexity of the responses you can receive if you opt to use the default model instead of GPT-4. The depth, accuracy, and nuances of the answers could be impacted depending on the capabilities of the alternative model being used (ChatGPT, 2024).

The researcher was unaware if this may have caused coding errors. Because the coder was not familiar enough with the multiple versions of ChatGPT the researcher was unable to make a determination as if the coding process was impacted. The coding confirmation process has been detailed in Appendix B with inconsistencies documented.

### **Coding Confirmation**

Due to the nature of this study, the researcher chose to combine the framework method with the Mayring step method. This allowed for leveraging the structural benefits of the framework method, which is used for data organization and thematic analysis. The Mayring step method allowed for detailed textual analysis. This approach is particularly useful in mixed-methods research, where both broad thematic insights and detailed text interpretations are based on a predetermined coding scheme (Mayring, 2000). During the coding process, the research found disagreement with ChatGPT's DOK-level assignment. Full details are shared in Appendix B.

The analysis of the New Jersey student learning standards for social studies using artificial intelligence (AI), specifically ChatGPT, revealed some intriguing insights into what it was capable of doing as well as what some of its limitations are when it comes to using it in educational research. This is specifically when using it for extraction and coding of large datasets. The researcher's process involved running the standards through ChatGPT twice to

assess how the AI coded the standards based on Webb's depth of knowledge levels. The findings highlighted a lack of consistency in the AI's coding process. Therefore, it was important to investigate or at least better understand the implications of using AI for extracting and coding large datasets.

### **Inconsistencies in AI Coding**

While using the AI, ChatGPT, the researcher noted inconsistencies between the two coding sessions. The coding of the dataset was performed at the grade level. This means the researcher inputted the Grades K–2 standards, then Grades 3–5, and finally Grades 6–8. Each grade level set was inputted in a unique session. The prompts were the same for all three grade levels. The researcher did not perform all the coding sessions on the same day or on the same computer. In fact, they were not even performed at the same time of day. This is important to note because there are different versions of ChatGPT, and at peak times, an older version of the AI may be used. When the researcher used ChatGPT to code the New Jersey student learning standards for social studies, inconsistencies were noted. These can be attributed to several factors in addition to those already mentioned. First, AI algorithms, including those used by ChatGPT, learn from vast amounts of data to make inferences. However, these inferences can vary due to the nuances in the data it was trained on and the inherent ambiguity in natural language. For example, in Webb's depth of knowledge, Level 2 and Level 3 both list “compare” as a verb in their respective levels. The difference between when it is level 2 versus level 3 is when the students are asked to apply the skill; it is a level 2 verb. When using reasoning to compare, it becomes a level 3 verb. Additionally, educational standards, like the New Jersey student learning standards for social studies, often contain complex, multifaceted concepts that can be interpreted

differently, leading to differences in how AI categorizes these standards into Webb's depth of knowledge levels.

### **Concerns with Using AI for Large Dataset Coding**

The inconsistencies observed raised important concerns regarding the reliability of using AI, like ChatGPT, for coding large datasets. The variability the researcher found in coding this dataset shows the potential impact that relying solely on AI can have on the quality of research findings.

These inconsistencies can lead to potentially flawed interpretations or conclusions. Relying on AI to process and code large datasets, the inconsistencies should be a concern to other researchers, and they should be cautious. It emphasizes the need for human oversight and verification. Due to the limitations presented by AI, the role of the researcher as a subject matter expert becomes incredibly important. For this study, the researcher manually coded the New Jersey student learning standards for social studies.

The researcher leveraged their expertise in the subject matter and their familiarity in using Webb's depth of knowledge framework. This manual approach allowed for more targeted interpretations of the standards. By leveraging AI in educational research through coding standards, both its potential and limitations were revealed. Even though AI offers promising opportunities for analyzing large datasets, human expertise and oversight are crucial. By incorporating subject matter experts into the research process, researchers help manage AI's limitations.



**Table 1***Frequency Table Grades K-2*

K-2 Frequency Table

DOK Levels	Chat GPT 1st	Chat GPT 2nd	Researcher
DOK 1 (Recall & Reproduction):	5	8	5
DOK 2 (Skill/Concept)	27	29	27
DOK 3 (Strategic Thinking & Reasoning)	21	16	19
DOK 4 (Extended Thinking)	1	1	3

*Note.* Comparison of depth of knowledge (DOK) level totals identified by ChatGPT and researchers for Grades K–2. Own Work.

The researcher continued to find some disagreement with ChatGPT coding in Grades 3–5. In reviewing the categorization of the depth of knowledge (DOK) levels between the ChatGPT responses and those determined by the researcher, minor discrepancies were noted across the categories. For instance, ChatGPT identified 58 items at DOK 2 (skill/concept), while the researcher identified 56, as shown in Table 2. This shows that there is some marginal variation in the categorization process. Similarly, a slight difference was observed at DOK 3 (strategic thinking and reasoning), with ChatGPT identifying 37 items and the researcher 35. It was important to acknowledge these differences. It should be noted that they are not deemed

substantial enough to warrant a more detailed statistical analysis at this moment. Overall, the researcher found that the trends in categorization were consistent between the two sources.

**Table 2**

*Frequency Table Grades 3–5*

3-5 Frequency Table

DOK Levels	ChatGPT 1st	ChatGPT 2nd	Researcher Total
DOK 1 (Recall & Reproduction):	5	0	4
DOK 2 (Skill/Concept)	58	36	56
DOK 3 (Strategic Thinking & Reasoning)	37	63	35
DOK 4 (Extended Thinking)	0	1	5

*Note.* Comparison of depth of knowledge (DOK) level totals identified by ChatGPT and researchers for Grades 3–5. Own Work.

The bigger discrepancies between ChatGPT and the researcher appear in Grades 6–8. As seen in Figure 11, the researcher deemed nine more standards to be classified as DOK Level 2 than ChatGPT, which categorized them as DOK Level 3. Eight of these nine standards specifically used “explain how” and “explain why,” which Webb’s depth of knowledge specifically categorizes as DOK Level 2 (Webb, 2002). Hence, the researcher categorized them as DOK Level 2, as noted in Table 3.

**Table 3***Frequency Table Grades 6-8*

6-8 Frequency Table

DOK Levels	ChatGPT 1st	ChatGPT 2nd	Researcher Total
DOK 1 (Recall & Reproduction):	1	0	0
DOK 2 (Skill/Concept)	7	7	16
DOK 3 (Strategic Thinking & Reasoning)	62	102	52
DOK 4 (Extended Thinking)	39	0	41

*Note.* Comparison of depth of knowledge (DOK) level totals identified by ChatGPT and researchers for Grades 6–8. Own Work.

### **Findings Summary**

On June 3, 2020, the New Jersey Board of Education adopted new social studies standards that were to inform education for all public school students in Grades K–12. The social studies standards were created to prepare students because “Today’s challenges are complex, have global implications, and are connected to people, places, and events of the past. The study of social studies focuses on a deep understanding of concepts that enable students to think critically and systematically about local, regional, national, and global issues. Authentic learning experiences that enable students to apply content knowledge, develop social studies

skills, and collaborate with students from around the world prepare New Jersey students for college, careers, and civic life” (New Jersey Department of Education, 2020, Para 3).

This purposeful shift meant that the New Jersey Department of Education recognized that the world was becoming more interconnected and that students in New Jersey needed to prepare for a more interconnected and interdependent future.

The 2020 intent, spirit, and mission for the New Jersey social studies standards align with the United Nations sustainable development goals, specifically targeting Goal 4: Education. The SDGs emphasize the importance of inclusive and quality education as a means to empower individuals and promote social justice.

The purpose of this mixed-methods study was to analyze the New Jersey student learning standards for social studies in grades K-8 using Hess' Cognitive Rigor Matrix. Standards were coded first using artificial intelligence, ChatGPT, and then reviewed by the researcher using the framework method. The standards were coded using Webb's depth of knowledge Level 1 through Level 4. The assessment of these standards as performed by AI, ChatGPT, and the researcher showed that these standards if executed in the classroom from kindergarten through eighth grade, may prepare students to think critically and be active and positive contributors to local, regional, national, and global issues. The standards not only focus on introducing students to higher-order thinking and complex cognitive skills and ideas but also progressively increase the DOK levels from kindergarten to eighth grade. For example, from kindergarten to second grade, there are approximately five DOK level 1, standards 27 DOK Level 2, 20 DOK level 3, and only two DOK level 4. This means that the New Jersey social studies standards in Grades K–8 align them with the UN's sustainable development goals, focusing on quality education. Using AI and cognitive analysis tools, it was found that these standards progressively built critical

thinking and problem-solving skills, preparing students to address local and global issues effectively.

### **Conclusion**

It was evident through analysis conducted in this study that the New Jersey social studies standards for Grades K–8 are setting the stage for New Jersey students to have a bright future. When exposed to these standards in the classroom, students are not just about memorizing dates and facts. They are being tasked with thinking bigger and deeper, not just about historical figures or events but about modern-day issues. This affords students the opportunity to develop the global thinking skills that the state of New Jersey so purposely emphasized in its mission and vision when it developed these standards. From the minute students arrive in kindergarten, they are ushered to the standards set goals. When delivered proficiently by teachers and mastered by students, the standards can set the learners on a path where learning is more than just taking notes. With these standards, social studies classes have the opportunity to be places that are about asking questions, analyzing different sides of a story, and finding solutions. When delivered properly, they afford students the opportunity to see the past, the present, and even the future through different lenses. This approach is key to getting them ready for a world that is dynamic on a daily basis.

When looking toward the future, it is pretty exciting to see that students will have the opportunity to grow up equipped with the kind of thinking that can tackle global challenges head-on. These standards are lofty in that they require a new way of thinking and teaching. The road to teaching these standards may be bumpy with all the learning gaps, but the education community is still smoothing out from the pandemic. However, they can become a benchmark for quality high-level instruction to help students navigate through life. As students learn and

master these standards, they can work together to create ideas that can make a real difference, understand other people from around the world, and learn how to work together. So, for the learner sitting in classrooms today and for the society waiting for them out there, this is more than just education; it is preparation for a world that needs their smart, compassionate, and leadership. The standards are not just about shaping scholars but global citizens ready to step up and create a better future for everyone.

This research journey was embarked on to explore the presence of cognitive complexity and global thinking in the 2020 New Jersey student learning standards for social studies in Grades K–8. The researcher used the lens of Hess' Cognitive Rigor Matrix and Webb's depth of knowledge levels to assess higher-order thinking in these. The findings support that when the standards were created, there was a deliberate curricular emphasis on higher-order thinking skills. If the standards are executed as intended by well-trained teachers, and these skills are mastered by students, they are better prepared for the demands of the modern world, where global and critical thinking capabilities are necessary.

During this research, an intriguing and unexpected subplot arose. Inconsistencies were found between the AI and the researcher as well as the AI and itself, when it was asked to assess and categorize the standards using the exact same prompts. This variability raised consequential reliability concerns in educational research contexts.

These inconsistencies are not just technical glitches. They indicate a broader issue inherent when using artificial intelligence programs to code educational content. The nuanced discrepancies observed, which could be attributable to factors such as the time of coding, the device used, or even the version of AI engaged with, highlighted the complex, dynamic nature of AI algorithms and their interpretations of educational standards.

While AI is new and offers unlimited potential, the researcher cautions against over-relying on it for the critical task of coding large datasets in educational research. The implications for future research are profound. AI offers unprecedented scalability and efficiency in handling large datasets; however, its current limitations necessitate a more balanced approach.

## **Chapter 5: Summary, Conclusions, and Recommendations**

Chapter 5 provides a summary of the findings, as well as conclusions and recommendations for policymakers and any potential future researchers. In order to do so, it is important to understand that education continues to change at an alarming rate. The world changes so fast that one no longer knows what kind of future schools are preparing students for. At the time this research was being compiled, education was changing rapidly. This can be attributed to the national teacher shortage, which can be blamed on teacher burnout, high demands from parents, lack of social-emotional support, and even lack of transition from the COVID-19 pandemic, in which many teachers and students had not addressed the trauma they faced. Technological resources are being marketed to districts and to educators daily. Many promise to make huge gains yet do not have the field data to support their promises. As teachers burn out and opportunity gaps widen, school leaders are more amenable to possible solutions that can stop the bleeding.

In addition to what is happening in education, the world is dealing with advancements in technology that is threatening to disrupt democracies around the world. The war that was going on in Europe between Russia and Ukraine threatened to destabilize the European Union and its allies. Additionally, the Israeli-Palestinian conflict was far from being resolved and possibly in one of the most hostile phases anyone has ever seen. For once, the United States and its international allies did not see eye-to-eye. The election of 2024 in the United States promises to be one of the most important elections in American and world history. Where does that leave society?

In order for education to be effective and to support students in their success in an ever-changing world, it must prepare them with the skills needed in the 21st century which will enable



them to understand themselves as part of an interconnected world, where they can develop the collaborative skills and critical thinking skills they need to succeed.

While this seems simple enough, one must take into account that teachers and schools are still dealing with learning loss that was a result of the global pandemic. For this reason, many may ask how educators can begin to focus on global thinking and critical thinking when many students still are not able to read or do mathematics at their grade level. While this is a valid concern, it should be noted that critical thinking and experiential learning opportunities that give students agency over their learning and foster global thinking are not in addition to, but a different approach to thinking about how students are taught while simultaneously preparing them for the future.

### **Purpose**

This study set out to answer three research questions. The first question was, “*In what ways does the language found in the 2020 New Jersey student learning standards for social studies in Grades K–8 compare to Hess' Cognitive Rigor Matrix definition of higher-order thinking?*” It was evident from the onset, as the researcher began to assess the standards from kindergarten all the way through eighth grade, that there was a purposeful and meaningful intention to include specific verbiage that aligned with Hess' Cognitive Rigor Matrix as well as Webb's depth of knowledge. For Grades K–2, the standards incorporate a balanced mix of Webb's depth of knowledge levels, with the majority falling under level 2 (skill/concept). Both the AI and researcher's coding results were quite consistent, suggesting that students were introduced to both basic recall and some more sophisticated skills at an early age. As students progress from Grades 3–5, there was a noticeable shift towards higher DOK levels, with the bulk of the standards focusing on DOK 2 (skill/concept) and DOK 3 (strategic thinking

& reasoning). The AI and researcher totals for DOK 4 (extended thinking) differed, indicating some room for interpretation at the most complex level of thinking; however, this shift was nominal, and none significantly altered the experience for the students in these grades.

In Grades 6–8, a significant increase in skills related to DOK 3 and DOK 4 levels was seen. The researcher identified more opportunities for extended thinking than AI. This shift in increasing levels of Webb’s depth of knowledge as students get older suggests that as students advance, the curriculum increasingly challenges them with complex and abstract thinking tasks. The skills they are exposed to and expected to develop are more rigorous and challenging than expected. It is important to understand how the findings relate to the research questions. The first question asked, *“In what way(s) does the language found on the 2020 New Jersey student learning standards for social studies in Grades K–8 compare to Hess’ Cognitive Rigor Matrix definition of higher-order thinking?”*

When the language in the New Jersey social studies standards was compared to Hess’ Cognitive Rigor Matrix, it was evident that there was a progression in cognitive complexity. This is evident in the verbiage and skill requirements as students progress through Grades K–8. The language and demands reflect a transition from basic recall to advanced analytical and evaluative tasks. For children, this progression means that as they move from Grades K–8, they are expected to develop and sharpen their thinking skills. As they enter kindergarten, they spend some of their social studies time on basic recall, like remembering facts and details. However, it should be noted that this is less than 10% of the time, as noted in the findings in Chapter 3. As learners get older, they are encouraged to think more deeply. They are tasked with analyzing information and evaluating different viewpoints, as well as citing evidence and using different resources. This kind of learning prepares them to handle more complex problems and think

critically, to be successful in today's world. When education systems emphasize higher-order thinking from an early age, students are able to develop problem-solving and critical thinking skills, which are important as they get older and become contributing members of a global society. Children who grow up with problem-solving and critical thinking skills can question the status quo, innovate, and find better ways of doing things. With these skills, and in the future, these students will have the ability to be more engaged as citizens, ready to tackle big issues like climate change, inequality, and global health crises.

The second question the research set out to answer was, *“How cognitively complex are the 2020 New Jersey student learning standards for social studies in Grades K–8 as defined by Hess' Cognitive Rigor Matrix?”*

Looking at how cognitive complexity is defined by Hess' Cognitive Rigor Matrix and Webb's depth of knowledge and distributed according to New Jersey standards, it is evident that they are well-distributed. Standards appear to move upward as students move from Grades K–8. This means that as children progress through their academic careers, they become more challenged and are able to develop higher-order thinking skills. This indicates a deliberate effort to develop higher-order thinking skills in students throughout their educational journey.

The final research questions asked, *“How frequently do the 2020 New Jersey student learning standards for social studies in Grades K–8 include higher-order thinking opportunities as identified in Hess' Cognitive Rigor Matrix?”* The frequency of higher-order thinking opportunities increases with each grade level. Grades K–2 are the foundational grades. Here, the groundwork for learning, understanding, and making sense of social studies concepts and ideas is set. In Grades 3–5, there are more intermediate skills developed, and by the time students reach middle school, Grades 6–8, the standards provide more frequent and advanced higher-order

thinking opportunities. As students progress from Grades K– 8, they are afforded more chances to flex their brain muscles. By the time students arrive in middle school, they are tackling the kind of cognitive complexity that prepares them for the real world. New Jersey's social studies standards for social studies in Grades K–8 provide students with a strong foundation that allows them to develop the global thinking skills that will help them to be successful in a world, no matter the challenges they face.

### **Discussions and Implications**

In this study, Hess' Cognitive Rigor Matrix was used to assess higher-order thinking in GradeK–8 social studies standards by using artificial intelligence (AI) as a coder. As AI has not been widely applied, thus, it was important to explore its implications for educational policy on its effectiveness in research, and the dynamic role it can play as a component of research. Throughout this research, AI proved to be a powerful tool for dissecting understanding and the cognitive complexity of these standards. In addition to its use as a coder, AI became a partner in research. In some cases, AI played an unofficial mentor role in the research process. The researcher was able to get recommendations and suggestions on the articles to read. It enabled the creation of idea maps.

It helped the researcher better understand readings by providing summaries and simplified explanations. An important finding in this research was how AI can be used to support students in higher education. The use of artificial intelligence can help tailor educational content, identify areas of difficulty, and suggest additional resources to help students succeed. This unique dynamic significantly shaped the research process, offering new perspectives and capabilities that enriched the analysis and understanding of the research process. This personalized approach can help bridge educational gaps that students from disadvantaged

backgrounds might face or fill gaps that polylingual students can encounter due to meet code-switching.

While AI was a wonderful tool for coding large datasets in a short amount of time, its inconsistencies highlighted the indispensable value of human oversight in contextualizing and reviewing its findings to ensure they aligned with research objectives. A human review was essential not only for interpreting and validating the results but also for ensuring that the research remained ethical. Through this symbiotic relationship, human intelligence and artificial intelligence can work together to enhance understanding of complex educational phenomena.

The ability to learn continuously is an intriguing aspect of using AI in research. As AI algorithms process more data, the accuracy and efficiency of their analyses should improve, suggesting that AI can yield more refined insights over time. It is important to note that OpenAI's ChatGPT does not learn and update its knowledge base in real time as a result of user interactions. The model's learning process occurs during its training phase, where it is fed vast amounts of text data. Despite this, due to its complex algorithms and the vast amount of training data it has encountered, the AI model's interpretation can vary slightly between sessions. This can lead to different emphases or nuances being picked up in each response, as was seen in this study. This study may contribute to the conversation about the use of artificial intelligence in education. It shows how AI can affect education research and policy, as well as the need to balance AI's abilities with human skills. In the future, combining AI with education can greatly enhance research and help students.

### **Suggestions for Future Research**

In this study, global thinking was assessed in the New Jersey social studies standards in Grades K–8. Based on this research, the standards create opportunities for students to develop

the global thinking skills, the New Jersey Department of Education set forth in its mission statement and vision statement. There are three potential studies that would provide valuable insight into their effectiveness. The first would be to engage in a barrier assessment. Researchers are encouraged to create a study that can identify any barriers to effectively teaching these standards in a manner that achieves the cognitive complexity learning opportunities intended by the standards.

Future studies could look into resource limitations, teacher training gaps, or systemic educational inequalities. Understanding these roadblocks is important because, without the right tools and support, those standards might not reach their full potential.

Another opportunity to research is to take a closer look at how schools are actually putting these standards into practice. Curriculum implementation is critical. Delving into how these standards are being implemented across various schools and districts and what factors contribute to successful or challenging integration would provide meaningful feedback. Quality standards are important, and the New Jersey Department of Education has been successful in developing them. However, teaching and learning are not just about handing teachers a new set of guidelines; it is about seeing how they bring them to life in the classroom. Are some schools able to implement these standards effectively while others struggle? It is vital to understand what is making the difference. This is not just about making sure every student is being provided equitable access; it is about sharing what is working so that every school can make the same gains.

It is also important to engage in longitudinal studies. Tracking how students are doing over time can provide feedback for improving these standards or for developing future standards. It is not enough to know they have the opportunity to be exposed to critical thinking and global issues. It has to be documented if these skills are maintained and carried beyond the classroom.

Are they becoming the problem-solvers and world-shakers? By following their journey, it will be apparent if what is being taught now is prepping them for the real world.

Finally, when it comes to AI, it is crucial to understand why there is a disagreement in coding standards. Research could be conducted to assess whether allowing AI to ask more guiding questions before prompting it to code the standards can enable it to better understand the nuances of coding. The question arising is whether it would be possible for AI to better code standards if Bloom's taxonomy framework and Webb's depth of knowledge framework were uploaded?

### **Considerations for Policymakers**

We stand at the crossroads of history, where the decisions made today forge the path for the generations of tomorrow. Education is our most potent weapon in the pursuit of freedom and equality. With that said it must be accessible to every child, regardless of their zip code or the circumstances of their birth. Today's students hold the promise of our nation's future within their capable hands. Each child deserves to walk into classrooms that serve not just as rooms with whiteboards but as gateways to forge critical thinking skills and develop an understanding of their role in an interconnected global village with many challenges to be faced.

We are in a very precarious time. Policymakers need to act very assertively and decisively, yet as a nation, we stand more divided than ever before. The first call is for policymakers to act with the courage that our times demand. For standards such as these to be successful, policymakers must ensure every school is equipped with the resources needed to thrive. They must ensure that educators are supported now more than ever, as we are already dealing with mass educator attrition across the country. Quality educators have the ability to nurture the minds of children who will one day solve the puzzles that are not being solved now.

Quality educators are the only ones who can break down the barriers of inequality so that every young child has the opportunity to rise, unbounded by the ceilings that confined their predecessors. When it comes to education, we should never be bound by what is politically expedient. We should be propelled to act with the conviction of what is right. Investing in education with unwavering belief is not merely an instrument of personal advancement but the bedrock of democracy and progress. Policymakers must act with urgency now more than ever. When providing children with the opportunity to think critically and logically and when giving them agency over their learning, we lift them up. Agentic students are not just taught to dream but to reason, not just to aspire, but to engage, not just to reach for the stars, but to navigate the cosmos. When education is done purposefully, rigorously, and when global thinking is the norm, schools do more than educate; they liberate. Policymakers' charges may be complex, but they are not complicated. Thus, they need to ensure:

- Resource allocation: Continue to ensure that schools have the necessary resources, such as adequate funding, modern technology, and access to quality materials.
- Teacher support: Providing robust training programs, ongoing professional development, and support systems for teachers can help them adapt to and effectively teach the new standards. Assuring that teachers have the quality leadership they deserve at the school, district, county, and state levels is vital.
- Equity in education: Continuing to address systemic inequalities that affect students' ability to benefit from the standards is crucial. This includes considering the needs of students from diverse socioeconomic, cultural, and language backgrounds.
- Assessment methods: Developing formative assessment tools that accurately measure the cognitive complexity and higher-order thinking skills outlined in the standards to help



ensure that educational objectives are being met. These should be seamless tools that are easily integrated into classroom instruction to keep things simple for teachers.

- Feedback loops: Establishing mechanisms to receive feedback from educators, students, and the community about how the standards are working in practice can help policymakers make informed adjustments.
- Sustainability: Policies should consider the sustainability of education reforms, including how to maintain and build upon the changes brought about by the standards.
- Ethics: Students and educators should have guidelines for the responsible use of AI, safeguarding their interests.

## References

- Aghion, P., Antonin, C., & Bunel, S. (2019). Artificial Intelligence, growth and employment: The role of policy. *Economie et Statistique / Economics and Statistics*, (510–512), 149–164. <https://doi.org/10.24187/ecostat.2019.510t.1994>
- American Psychological Association. (2010). Using the global assessment of functioning scale to demonstrate the importance of inter-rater reliability. *American Psychological Association*. <https://dictionary.apa.org/interrater-reliability>
- Armstrong, P. (2010). Bloom's Taxonomy. Vanderbilt University Center for Teaching. Retrieved 2023, August 8 from <https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>
- Artificial Intelligence (AI) vs. Machine Learning*. CU-CAI. (2023, October 3). <https://ai.engineering.columbia.edu/ai-vs-machine-learning/>
- Assarroudi, A., Heshmati Nabavi, F., Armat, M. R., Ebadi, A., & Vaismoradi, M. (2018). Directed qualitative content analysis: The description and elaboration of its underpinning methods and Data Analysis process. *Journal of Research in Nursing*, 23(1), 42–55. <https://doi.org/10.1177/1744987117741667>
- Bakan, J. (2022b, July 28). *NJ has 3rd-Best School System In Nation, new study shows*. Across New Jersey, NJ Patch. <https://patch.com/new-jersey/across-nj/nj-has-3rd-best-school-system-nation-new-study-shows>
- Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain*. David McKay Co.

- Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in Research Preparation. *Educational Researcher*, 34(6), 3–15. <https://doi.org/10.3102/0013189x034006003>
- Bruun, E. P. G., & Duka, A. (2018). Artificial Intelligence, jobs and the future of work: Racing with the machines. *Basic Income Studies*, 13(2). <https://doi.org/10.1515/bis-2018-0018>
- Campus Suite. (n.d.). *Webb's Depth of Knowledge (DOK) Levels Graphic* [Image]. Campus Suite. <http://westcaryinstructionalresources.weebly.com/depth-of-knowledge.html>
- Charlton, E. (2019, October 24). *Here's How to Improve Critical Thinking and Why It's Important*. World Economic Forum. <https://www.weforum.org/agenda/2019/10/improve-critical-thinking-why-important/>
- Cloud, J. P. (2005). Some systems thinking concepts for environmental educators during the decade of Education for Sustainable Development. *Applied Environmental Education & Communication*, 4(3), 225–228. <https://doi.org/10.1080/15330150591004625>
- Cleland, J. A. (2017). The qualitative orientation in medical education research. *Korean Journal of Medical Education*, 29(2), 61–71. <https://doi.org/10.3946/kjme.2017.53>
- Common Core State Standards Initiative. (n.d.) *What are educational standards? What are educational standards?* Core Standards. <https://www.corestandards.org/about-the-standards/frequently-asked-questions/>
- Cornell University. (n.d.). *Global learning: Center for teaching innovation*. Global Learning | Center for Teaching Innovation. <https://teaching.cornell.edu/teaching-resources/building-inclusion-your-courses/global-learning>
- Council of Chief State School Officers. (n.d.). *About CCSSO*. CCSSO <https://ccsso.org/>

Council of Chief State School Officers. (n.d.). Policy & Advocacy. CCSSO.

<https://ccsso.org/topics/advocacy>

Dernbach, J. C. (2009). *Agenda for a Sustainable America*. ELI Press, Environmental Law Institute.

Duggal, N. (2023, November 24). *Advantages and disadvantages of artificial intelligence [AI]*.

Simplilearn.com. <https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article>

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107–115. <https://doi.org/10.1111/j.1365-2648.2007.04569.x>

Ennis, R. H. (1985). Critical thinking. *The Palgrave Handbook of Critical Thinking in Higher Education*, (43). <https://link.springer.com/book/10.1057/9781137378057>

Francis, E. M. (2017, May 9). *What is depth of knowledge?*. ASCD.

<https://www.ascd.org/blogs/what-exactly-is-depth-of-knowledge-hint-its-not-a-wheel>

Freire, P. (1970). *Pedagogy of the oppressed*. Continuum.

Frempong, S., Davenport, C., Sutton, A., Nonvignon, J. and Barton, P. (2018). Integrating Qualitative Techniques in Model Development: A Case Study Using the Framework Approach. *Applied Health Economics and Health Policy*, 16(5), pp.723-733.

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013b). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, 13(1). <https://doi.org/10.1186/1471-2288-13-117>

Giroux, H. A. (2021). Paulo Freire and the politics of postcolonialism. *PAULO FREIRE*, 18(2), 177–188. [https://doi.org/10.4324/9780203420263\\_chapter\\_10](https://doi.org/10.4324/9780203420263_chapter_10)

- Hackman, H. W. (2005). Five Essential Components for Social Justice Education. *Equity & Excellence in Education*, 38(2), 103–109. <https://doi.org/10.1080/10665680590935034>
- Haigh, M. (2014). From internationalisation to education for Global Citizenship: A multi-layered history. *Higher Education Quarterly*, 68(1), 6–27. <https://doi.org/10.1111/hequ.12032>
- Hanna, S. (2021, December 29). *Social Studies Standards in New Jersey: An explorative look*. Atlas. <https://www.onatlas.com/blog/social-studies-standards-in-new-jersey-an-explorative-look>
- Hara, K. (1995). Quantitative and qualitative research approaches in education. *Education*, 115(3), 351.
- Held, D., & McGrew, A. (2009). Governing globalization: Power, authority and global governance. *Rugman Reviews*, 159–160.  
[https://www.researchgate.net/publication/316328464\\_Governing\\_Globalization\\_Power\\_Authority\\_and\\_Global\\_Governance](https://www.researchgate.net/publication/316328464_Governing_Globalization_Power_Authority_and_Global_Governance)
- Hess, K. (2014). Cognitive Rigor Matrix. <https://www.karin-hess.com/>
- Hess, K. K., Jones, B. S., Carlock, D., & Walkup, J. R. (2009). Cognitive rigor: Blending the strengths of Bloom's taxonomy and Webb's depth of knowledge to enhance classroom level processes. <https://files.eric.ed.gov/fulltext/ED517804.pdf>
- Hill, I. (2012). Evolution of education for international mindedness. *Journal of Research in International Education*, 11(3), 245–261. <https://doi.org/10.1177/1475240912461990>
- Organisation for Economic Co-operation and Development (OECD). (2018). *Preparing our youth for an inclusive and sustainable world - OECD*. The Organisation for Economic Co-operation and Development (OECD). <https://www.oecd.org/en.html>

- Hull, G. A., & Hellmich, E. A. (2018). Locating the global: Schooling in an Interconnected World. *Teachers College Record: The Voice of Scholarship in Education*, 120(3), 1–36.  
<https://doi.org/10.1177/016146811812000303>
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288.  
<https://doi.org/10.1177/1049732305276687>
- International Business Machines. (2024). *What is natural language processing?*  
<https://www.ibm.com/topics/natural-language-processing>
- Israel, R. (2015). *The rights and responsibilities of Global Citizenship*. The Global Citizens' Initiative. <https://www.theglobalcitizensinitiative.org/the-rights-and-responsibilities-of-global-citizenship/>
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14–26.  
<https://doi.org/10.3102/0013189x033007014>
- Leopold, A. (2015, July 23). *Extract 7: Land Ethic of Aldo Leopold*. Philosophical Investigations. <https://peped.org/philosophicalinvestigations/extract-aldo-leopold/>
- Mahmoudi, A., Khoshnood, A., & Babaei, A. (2014). *AyoubPaulo Freire critical pedagogy and its implications in Curriculum Planning*. CORE. <https://core.ac.uk/reader/234635740>
- Main, P (2023, February 14). *Multiple Intelligences - Howard Gardner*. Retrieved from <https://www.structural-learning.com/post/multiple-intelligences-howard-gardner>

- Mansilla, V. B. (2016). *Global thinking An ID-Global Bundle To Foster Global Thinking Dispositions Through Global Thinking Routines*. Project Zero.  
<https://pz.harvard.edu/resources/global-thinking>
- Manyika, J., Silberg, J., & Presten, B. (2022, November 17). *What do we do about the biases in ai?*. Harvard Business Review. <https://hbr.org/2019/10/what-do-we-do-about-the-biases-in-ai>
- Mayring, P. (2000). Qualitative Content Analysis. Forum Qualitative Sozialforschung / Forum: *Qualitative Social Research*, 1(2), Article 2. <https://doi.org/10.17169/fqs-1.2.1089>
- Meadows, D. H., & Wright, D. (2015). *Thinking in systems: A Primer*. Chelsea Green Publishing.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass
- Miri, B., David, B.-C., & Uri, Z. (2007). Purposely teaching for the promotion of higher-order thinking skills: A case of critical thinking. *Research in Science Education*, 37(4), 353–36. <https://doi.org/10.1007/s11165-006-9029-2>
- Mundy, K. (2002). Education for global citizenship: Toward a renewed understanding of global education for Canadian teachers. *Canadian Journal of Education*, 27(4), 477–498.
- National Council for the Social Studies. (n.d.). *The College, Career, and Civic Life (C3) Framework for Social Studies State Standards: Guidance for Enhancing the Rigor of K-12 Civics, Economics, Geography, and History*. National Council for the Social Studies.  
<https://www.socialstudies.org/standards/c3>

- Nentl, N., & Zietlow, R. (2008). Using Bloom's taxonomy to teach critical thinking skills to business students. *College & Undergraduate Libraries*, 15(1–2), 159–172.  
<https://doi.org/10.1080/10691310802177135>
- Neuendorf, K. A. (2017). *The Content Analysis Guidebook*. Sage Publication.
- New Jersey Department of Education. (2020). *NJ Student Learning Standards for Social Studies*.  
New Jersey Department of Education . <https://www.nj.gov/education/standards/socst/>
- Nussbaum, M. (2017). Education for citizenship in an era of global connection 1. *The Evolution of Liberal Arts in the Global Age*, 213–225. <https://doi.org/10.4324/9781315645216-19>
- NYSED. (n.d.). *Culturally responsive-sustaining education framework*. New York State Education Department . <https://www.nysed.gov/sites/default/files/programs/crs/culturally-responsive-sustaining-education-framework.pdf>
- OECD Publishing. (2020). *Codebook for Global Student Learning Outcomes*. Global Cities.  
<https://www.globalcities.org/codebook>
- OpenAI. (2024). Explanation of a new session in ChatGPT. Retrieved from ChatGPT session on February 13, 2024.
- OECD. (2020). *Education for living in an interconnected world*. OECD iLibrary.  
<https://www.oecd-ilibrary.org/>
- Ornstein, A. C., & Hunkins, F. P. (2018). *Curriculum: Foundations, principles, and issues*. Pearson Education Limited.
- Papadopoulos, T., & Charalabidis, Y. (2020). What do governments plan in the field of artificial intelligence? *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance*. <https://doi.org/10.1145/3428502.3428514>
- Parkinson, S., Eatough, V., Holmes, J., Stapley, E., & Midgley, N. (2015). Framework analysis: A worked example of a study exploring young people's experiences of depression.



*Qualitative Research in Psychology*, 13(2), 109–129.

<https://doi.org/10.1080/14780887.2015.1119228>

Tomlinson, J. (2009). Globalization and culture. *Rugman Reviews*, 135–136. *Journal of World-Systems Research*, 8(3), 453.

[https://www.researchgate.net/publication/282390752\\_Review\\_of\\_Globalization\\_and\\_Culture\\_by\\_John\\_Tomlinson](https://www.researchgate.net/publication/282390752_Review_of_Globalization_and_Culture_by_John_Tomlinson)

Research Advisory Committee of the National Council of Teachers of Mathematics. (1988).

NCTM curriculum and Evaluation Standards for School Mathematics: Responses from the Research Community. *Journal for Research in Mathematics Education*, 19(4), 338–344. <https://doi.org/10.5951/jresmetheduc.19.4.0338>

Sahu, B. (2002). *The New Educational Philosophy*. New Delhi: Sarup & Sons.

Shiva, V. (2000). The hijacking of the global food supply. In *Stolen Harvest: The Hijacking of the Global Food Supply* (pp. 5-20). Cambridge, MA: South End Press. (2017).

Silver, B. J. (2013). *Forces of Labor: Workers' movements and globalization since 1870*. Cambridge University Press.

Smith, K. A., & Smith, R. S. (2019). The Cognitive Rigor Matrix: An Analytical Tool for Evaluating Student Cognitive Engagement. In G. D. R. Beck (Ed.), *Handbook of Research on Assessment Technologies, Methods, and Applications in Higher Education* (pp. 268-284). IGI Global.

[https://www.google.com/books/edition/Handbook\\_of\\_Research\\_on\\_Assessment\\_Techn/v0bJUV2MpVUC?hl=en&gbpv=1&printsec=frontcover](https://www.google.com/books/edition/Handbook_of_Research_on_Assessment_Techn/v0bJUV2MpVUC?hl=en&gbpv=1&printsec=frontcover)

Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N., Stigson, B., Shrivastava, P., Leach, M., & O'Connell, D. (2016). *Integration: The key to*

- implementing the sustainable development goals. *Sustainability Science*, 12(6), 911–919.  
<https://pubmed.ncbi.nlm.nih.gov/30147763/>
- Suárez-Orozco, M., & Qin-Hilliard, D. B. (2004). Introduction, Globalization: Culture and education in the new millennium. In M. Suárez-Orozco & D. B. Qin-Hilliard (Eds.), *Globalization: Culture and education in the new millennium* (pp. 1–37). Berkeley, CA: University of California Press.
- UNESCO. (2013). *Global Citizenship Education: Topics and Learning Objectives*. United Nations Educational, Scientific and Cultural Organization.
- United Nations. (n.d.). *Global citizenship*. United Nations. <https://www.un.org/en/academic-impact/global-citizenship>
- Vanderbilt University Center for Teaching. 2023. Bloom’s Taxonomy.  
<https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>
- Watson, I. (2017). Globalization and its real discontents. In A. Editor & B. Editor (Eds.), *Rethinking the Politics of Globalization* (pp. 87–110).  
<https://doi.org/10.4324/9781315195384-5>
- Webb, N. L. (2002). *Depth-of-knowledge levels for four content areas*. University of Wisconsin-Madison, Wisconsin Center for Education Research.
- Weeks, C. (2023, May 17). *Global competency: How to build critical thinking*. Participate Learning. <https://www.participatelearning.com/blog/global-competency-how-to-build-critical-thinking/>

## Appendix A

### Researcher Verification of AI Classification of Tasks by Depth of Knowledge (DOK)

#### Levels

This appendix presents the results of two sets of analyses conducted to assess the New Jersey (NJ) student learning standards in grades K-8 using Hess' Cognitive Rigor Matrix. The first two sets of results pertain to the application of artificial intelligence (AI) in assessing the cognitive rigor of these standards. Through the utilization of AI, the researcher aimed to gain insights into the level of higher-order thinking skills required by the NJ student learning standards.

Furthermore, this appendix includes the outcomes of the Researcher Verification of AI Classification of Tasks by Depth of Knowledge (DOK) Levels. In this verification process, the researcher scrutinized and verified the AI-generated classifications of tasks according to DOK levels, using the Framework Method and Mayring Step Model ensuring the accuracy and reliability of the AI assessment results.

Together, these analyses provide a comprehensive evaluation of the cognitive demands embedded within the NJ student learning standards, shedding light on the depth and complexity of thinking skills required for student achievement across the K-8 educational spectrum.

#### Grades K-2

Standard	Webb's Depth of Knowledge 1st Time	Webb's Depth of Knowledge 2nd Time	Researcher Verification
6.1.2.CivicsPI.1 Describe roles and responsibilities of community and	DOK 1 (Recall & Reproduction)	DOK 1	DOK 1

local government leaders (e.g., mayor, town council).			
6.1.2.CivicsPI.2: Investigate the importance of services provided by the local government to meet the needs and ensure the safety of community members.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.CivicsPI.3: Explain how individuals work with different levels of government to make rules.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsPI.4: Explain how all people, not just official leaders, play important roles in a community.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsPI.5: Describe how communities work to accomplish common tasks, establish responsibilities, and fulfill roles of authority.	DOK 2 (Skill/Concept)	DOK 2	DOK 2

6.1.2.CivicsPI.6: Explain what government is and its function.	DOK 1 (Recall & Reproduction)	DOK 1	DOK 1
6.1.2.CivicsPD.1: Engage in discussions effectively by asking questions, considering facts, listening to the ideas of others, and sharing opinions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.CivicsPD.2: Establish a process for how individuals can effectively work together to make decisions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 4	DOK 3
6.1.2.CivicsDP.1: Explain how national symbols reflect on American values and principles.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsDP.2: Use evidence to describe how democratic principles such as equality, fairness, and respect for legitimate authority and rules have impacted individuals and communities.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.2.CivicsDP.3: Explain how historical symbols, monuments and holidays reflect the shared values, principles, and beliefs of the American identity.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsPR.1: Determine what makes a good rule or law.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.CivicsPR.2: Cite evidence that explains why rules and laws are necessary at home, in schools, and in communities.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsPR.3: Analyze classroom rules and routines and describe how they are designed to benefit the common good.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.2.CivicsPR.4: Explain why teachers, local community leaders, and other adults have a responsibility to make rules that are fair, consistent, and respectful of individual rights.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsCM.1: Describe why it is important that individuals assume personal and civic responsibilities in a democratic society.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.CivicsCM.2: Use examples from a variety of sources to describe how certain characteristics can help individuals collaborate and solve problems (e.g., open-mindedness, compassion, civility, persistence).	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.CivicsCM.3: Explain how diversity, tolerance, fairness, and respect for others can contribute to individuals feeling accepted.	DOK 2 (Skill/Concept)	DOK 2	DOK 2

6.1.2.GeoPP.1 Explain the different physical and human characteristics that might make a location a good place to live (e.g., landforms, climate and weather, resource availability).	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.Geo.SV.1: Use maps to identify physical features (e.g., continents, oceans, rivers, lakes, mountains).	DOK 1 (Recall & Reproduction)	DOK 1	DOK 1
6.1.2.Geo.SV.2 Describe how maps are created for a specific purpose (e.g., school fire-drill map, route from home to school, learning centers in a classroom).	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.Geo.SV.3 Identify and describe the properties of a variety of maps and globes (e.g., title, legend, cardinal directions, scale, symbols,) and purposes (wayfinding, thematic).	DOK 2 (Skill/Concept)	DOK 2	DOK 2



6.1.2.Geo.SV.4. Identify examples of geospatial data (e.g., landmarks on the school grounds, the spatial location of each student's assigned seat in the classroom).	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.Geo.HE.1 Explain how seasonal weather changes, climate, and other environmental characteristics affect people's lives in a place or region.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.Geo.HE.2 Describe how human activities affect the culture and environmental characteristics of places or regions (e.g., transportation, housing, dietary needs).	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.Geo.HE.3 Identify cultural and environmental characteristics of different regions in New Jersey and the United States.	DOK 1 (Recall & Reproduction)	DOK 1	DOK 1

6.1.2.Geo.HE.4: Investigate the relationship between the physical environment of a place and the economic activities found there.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.Geo.GI.1: Explain why and how people, goods, and ideas move from place to place.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.Geo.GI.2: Use technology to understand the culture and physical characteristics of regions.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.EconET.1: Explain the difference between needs and wants.	DOK 1 (Recall & Reproduction)	DOK 1	DOK 1
6.1.2.EconET.2: Cite examples of choices people make when resources are scarce.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.EconET.3: Describe how supply and demand influence price and output of products.	DOK 2 (Skill/Concept)	DOK 2	DOK 2

6.1.2.EconET.4: Explain the impact that decisions about savings, debt, and investment can have on individuals' lives.	DOK 3 (Strategic Thinking & Reasoning)	DOK 2	DOK 3
6.1.2.EconET.5: Describe how local and state governments make decisions that affect individuals and the community.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.EconEM.1: Describe the skills and knowledge required to produce specific goods and services.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.EconEM.2: Describe the goods and services that individuals and businesses in the local community produce and those that are produced in other communities.	DOK 2 (Skill/Concept)	DOK 1	DOK 2
6.1.2.EconEM.3: Identify the ways in which people exchange(d) goods and services today, and in the past (e.g., purchase, borrow, barter).	DOK 2 (Skill/Concept)	DOK 2	DOK 2

6.1.2.EconNE.1: Identify examples of human capital, physical capital, and natural resources that contribute to favorable economic conditions.	DOK 2 (Skill/Concept)	DOK 1	DOK 2
6.1.2.EconNE.2: Describe examples of goods and services that governments provide.	DOK 2 (Skill/Concept)	DOK 1	DOK 2
6.1.2.EconGE.1: Cite examples of products that are produced domestically and sold abroad and produced abroad and sold domestically.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.EconGE.2: Explain why people in one country trade goods and services with people in other countries.	DOK 3 (Strategic Thinking & Reasoning)	DOK 2	DOK 3

6.1.2.HistoryCC.1: Use multiple sources to create a chronological sequence of events that describes how and why your community has changed over time.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.HistoryCC.2: Use a timeline of important events to make inferences about the "big picture" of history.	DOK 3 (Strategic Thinking & Reasoning)	DOK 2	DOK 3
6.1.2.HistoryCC.3: Make inferences about how past events, individuals, and innovations affect our current lives.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.HistoryUP.1: Use primary sources representing multiple perspectives to compare and make inferences about why there are different accounts of the same event.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.2.HistoryUP.2: Use evidence to demonstrate how an individual's beliefs, values, and traditions may change and/or reflect more than one culture.	DOK 3 (Strategic Thinking & Reasoning)	DOK 2	DOK 3

6.1.2.HistoryUP.3: Use examples from the past and present to describe how stereotyping and prejudice can lead to conflict.	DOK 2 (Skill/Concept)	DOK 2	DOK 2
6.1.2.HistorySE.1: Use examples of regional folk heroes, stories, and/or songs and make inferences about how they have contributed to the development of a culture's history.	DOK 3 (Strategic Thinking & Reasoning)	DOK 2	DOK 3
6.1.2.HistorySE.2: Analyze a variety of sources describing the same event and make inferences about why the accounts are different (e.g., photographs, paintings, cartoons, newspapers, poetry, novels, plays).	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 4
6.1.2.HistorySE.3: Use historical data from a variety of sources to investigate the development of a local community (e.g., origins of its name, originating members, important historical events and places).	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.2.HistoryCA.1: Make an evidence-based argument how and why communities change over time (e.g., locally, nationally, globally).	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.3.2.CivicsPD.1: With adult guidance and support, bring awareness of a local issue to school and/or community members and make recommendations for change.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 4
6.3.2.GeoGI.1: Investigate a global issue such as climate change, its significance, and share information about how it impacts different regions around the world.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.3.2.GeoGI.2: Collect data and consider sources from multiple perspectives to become informed about an environmental issue and identify possible solutions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

K-2 Frequency Table

DOK Levels	Chat GPT 1st	Chat GPT 2nd	Researcher
------------	--------------	--------------	------------

DOK 1 (Recall & Reproduction):	5	8	5
DOK 2 (Skill/Concept)	27	29	27
DOK 3 (Strategic Thinking & Reasoning)	21	16	19
DOK 4 (Extended Thinking)	1	1	3

**Grades 3-5**

<b>Standard</b>	<b>Webb's Depth of Knowledge 1st Time</b>	<b>Webb's Depth of Knowledge 2nd Time</b>	<b>Researcher Verification</b>
6.1.5.CivicsPI.1: Describe ways in which people benefit from and are challenged by working together, including through government, workplaces, voluntary organizations, and families.	DOK 1 (Recall & Reproduction)	DOK 2	DOK 1
6.1.5.CivicsPI.2: Investigate different ways individuals	DOK 2 (Skills and Concepts)	DOK 3	DOK 2



participate in government (e.g., voters, jurors, taxpayers).			
6.1.5.CivicsPI.3: Explain how the United States functions as a representative democracy and describe the roles of elected representatives and how they interact with citizens at local, state, and national levels.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.CivicsPI.4: Describe the services our government provides the people in the community, state and across the United States.	DOK 1 (Recall & Reproduction)	DOK 2	DOK 1
6.1.5.CivicsPI.5: Explain how government functions at the local, county, and state level.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsPI.6: Distinguish the roles and responsibilities of the three branches of the national government.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2

6.1.5.CivicsPI.7: Explain how national and state governments share power in the federal system of government.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsPI.8: Describe how the United States Constitution defines and limits the power of government.	DOK 1 (Recall & Reproduction)	DOK 2	DOK 2
6.1.5.CivicsPI.9: Research and compare the differences and similarities between the United States and other nations' governments, customs, and laws.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.CivicsPD.1: Describe the roles of elected representatives and explain how individuals at local, state, and national levels can interact with them.	DOK 1 (Recall & Reproduction)	DOK 2	DOK 1
6.1.5.CivicsPD.2: Explain how individuals can initiate and/or influence local, state, or national public policymaking (e.g., petitions,	DOK 2 (Skills and Concepts)	DOK 3	DOK 2

proposing laws, contacting elected officials).			
6.1.5.CivicsPD.3: Explain how and why it is important that people from diverse cultures collaborate to find solutions to community, state, national, and global challenges.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.CivicsPD.4: Compare the qualifications of candidates running for local, state, or national public office with the responsibilities of the position.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsDP.1: Using evidence, explain how the core civic virtues and democratic principles impact the decisions made at the local, state, and national government (e.g., fairness, equality, common good).	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.CivicsDP.2: Compare and contrast responses of individuals	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

and groups, past and present, to violations of fundamental rights (e.g., fairness, civil rights, human rights).			
6.1.5.CivicsDP.3: Describe the role of religious freedom and participatory government in various North American colonies.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsPR.1: Compare procedures for making decisions in a variety of settings including classroom, school, government, and /or society.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.CivicsPR.2: Describe the process by which immigrants can become United States citizens.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsPR.3: Evaluate school and community rules, laws and/or policies and determine if they meet their intended purpose.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.5.CivicsPR.4: Explain how policies are developed to address public problems.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsHR.1: Describe how fundamental rights guaranteed by the United States Constitution and the Bill of Rights contribute to the improvement of American democracy.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsHR.2: Research and cite evidence for how the actions of Dr. Martin Luther King, Jr. and other historical civil rights leaders served as catalysts for social change, inspired social activism in subsequent generations.	DOK 3 (Strategic Thinking & Reasoning)	DOK 4	DOK 3
6.1.5.CivicsHR.3: Cite examples from a variety of sources to describe how national and international leaders, businesses, and global organizations promote human rights	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

and aid individuals and nations in need.			
6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.CivicsCM.1: Use a variety of sources to describe the characteristics exhibited by real and fictional people that contribute(d) to the well-being of their community and country.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsCM.2: Use evidence from multiple sources to construct a claim about how self-discipline and civility contribute to the common good.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.CivicsCM.3: Identify the types of behaviors that promote	DOK 2 (Skills and Concepts)	DOK 3	DOK 2

collaboration and problem solving with others who have different perspectives.			
6.1.5.CivicsCM.4: Examine the responsibilities of differing positions of authority and identify criteria that are likely to make leaders qualified for those positions.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.CivicsCM.5: Investigate the lives of New Jersey individuals with diverse experiences who have contributed to the improvement of society.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.CivicsCM.6: Cite evidence from a variety of sources to describe how a democracy depends upon and responds to individuals' participation.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.GeoPP.1: Compare and contrast characteristics of regions in the United States based on culture, economics, and physical	DOK 2 (Skills and Concepts)	DOK 1	DOK 2

characteristics to understand the concept of regionalism.			
6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.GeoPP.3: Use geographic models to describe how human movement relates to the location of natural resources and sometimes results in conflict.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.GeoPP.4: Investigate the different physical and human characteristics of urban, suburban, and rural communities and identify the factors that might attract individuals to that space.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.GeoPP.5: Describe how the migration and settlement patterns of	DOK 2 (Skills and Concepts)	DOK 2	DOK 2



Native American groups impacted different regions of the Western Hemisphere.			
6.1.5.GeoPP.6: Compare and contrast the voluntary and involuntary migratory experiences of different groups of people and explain why their experiences differed.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.GeoSV.1: Identify the maps or types of maps most appropriate for specific purposes.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.GeoSV.2: Use maps to explain the impact of location and place on the relationships between places in NJ, the US, and other countries.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.GeoSV.3: Demonstrate how to use digital geographic tools, maps, and globes to measure distances and determine time zones, and locations using latitude and longitude.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.5.GeoSV.4: Use a variety of geographic representations to describe similarities and differences between places.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.GeoSV.5: Use geographic data to examine how the search for natural resources resulted in conflict and cooperation.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.GeoHE.1: Use sources to describe how human activity has impacted the physical environment in different periods in NJ and the US.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.GeoHE.2: Cite examples of how technological advances have changed the environment in NJ and the US.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.GeoHE.3: Analyze the effects of catastrophic environmental and technological events on human settlements and migration.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.5.GeoGI.1: Evaluate the impact of the movement of people on individuals, communities, and regions.	DOK 2 (Skills and Concepts)	DOK 3	DOK 3
6.1.5.GeoGI.2: Use historical maps to explain what led to the exploration of new water and land routes.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.GeoGI.3: Use geographic tools to determine factors that impacted emigration, settlement patterns, and regional identities of the US colonies.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.GeoGI.4: Explain how cultural and environmental characteristics affect the distribution and movement of people, goods, and ideas.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.EconET.1: Identify positive and negative incentives that influence decisions.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2

6.1.5.EconET.2: Use quantitative data to engage in cost-benefit analyses of decisions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.EconET.3: Explain how scarcity and choice influence decisions made by individuals, communities, and nations.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconEM.1: Explain why individuals and businesses specialize and trade.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconEM.2: Identify examples of resources used to produce goods and services.	DOK 1 (Recall & Reproduction)	DOK 2	DOK 1
6.1.5.EconEM.3: Describe how supply and demand influence price and output of products.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconEM.4: Compare different regions of NJ to determine the role	DOK 2 (Skills and Concepts)	DOK 3	DOK 2

of geography, resources, climate, etc., in economic opportunities.			
6.1.5.EconEM.5 Explain why individuals and societies trade, how trade functions, and the role of trade.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconEM.6 Explain the system of mercantilism and its impact on the economies of the colonies and European countries.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.EconNE.1 Explain the ways in which the government pays for the goods and services it provides.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconNE.2 Use data to describe how the availability of resources in New Jersey and other regions in the United States have impacted economic opportunities.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2

6.1.5.EconNE.3: Describe how the development of different transportation systems impacted the economies of New Jersey and the United States.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconNE.4: Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.EconNE.5: Explain how the availability of private and public goods and services is influenced by the government and the global economy.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconNE.6: Examine the qualities of entrepreneurs in a capitalistic society.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.EconNE.7: Describe the role and relationship among households,	DOK 2 (Skills and Concepts)	DOK 2	DOK 2

businesses, laborers, and governments within the economic system.			
6.1.5.EconGE.1 Explain how the development of communication systems has led to increased collaboration and spread of ideas.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.EconGE.2 Illustrate how production, distribution, and consumption of goods and services are interrelated and affected by the global market.	DOK 2 (Skills and Concepts)	DOK 2	DOK 3
6.1.5.EconGE.3: Use economic data to explain how trade leads to economic interdependence among nations.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.EconGE.4: Compare and contrast how the availability of resources affects people across the world.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2

6.1.5.EconGE.5: Evaluate the economic impact of science and technology innovations on European exploration.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.1: Analyze key historical events to explain the creation of the state of New Jersey and the United States.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 4
6.1.5.HistoryCC.2: Use various sources to illustrate how the American identity evolved over time.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.3: Use multiple sources to describe impacts of historical figures on state and national governments.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.4: Use evidence to document interactions among African, European, and Native American groups.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2



6.1.5.HistoryCC.5: Analyze the power struggle among European countries and its impact on Europe and the Americas.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 4
6.1.5.HistoryCC.6: Use sources to make inferences on the impact of European colonization on Native American populations.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.7: Evaluate the impact of slavery using sources representing multiple perspectives.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.8: Make inferences to describe the influence of Native American groups in different regions of New Jersey.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.9: Evaluate the impact of prominent figures in New Jersey.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.10: Analyze the power struggle among European		DOK 3	DOK 4

countries and its impact on Europe and the Americas.	DOK 3 (Strategic Thinking & Reasoning)		
6.1.5.HistoryCC.11: Make inferences to explain the impact of belief systems and family structures on government structures.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.12: Determine the roles of religious freedom and participatory government in North American colonies.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.HistoryCC.13: Craft a claim explaining the impact of early government structures on American politics.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryCC.14: Compare the practice of slavery and indentured servitude in Colonial labor systems.	DOK 2 (Skills and Concepts)	DOK 3	DOK 3

6.1.5.HistoryCC.15: Analyze key historical documents and their role in government and citizenship.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 4
6.1.5.HistoryUP.1: Describe immigration to New Jersey and America and cite challenges encountered.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.HistoryUP.2: Compare governance, belief systems, and family structures among different groups.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.HistoryUP.3: Evaluate the impact of the Columbian Exchange using multiple perspectives.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryUP.4: Compare gender roles, religion, values, and political systems of Native American groups.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2

6.1.5.HistoryUP.5: Compare historians' interpretations of historical ideas, resources.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.HistoryUP.6: Evaluate the impact of different interpretations of experiences and events by people with different perspectives.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.1.5.HistoryUP.7: Describe why understanding perspectives of other cultures is important in an interconnected world.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.5.HistorySE.1: Examine accounts of early European explorations of North America.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.5.HistorySE.2: Construct an argument for the role of historical symbols, monuments, and holidays in the American identity.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.1.5.HistoryCA.1: Craft an argument with historical evidence on how demographics affected opportunities during the Colonial era.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.3.5.CivicsPD.1: Develop an action plan addressing climate change issues.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.3.5.CivicsPD.2: Use sources to identify perspectives and actions on a community, state, or national issue.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.3.5.CivicsPD.3: Propose a solution to a local issue considering different perspectives.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
6.3.5.GeoHE.1: Participate in a project advocating for climate change awareness and solutions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 4
6.3.5.GeoGI.1: Use technology to examine global issues and propose solutions.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3

6.3.5.EconET.1. Investigate an economic issue impacting children and propose a solution.	DOK 3 (Strategic Thinking & Reasoning)	DOK 3	DOK 3
--	--	-------	-------

Frequency Table

DOK Levels	Chat GPT 1st	Chat GPT 2nd	Researcher
DOK 1 (Recall & Reproduction):	5	0	4
DOK 2 (Skill/Concept)	58	36	56
DOK 3 (Strategic Thinking & Reasoning)	37	63	35
DOK 4 (Extended Thinking)	0	1	5

#### Grades 6-8

Standard	Webb's Depth of Knowledge 1st Time	Webb's Depth of Knowledge 2nd Time	Researcher Verification
----------	---	---	----------------------------

6.1.8.CivicsPI.3.a: Cite evidence to evaluate the extent to which the leadership and decisions of early administrations of the national government met the goals established in the Constitution.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.CivicsPI.3.b: Evaluate the effectiveness of the fundamental principles of the Constitution (i.e., consent of the governed, rule of law, federalism, limited government, separation of powers, checks and balances, and individual rights) in establishing a federal government that allows for growth and change over time.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.CivicsPI.3.c: Distinguish the powers and responsibilities of citizens, political parties, interest groups, and the media in a variety of governmental and nongovernmental contexts.	DOK 3 (Strategic Thinking)	DOK 2	DOK 3
6.1.8.CivicsPI.3.d: Use data and other evidence to determine the extent to which demographics influenced the debate on representation in Congress and federalism by examining the New Jersey and Virginia plans.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3

6.1.8.CivicsPD.3.a: Cite evidence to determine the role that compromise played in the creation and adoption of the Constitution and Bill of Rights.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.CivicsDP.3.a: Use primary and secondary sources to assess whether or not the ideals found in the Declaration of Independence were fulfilled for women, African Americans, and Native Americans during this time period.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.CivicsHR.3.a: Explain how and why constitutional civil liberties were impacted by acts of government during the Early Republic (i.e., Alien and Sedition Acts).	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.1.8.CivicsHR.3.b: Evaluate the impact of the institution of slavery on the political and economic expansion of the United States.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.CivicsHR.3.c: Construct an argument to explain how the expansion of slavery violated human rights and contradicted American ideals.	DOK 4 (Extended Thinking)	DOK 3	DOK 4



6.1.8.GeoSV.3.a: Use maps and other geographic tools to construct an argument on the impact of geography on the developments and outcomes of the American Revolution including New Jersey's pivotal role.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.EconET.3.a: Identify the effect of inflation and debt on the American people and evaluate the policies of state and national governments during this time.	DOK 3 (Strategic Thinking)	DOK 2	DOK 3
6.1.8.HistoryCC.3.a: Explain how the consequences of the Seven Years War, changes in British policies toward American colonies, and responses by various groups and individuals in the North American colonies led to the American Revolution.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.8.HistoryCC.3.b: Explain how political parties were formed and continue to be shaped by differing perspectives regarding the role and power of federal government.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.1.8.HistoryCC.3.c: Use geographic tools and resources to investigate how conflicts and alliances among European countries and Native American groups impacted the expansion of American territory.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3

6.1.8.HistoryCC.3.d: Compare and contrast the Articles of Confederation and the United States Constitution in terms of the decision-making powers of national government.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryUP.3.a: Use primary sources as evidence to explain why the Declaration of Independence was written and how its key principles evolved to become unifying ideas of American democracy.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryUP.3.b: Examine the roles and perspectives of various socioeconomic groups during the American Revolution, and determine how these groups were impacted by the war.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryUP.3.c: Analyze how the terms of the Treaty of Paris affected United States relations with Native Americans and with European powers that had territories in North America from multiple perspectives.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistorySE.3.a: Analyze how the leadership of George Washington during the American Revolution and as president allowed for the establishment of American democracy.	DOK 3 (Strategic Thinking)	DOK 3	DOK 4

6.1.8.HistorySE.3.b: Analyze a variety of sources to make evidence-based inferences about how prominent individuals and other nations contributed to the causes, execution, and outcomes of the American Revolution.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.CivicsDP.4.a: Research and prioritize the most significant events that led to the expansion of voting rights during the Jacksonian period.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.CivicsHR.4.a: Examine sources from a variety of perspectives to describe efforts to reform education, women's rights, slavery, and other issues during the Antebellum period.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.GeoSV.4.a: Map territorial expansion and settlement, highlighting the locations of conflicts with and resettlement of Native Americans.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.EconET.4.a: Analyze the debates involving the National Bank, uniform currency, and tariffs, and determine the extent to which each of these economic tools met the economic challenges facing the new nation.	DOK 4 (Extended Thinking)	DOK 3	DOK 4

6.1.8.EconET.4.b: Assess the impact of the Louisiana Purchase and western exploration on the expansion and economic development of the United States.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.EconNE.4.a: Explain how major technological developments revolutionized land and water transportation, as well as the economy, in New Jersey and the nation.	DOK 3 (Strategic Thinking)	DOK 2	DOK 3
6.1.8.EconNE.4.b: Analyze how technological innovations affected the status and social class of different groups of people and explain the outcomes that resulted.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.4.a: Explain the changes in America's relationships with other nations by analyzing policies, treaties, tariffs, and agreements.	DOK 3 (Strategic Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.4.b: Explain the growing resistance to slavery and New Jersey's role in the Underground Railroad.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3

6.1.8.HistoryCC.4.c: Analyze how the concept of Manifest Destiny influenced the acquisition of land through annexation, diplomacy, and war.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.4.d: Analyze the push-pull factors that led to increase in immigration and explain why ethnic and cultural conflicts resulted.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.5.a: Prioritize the causes and events that led to the Civil War from different perspectives.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC5.b: Analyze critical events and battles of the Civil War from different perspectives.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.5.c: Assess the human and material costs of the Civil War in the North and South.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryUP.5.d: Analyze the effectiveness of the 13th, 14th, and 15th Amendments to the United States Constitution from multiple perspectives.	DOK 4 (Extended Thinking)	DOK 3	DOK 4

6.1.8.HistoryUP.5.b: Examine the roles of women, African Americans, and Native Americans in the Civil War.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryUP.5.c: Explain how and why the Emancipation Proclamation and the Gettysburg Address continue to impact American life.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryCC.5.d: Assess the role of various factors that affected the course and outcome of the Civil War (i.e., geography, natural resources, demographics, transportation, leadership, and technology).	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.5.e: Compare and contrast the approaches of Congress and Presidents Lincoln and Johnson toward the reconstruction of the South.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.1.8.HistoryCC.5.f: Analyze the economic impact of Reconstruction on the South from different perspectives.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.1.8.HistoryCC.5.g: Construct an argument that prioritizes the causes and events that led to the Civil	DOK 4 (Extended Thinking)	DOK 3	DOK 4

War using multiple sources from different perspectives.			
6.2.8.GeoPP.1.a: Compare and contrast the social organization, natural resources, and land use of early hunters/gatherers and those who lived in early agrarian societies.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.2.8.GeoPP.1.b: Use maps to examine the impact of the various migratory patterns of hunters/gatherers that moved from Africa to Eurasia, Australia, and the Americas.	DOK 2 (Skills and Concepts)	DOK 3	DOK 2
6.2.8.HistoryCC.1.a: Describe the influence of the agricultural revolution on population growth and the subsequent development of civilizations.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.2.8.HistoryCC.1.b: Determine the impact of technological advancements on hunter/gatherer and agrarian societies.	DOK 3 (Strategic Thinking)	DOK 2	DOK 3

6.2.8.HistoryCC.1.c: Describe how the development of both written and unwritten languages impacted human understanding, development of culture, and social structure.	DOK 2 (Skills and Concepts)	DOK 2	DOK 2
6.2.8.HistoryCC.1.d: Demonstrate an understanding of pre-agricultural and post-agricultural periods in terms of relative length of time.	DOK 1 (Recall and Reproduction)	DOK 2	DOK 2
6.2.8.HistorySE.1.a: Explain how archaeological discoveries are used to develop and enhance understanding of life prior to written records.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.CivicsPI.2.a: Explain how/why different early river valley civilizations developed similar forms of government and legal structures.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.CivicsHR.2.a: Determine the role of slavery in the economic and social structures of early river valley civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoSV.2.a: Compare and contrast physical and political maps of early river valley civilizations and their modern counterparts and determine the	DOK 4 (Extended Thinking)	DOK 3	DOK 4



geopolitical impact of these civilizations, then and now.			
6.2.8.GeoHE.2.a: Determine the extent to which geography influenced settlement, the development of trade networks, technological innovations, and the sustainability of early river valley civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.EconGE.2.a: Explain how technological advancements led to greater economic specialization, improved weaponry, trade, and the development of a class system in early river valley civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.HistoryCC.2.a: Evaluate the importance and enduring legacy of the major achievements of the early river valley civilizations over time.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.HistoryCC.2.b: Analyze the impact of religion on daily life, government, and culture in various early river valley civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 4

6.2.8.HistoryCC.2.c: Explain how the development of written language transformed all aspects of life in early river valley civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.HistoryCA.2.a: Analyze the factors that led to the rise and fall of various early river valley civilizations and determine whether there was a common pattern of growth and decline.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.CivicsPI.3.a: Compare and contrast the methods used by the rulers of Rome, China, and India to control and unify their expanding empires.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.CivicsDP.3.a: Compare and contrast the American legal system with the legal systems of classical civilizations and determine their influence on our current legal system.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.CivicsDP.3.b: Use evidence to describe the impact of Athenian democracy and the Roman Republic on the development of the United States Constitution.	DOK 4 (Extended Thinking)	DOK 3	DOK 3

6.2.8.CivicsHR.3.a: Compare and contrast the rights and responsibilities of free men, women, slaves, and foreigners in classical civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoPP.3.a: Use geographic models to describe how the availability of natural resources influenced the development of classical civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoPP.3.b: Explain how geography and the availability of natural resources led to the development and decline of classical civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.EconEM.3.a: Analyze the impact of expanding land and sea trade routes as well as a uniform system of exchange in the Mediterranean World and Asia.	DOK 3 (Strategic Thinking)	DOK 3	DOK 4
6.2.8.EconGE.3.a: Explain how classical civilizations used technology and innovation to enhance various aspects of society.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.HistoryCC.3.a: Determine the extent to which religion, economic issues, and conflict shaped the values and decisions of classical civilizations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3

6.2.8.HistoryUP.3.a: Compare and contrast social hierarchies in classical civilizations as they relate to power, wealth, and equality.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.HistoryUP.3.b: Compare the status of groups in the Ancient World to those of people today and evaluate perceptions of liberty and equality.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.HistoryUP.3.c: Compare and contrast the tenets of various world religions, their expansion, and responses to globalization.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.HistoryCA.3.a: Evaluate the enduring legacy of major achievements of Greece, Rome, India, and China.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.HistoryCA.3.b: Determine common factors in the decline and fall of the Roman Empire, Gupta India, and Han China.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.CivicsPI.4.a: Analyze the role of religion and other means used by rulers to unify and govern diverse populations.	DOK 3 (Strategic Thinking)	DOK 3	DOK 4

6.2.8.CivicsDP.4.a: Cite evidence of medieval English legal practices' influence on modern democracy.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoHE.4.a: Explain how geography influenced the development of empire centers and their world relationships.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.GeoPP.4.a: Explain the Arabian Peninsula's role in trade and the spread of Islam.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoPP.4.b: Assess how trade routes impacted urbanization and the development of trade centers.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoPP.4.c: Use maps to show the interaction between the Islamic world and medieval Europe.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.GeoHE.4.b: Use geographic models to determine the impact of environmental modifications.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3

6.2.8.GeoHE.4.c: Explain how geographies and climates influenced economic development.	DOK 3 (Strategic Thinking)	DOK 3	DOK 2
6.2.8.GeoGI.4.a: Determine how Africa's geography presented challenges and opportunities.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.EconGE.4.a: Analyze the impact of the open exchange between Europe and the Yuan Dynasty.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.EconNE.4.a: Compare and contrast feudalism in Japan and Europe.	DOK 4 (Extended Thinking)	DOK 3	DOK 3
6.2.8.HistoryCC.4.a: Determine events leading to the rise and decline of European feudalism.	DOK 3 (Strategic Thinking)	DOK 3	DOK3
6.2.8.HistoryCC.4.b: Explain the rise of powerful states due to various factors.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3

6.2.8.HistoryCC.4.c: Assess the impact of the plague on Europe.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.HistoryCC.4.d: Analyze the Crusades from different perspectives.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.HistoryCC.4.e: Determine the Byzantine Empire's influence.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.2.8.HistoryCC.4.f: Analyze the role of religion and economics in shaping social hierarchies.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.2.8.HistoryCC.4.g: Evaluate the legacy of major achievements in Asia, Africa, Europe, and the Americas.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.3.8.CivicsPI.1: Evaluate and defend a position on the necessity of government.	DOK 4 (Extended Thinking)	DOK 3	DOK 4

6.3.8.CivicsPI.2: Evaluate how different forms of government reflect societal values.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.3.8.CivicsPI.3: Use sources to examine roles in a local/global issue and share to gain support.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPI.4: Investigate roles of organizations in shaping lives and share information.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPD.1: Deliberate on a public issue, consider opposing arguments, and conclude.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPD.2: Propose and defend a position on a public policy issue.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.3.8.CivicsPD.3: Construct a claim on the importance of informed participation in democracy.	DOK 4 (Extended Thinking)	DOK 3	DOK 4



6.3.8.CivicsDP.1: Identify an issue of inequality, develop solutions, and communicate the best one.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsDP.2: Make a claim on the extent/limitations of First Amendment rights.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsDP.3: Use case studies/events to explain the necessity of due process.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPR.1: Analyze primary sources to explain the development of democratic ideas in the U.S.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPR.2: Evaluate the Constitution's principles' effectiveness.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.3.8.CivicsPR.3: Take a position on an issue where fundamental ideals/principles conflict.	DOK 4 (Extended Thinking)	DOK 3	DOK 4

6.3.8.CivicsPR.4: Use evidence/data to propose/defend a policy on climate change.	DOK 4 (Extended Thinking)	DOK 3	DOK 4
6.3.8.CivicsPR.5: Engage in simulated democratic processes.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPR.6: Seek perspectives on a local budget issue and take a position.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsPR.7: Compare how ideas become laws across different government levels.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
6.3.8.CivicsHR.1: Construct an argument on the source of human rights and their protection.	DOK 4 (Extended Thinking)	DOK 3	DOK 3
6.3.8.EconET.1: Evaluate the opportunity cost of an economic action using quantitative data.	DOK 4 (Extended Thinking)	DOK 3	DOK 4

6.3.8.EconET.2: Assess the impact of government incentives and disincentives on the economy.	DOK 3 (Strategic Thinking)	DOK 3	DOK 3
--	-------------------------------	-------	-------

DOK Levels	Chat GPT 1st	Chat GPT 2nd	Researcher
DOK 1 (Recall & Reproduction):	1	0	0
DOK 2 (Skill/Concept)	7	7	16
DOK 3 (Strategic Thinking & Reasoning)	62	102	52
DOK 4 (Extended Thinking)	39	0	41

## **Appendix B:**

### **Classification of Tasks by Depth of Knowledge (DOK) Levels**

This appendix presents a detailed classification of educational standards and tasks within this dissertation using Hess' Cognitive Rigor Matrix. The classification was conducted with the assistance of ChatGPT, an advanced language model by OpenAI, which was utilized to interpret and categorize these standards based on the cognitive demands they place on students. A key aspect of this process was the use of specific prompts given as commands for each query, ensuring that the study's methodology is transparent and replicable. Sharing the prompts will allow future studies to replicate the study.

This appendix acknowledges an error message encountered during the second query. This inclusion serves as a critical point of transparency but how the various versions of ChatGPT can impact the output of your queries. Sharing this challenges/limitations is important as one considers the use of AI technologies in research. It is included to provide a complete picture of the research process and to facilitate problem-solving in future replications.

#### **Grades K-2**

##### **Researcher Prompt:**

You are conducting doctoral research on the New Jersey Social Studies Standards. I will give you about 10 standards at a time copied from the New Jersey Department of Education website. You will use the Hess Cognitive Rigor Matrix to label the standards by level based on the verbiage or task demand. Specifically you will use Hess Cognitive Rigor Matrix (Reading CRM) and (writing-speaking CRM) applying webb's depth of knowledge levels to Blooms Cognitive process dimensions. You will create a table with column one for the standards and column two for the Webb's depth of knowledge classification. Do you understand?

ChatGPT  
ChatGPT

Yes, I understand your request. You're asking to analyze and classify New Jersey Social Studies Standards using the Hess Cognitive Rigor Matrix, which integrates Webb's Depth of Knowledge (DOK) Levels with Bloom's Cognitive Process Dimensions. For each standard you provide, I'll assign a DOK level based on the complexity of the tasks or skills that students are expected to demonstrate. This classification will help in understanding the cognitive demands of each standard.

Please go ahead and provide the standards you'd like me to classify.

**Researcher Prompt:**

- 6.1.2.CivicsPI.1: Describe roles and responsibilities of community and local government leaders (e.g., mayor, town council).
- 6.1.2.CivicsPI.2: Investigate the importance of services provided by the local government to meet the needs and ensure the safety of community members.
- 6.1.2.CivicsPI.3: Explain how individuals work with different levels of government to make rules.
- 6.1.2.CivicsPI.4: Explain how all people, not just official leaders, play important roles in a community.
- 6.1.2.CivicsPI.5: Describe how communities work to accomplish common tasks, establish responsibilities, and fulfill roles of authority.
- 6.1.2.CivicsPI.6: Explain what government is and its function.
- 6.1.2.CivicsPD.1: Engage in discussions effectively by asking questions, considering facts, listening to the ideas of others, and sharing opinions.
- 6.1.2.CivicsPD.2: Establish a process for how individuals can effectively work together to make decisions.

ChatGPT

ChatGPT

To classify the provided New Jersey Social Studies Standards using the Hess Cognitive Rigor Matrix and Webb's Depth of Knowledge (DOK) levels, we'll examine the complexity and cognitive demands of each standard. The analysis will focus on identifying the kind of thinking and depth required to meet each standard, aligning them with the appropriate DOK level. The DOK levels range from Level 1 (Recall and Reproduction) to Level 4 (Extended Thinking).

Here's a classification based on the description of each standard:

Standard	Webb's Depth of Knowledge Classification
6.1.2.CivicsPI.1: Describe roles and responsibilities of community and local government leaders (e.g., mayor, town council).	DOK 1 (Recall & Reproduction)
6.1.2.CivicsPI.2: Investigate the importance of services provided by the local government to meet the needs and ensure the safety of community members.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.CivicsPI.3: Explain how individuals work with different levels of government to make rules.	DOK 2 (Skill/Concept)
6.1.2.CivicsPI.4: Explain how all people, not just official leaders, play important roles in a community.	DOK 2 (Skill/Concept)
6.1.2.CivicsPI.5: Describe how communities work to accomplish common tasks, establish responsibilities, and fulfill roles of authority.	DOK 2 (Skill/Concept)
6.1.2.CivicsPI.6: Explain what government is and its function.	DOK 1 (Recall & Reproduction)
6.1.2.CivicsPD.1: Engage in discussions effectively by asking questions, considering facts, listening to the ideas of others, and sharing opinions.	DOK 3 (Strategic Thinking & Reasoning)

6.1.2.CivicsPD.2: Establish a process for how individuals can effectively work together to make decisions.	DOK 3 (Strategic Thinking & Reasoning)
--	--

- DOK 1 (Recall & Reproduction) tasks require recall of facts or rote application of simple procedures. The tasks do not require significant cognitive effort. Standards classified under this level involve describing or explaining simple concepts or procedures.
- DOK 2 (Skill/Concept) tasks involve some mental skills and concepts. Students need to make some decisions as to how to approach the question or problem.
- DOK 3 (Strategic Thinking & Reasoning) tasks require reasoning, planning, using evidence, and a higher level of thinking than the previous levels. These tasks often involve more complex and abstract reasoning.

Please note that the classification can vary depending on the specific context in which a standard is taught or assessed. This analysis is based on the descriptions provided and the general expectations for cognitive demand according to the Hess Cognitive Rigor Matrix and Webb's DOK levels.

**Researcher Prompt:**

- 6.1.2.CivicsDP.1: Explain how national symbols reflect on American values and principles.
- 6.1.2.CivicsDP.2: Use evidence to describe how democratic principles such as equality, fairness, and respect for legitimate authority and rules have impacted individuals and communities.
- 6.1.2.CivicsDP.3 Explain how historical symbols, monuments and holidays reflect the shared values, principles, and beliefs of the American identity.
- 6.1.2.CivicsPR.1: Determine what makes a good rule or law.
- 6.1.2.CivicsPR.2: Cite evidence that explains why rules and laws are necessary at home, in schools, and in communities.
- 6.1.2.CivicsPR.3: Analyze classroom rules and routines and describe how they are designed to benefit the common good.
- 6.1.2.CivicsPR.4: Explain why teachers, local community leaders, and other adults have a responsibility to make rules that fair, consistent, and respectful of individual rights.

- 6.1.2.CivicsCM.1: Describe why it is important that individuals assume personal and civic responsibilities in a democratic society.
- 6.1.2.CivicsCM.2: Use examples from a variety of sources to describe how certain characteristics can help individuals collaborate and solve problems (e.g., open-mindedness, compassion, civility, persistence).
- 6.1.2.CivicsCM.3: Explain how diversity, tolerance, fairness, and respect for others can contribute to individuals feeling accepted.

ChatGPT

ChatGPT

For this set of New Jersey Social Studies Standards, I'll continue to classify each standard using the Hess Cognitive Rigor Matrix and Webb's Depth of Knowledge (DOK) levels. These levels help us understand the complexity of cognitive processes required by the standards, ranging from basic recall of information to extended thinking and reasoning.

Standard	Webb's Depth of Knowledge Classification
6.1.2.CivicsDP.1: Explain how national symbols reflect on American values and principles.	DOK 2 (Skill/Concept)
6.1.2.CivicsDP.2: Use evidence to describe how democratic principles such as equality, fairness, and respect for legitimate authority and rules have impacted individuals and communities.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.CivicsDP.3: Explain how historical symbols, monuments and holidays reflect the shared values, principles, and beliefs of the American identity.	DOK 2 (Skill/Concept)
6.1.2.CivicsPR.1: Determine what makes a good rule or law.	DOK 3 (Strategic Thinking & Reasoning)



6.1.2.CivicsPR.2: Cite evidence that explains why rules and laws are necessary at home, in schools, and in communities.	DOK 2 (Skill/Concept)
6.1.2.CivicsPR.3: Analyze classroom rules and routines and describe how they are designed to benefit the common good.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.CivicsPR.4: Explain why teachers, local community leaders, and other adults have a responsibility to make rules that are fair, consistent, and respectful of individual rights.	DOK 2 (Skill/Concept)
6.1.2.CivicsCM.1: Describe why it is important that individuals assume personal and civic responsibilities in a democratic society.	DOK 2 (Skill/Concept)
6.1.2.CivicsCM.2: Use examples from a variety of sources to describe how certain characteristics can help individuals collaborate and solve problems (e.g., open-mindedness, compassion, civility, persistence).	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.CivicsCM.3: Explain how diversity, tolerance, fairness, and respect for others can contribute to individuals feeling accepted.	DOK 2 (Skill/Concept)

**Researcher Prompt:**

- 6.1.2.GeoPP.1: Explain the different physical and human characteristics that might make a location a good place to live (e.g., landforms, climate and weather, resource availability).
- 6.1.2.Geo.SV.1: Use maps to identify physical features (e.g., continents, oceans, rivers, lakes, mountains).
- 6.1.2.Geo.SV.2: Describe how maps are created for a specific purpose (e.g., school fire-drill map, route from home to school, learning centers in a classroom).
- 6.1.2.Geo.SV.3: Identify and describe the properties of a variety of maps and globes (e.g., title, legend, cardinal directions, scale, symbols,) and purposes (wayfinding, thematic).
- 6.1.2.Geo.SV.4: Identify examples of geospatial data (e.g., landmarks on the school grounds, the spatial location of each student’s assigned seat in the classroom, needs more thought).

- 6.1.2.Geo.HE.1: Explain how seasonal weather changes, climate, and other environmental characteristics affect people's lives in a place or region.
- 6.1.2.Geo.HE.2: Describe how human activities affect the culture and environmental characteristics of places or regions (e.g., transportation, housing, dietary needs).
- 6.1.2.Geo.HE.3: Identify cultural and environmental characteristics of different regions in New Jersey and the United States.
- 6.1.2.Geo.HE.4: Investigate the relationship between the physical environment of a place and the economic activities found there.

ChatGPT

ChatGPT

For this set of New Jersey Social Studies Standards focused on geography, I'll classify each standard using the Hess Cognitive Rigor Matrix and Webb's Depth of Knowledge (DOK) levels. This framework helps identify the cognitive demand required by each standard, ranging from basic recall and reproduction of information to more complex, strategic thinking and extended reasoning tasks.

Standard	Webb's Depth of Knowledge Classification
6.1.2.GeoPP.1: Explain the different physical and human characteristics that might make a location a good place to live (e.g., landforms, climate and weather, resource availability).	DOK 2 (Skill/Concept)
6.1.2.Geo.SV.1: Use maps to identify physical features (e.g., continents, oceans, rivers, lakes, mountains).	DOK 1 (Recall & Reproduction)
6.1.2.Geo.SV.2: Describe how maps are created for a specific purpose (e.g., school fire-drill map, route from home to school, learning centers in a classroom).	DOK 2 (Skill/Concept)

6.1.2.Geo.SV.3: Identify and describe the properties of a variety of maps and globes (e.g., title, legend, cardinal directions, scale, symbols,) and purposes (wayfinding, thematic).	DOK 2 (Skill/Concept)
6.1.2.Geo.SV.4: Identify examples of geospatial data (e.g., landmarks on the school grounds, the spatial location of each student's assigned seat in the classroom).	DOK 2 (Skill/Concept)
6.1.2.Geo.HE.1: Explain how seasonal weather changes, climate, and other environmental characteristics affect people's lives in a place or region.	DOK 2 (Skill/Concept)
6.1.2.Geo.HE.2: Describe how human activities affect the culture and environmental characteristics of places or regions (e.g., transportation, housing, dietary needs).	DOK 2 (Skill/Concept)
6.1.2.Geo.HE.3: Identify cultural and environmental characteristics of different regions in New Jersey and the United States.	DOK 1 (Recall & Reproduction)
6.1.2.Geo.HE.4: Investigate the relationship between the physical environment of a place and the economic activities found there.	DOK 3 (Strategic Thinking & Reasoning)

- DOK 1 (Recall & Reproduction) tasks require recall of information such as facts, rules, or formulas. It's about remembering, not requiring much beyond reproducing knowledge.
- DOK 2 (Skill/Concept) tasks involve engagement with some mental skills and concepts. Students need to make some decisions about how to approach the question or problem, involving more than rote application, including comparison, organizing, summarizing, predicting, and estimating.
- DOK 3 (Strategic Thinking & Reasoning) tasks require deep understanding evidenced by the ability to plan and conduct significant investigations, requiring

reasoning, the development of a plan or sequence of steps, dealing with complexity, and abstract thinking.

This classification reflects the cognitive processes students need to engage with to meet each standard's expectations. It provides insights into the depth of understanding and learning experiences required to achieve proficiency in geographic knowledge and skills.

### Researcher Prompt

- 6.1.2.Geo.GI.1: Explain why and how people, goods, and ideas move from place to place.
- 6.1.2.Geo.GI.2: Use technology to understand the culture and physical characteristics of regions.
- 6.1.2.EconET.1: Explain the difference between needs and wants.
- 6.1.2.EconET.2: Cite examples of choices people make when resources are scarce.
- 6.1.2.EconET.3: Describe how supply and demand influence price and output of products.
- 6.1.2.EconET.4: Explain the impact that decisions about savings, debt, and investment can have on individuals' lives.
- 6.1.2.EconET.5: Describe how local and state governments make decisions that affect individuals and the community.
- 6.1.2.EconEM.1: Describe the skills and knowledge required to produce specific goods and services.
- 6.1.2.EconEM.2: Describe the goods and services that individuals and businesses in the local community produce and those that are produced in other communities.
- 6.1.2.EconEM.3: Identify the ways in which people exchange(d) goods and services today, and in the past (e.g., purchase, borrow, barter).

ChatGPT

ChatGPT

For this set of standards, which includes geography and economics standards for New Jersey Social Studies, I'll apply the Hess Cognitive Rigor Matrix and Webb's Depth of Knowledge (DOK) levels to classify each standard. This analysis helps understand the cognitive demands of each standard by identifying the depth and complexity of thinking skills required from students.

Standard	Webb's Depth of Knowledge Classification
----------	--

6.1.2.Geo.GI.1: Explain why and how people, goods, and ideas move from place to place.	DOK 2 (Skill/Concept)
6.1.2.Geo.GI.2: Use technology to understand the culture and physical characteristics of regions.	DOK 2 (Skill/Concept)
6.1.2.EconET.1: Explain the difference between needs and wants.	DOK 1 (Recall & Reproduction)
6.1.2.EconET.2: Cite examples of choices people make when resources are scarce.	DOK 2 (Skill/Concept)
6.1.2.EconET.3: Describe how supply and demand influence price and output of products.	DOK 2 (Skill/Concept)
6.1.2.EconET.4: Explain the impact that decisions about savings, debt, and investment can have on individuals' lives.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.EconET.5: Describe how local and state governments make decisions that affect individuals and the community.	DOK 2 (Skill/Concept)
6.1.2.EconEM.1: Describe the skills and knowledge required to produce specific goods and services.	DOK 2 (Skill/Concept)
6.1.2.EconEM.2: Describe the goods and services that individuals and businesses in the local community produce and those that are produced in other communities.	DOK 2 (Skill/Concept)

6.1.2.EconEM.3: Identify the ways in which people exchange(d) goods and services today, and in the past (e.g., purchase, borrow, barter).	DOK 2 (Skill/Concept)
---	-----------------------

- DOK 1 (Recall & Reproduction) tasks involve the recall of information, such as facts, definitions, or simple processes. There's no need for explanations or reasoning beyond the recall.
- DOK 2 (Skill/Concept) tasks require engagement with some mental skills and concepts. These tasks involve more than just recalling information and may require students to explain processes, make decisions on how to approach a question or problem, and use evidence or reasoning to support their conclusions.
- DOK 3 (Strategic Thinking & Reasoning) tasks demand deep understanding through reasoning, planning, using evidence, and a higher level of thinking than the previous levels. These tasks may involve analyzing or evaluating various aspects of a complex situation.

This classification is intended to guide educators in understanding the cognitive demands associated with each standard, aiding in the development of curriculum, instruction, and assessments that meet these demands.

#### **Researcher Prompt:**

- 6.1.2.HistoryUP.1: Use primary sources representing multiple perspectives to compare and make inferences about why there are different accounts of the same event.
- 6.1.2.HistoryUP.2: Use evidence to demonstrate how an individual's beliefs, values, and traditions may change and/or reflect more than one culture.
- 6.1.2.HistoryUP.3: Use examples from the past and present to describe how stereotyping and prejudice can lead to conflict.
- 6.1.2.HistorySE.1: Use examples of regional folk heroes, stories, and/or songs and make inferences about how they have contributed to the development of a culture's history.
- 6.1.2.HistorySE.2: Analyze a variety of sources describing the same event and make inferences about why the accounts are different (e.g., photographs, paintings, cartoons, newspapers, poetry, novels, plays).
- 6.1.2.HistorySE.3: Use historical data from a variety of sources to investigate the development of a local community (e.g., origins of its name, originating members, important historical events and places).
- 6.1.2.HistoryCA.1: Make an evidence-based argument how and why communities change over time (e.g., locally, nationally, globally).

ChatGPT

ChatGPT

This set of standards focuses on history and involves critical thinking skills such as analysis, inference, and evaluation based on evidence from multiple sources. Applying the Hess Cognitive

Rigor Matrix and Webb's Depth of Knowledge (DOK) levels, we can classify these standards according to the cognitive demands they place on students. These levels range from basic recall of information to complex, extended thinking tasks.

Standard	Webb's Depth of Knowledge Classification
6.1.2.EconNE.1: Identify examples of human capital, physical capital, and natural resources that contribute to favorable economic conditions.	DOK 2 (Skill/Concept)
6.1.2.EconNE.2: Describe examples of goods and services that governments provide.	DOK 2 (Skill/Concept)
6.1.2.EconGE.1: Cite examples of products that are produced domestically and sold abroad and produced abroad and sold domestically.	DOK 2 (Skill/Concept)
6.1.2.EconGE.2: Explain why people in one country trade goods and services with people in other countries.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistoryCC.1: Use multiple sources to create a chronological sequence of events that describes how and why your community has changed over time.	DOK 3 (Strategic Thinking & Reasoning)

6.1.2.HistoryCC.2: Use a timeline of important events to make inferences about the "big picture" of history.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistoryCC.3: Make inferences about how past events, individuals, and innovations affect our current lives.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistoryUP.1: Use primary sources representing multiple perspectives to compare and make inferences about why there are different accounts of the same event.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistoryUP.2: Use evidence to demonstrate how an individual's beliefs, values, and traditions may change and/or reflect more than one culture.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistoryUP.3: Use examples from the past and present to describe how stereotyping and prejudice can lead to conflict.	DOK 2 (Skill/Concept)
6.1.2.HistorySE.1: Use examples of regional folk heroes, stories, and/or songs and make inferences about how they have contributed to the development of a culture's history.	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistorySE.2: Analyze a variety of sources describing the same event and make inferences about why the accounts are different (e.g., photographs, paintings, cartoons, newspapers, poetry, novels, plays).	DOK 3 (Strategic Thinking & Reasoning)



6.1.2.HistorySE.3: Use historical data from a variety of sources to investigate the development of a local community (e.g., origins of its name, originating members, important historical events and places).	DOK 3 (Strategic Thinking & Reasoning)
6.1.2.HistoryCA.1: Make an evidence-based argument how and why communities change over time (e.g., locally, nationally, globally).	DOK 4 (Extended Thinking)

- DOK 2 (Skill/Concept) involves engagement with some mental skills and concepts, requiring more than mere recall. This level may involve explanation of concepts or processes and a basic level of application or decision-making.
- DOK 3 (Strategic Thinking & Reasoning) tasks demand reasoning, planning, and use of evidence. These tasks often involve analysis, comparison, and making inferences or predictions based on complex evidence or viewpoints.
- DOK 4 (Extended Thinking) tasks require complex reasoning, planning, developing, and thinking most significantly over time. These tasks involve making connections between ideas, synthesizing information from multiple sources, and elaborating on the information to develop a comprehensive argument or solution.

These classifications help educators understand the depth of understanding required by each standard, aiding in creating instructional strategies and assessments that align with the cognitive rigor demanded by the standards.

#### **Researcher Prompt:**

6.3.2.CivicsPD.1: With adult guidance and support, bring awareness of a local issue to school and/or community members and make recommendations for change.

- 6.3.2.GeoGI.1: Investigate a global issue such as climate change, its significance, and share information about how it impacts different regions around the world.

- 6.3.2.GeoGI.2: Collect data and consider sources from multiple perspectives to become informed about an environmental issue and identify possible solutions.

ChatGPT

ChatGPT

For these standards, which focus on civics and geography at a more advanced level, I'll classify them using the Hess Cognitive Rigor Matrix and Webb's Depth of Knowledge (DOK) levels.

These levels help in identifying the cognitive processes and skills required, from basic recall of facts to extended strategic thinking and problem-solving.

Standard	Webb's Depth of Knowledge Classification
6.3.2.CivicsPD.1: With adult guidance and support, bring awareness of a local issue to school and/or community members and make recommendations for change.	DOK 3 (Strategic Thinking & Reasoning)
6.3.2.GeoGI.1: Investigate a global issue such as climate change, its significance, and share information about how it impacts different regions around the world.	DOK 3 (Strategic Thinking & Reasoning)
6.3.2.GeoGI.2: Collect data and consider sources from multiple perspectives to become informed about an environmental issue and identify possible solutions.	DOK 3 (Strategic Thinking & Reasoning)

- DOK 3 (Strategic Thinking & Reasoning) tasks require reasoning, planning, and using evidence. These tasks often involve analysis, comparison, and making inferences based on complex evidence or viewpoints. They may also require students to engage in argumentation, explaining the reasoning behind their conclusions or recommendations.

The classification of these standards reflects their emphasis on engaging students in deep thinking about real-world issues, encouraging them to analyze information from multiple sources, consider different perspectives, and make informed recommendations or decisions. Such tasks demand a higher level of cognitive engagement, encouraging students to apply their knowledge and skills in meaningful, context-driven ways.

What is the frequency of each level.

ChatGPT

ChatGPT

Based on the latest input, the frequency of each Depth of Knowledge (DOK) level is as follows:

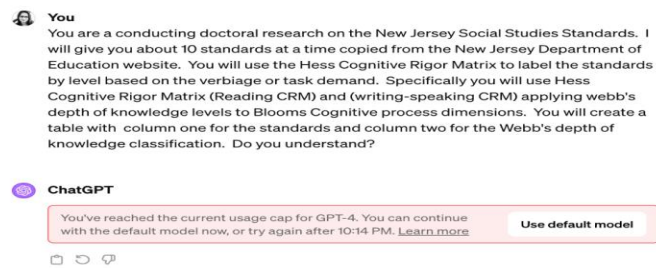
Frequency Table

DOK Levels	ChatGPT Total
DOK 1 (Recall & Reproduction):	5
DOK 2 (Skill/Concept)	27
DOK 3 (Strategic Thinking & Reasoning)	21
DOK 4 (Extended Thinking)	1

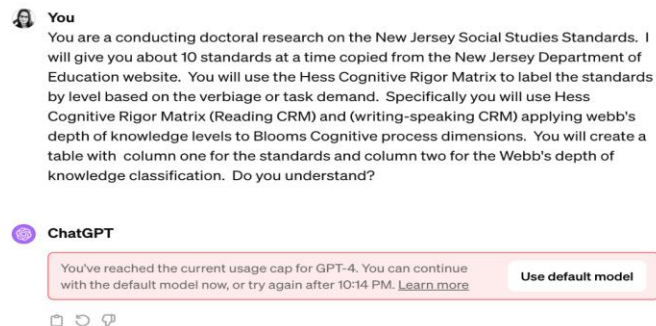
This distribution shows a predominant focus on DOK 2 (Skill/Concept) tasks, followed closely by DOK 3 (Strategic Thinking & Reasoning), with fewer instances of DOK 1 (Recall & Reproduction) and a single instance of DOK 4 (Extended Thinking).

## Grades 3-5

### Error Note appeared



The researcher inquired with ChatGPT what the error message said and meant:  
**Researcher Prompt:**



What does this message from ChatGPT mean? How does it affect a query.

### ChatGPT

ChatGPT

The message in the screenshot you provided indicates that the user has reached the current usage cap for GPT-4 and therefore cannot continue using GPT-4 until a specified time when the cap resets. It offers two alternatives:

- Use the default model: This allows the user to continue interacting with the AI, but with the default model provided by OpenAI, which may not be GPT-4. The default model might be an earlier version, like GPT-3 or GPT-3.5, which could potentially offer a different performance in terms of understanding and generating responses.

- Try again after the specified time: This suggests that the user can wait until the indicated time when the usage cap for GPT-4 is reset. At this time, the user will be able to use GPT-4 again.

The usage cap is likely in place to manage demand and ensure fair access to the system for all users. When you encounter such a message, it affects your query by potentially limiting the complexity of the responses you can receive if you opt to use the default model instead of GPT-

4. The depth, accuracy, and nuances of the answers could be impacted, depending on the capabilities of the alternative model being used.

### **Researcher Prompt:**

You are conducting doctoral research on the New Jersey Social Studies Standards. I will give you about 10 standards at a time copied from the New Jersey Department of Education website. You will use the Hess Cognitive Rigor Matrix to label the standards by level based on the verbiage or task demand. Specifically you will use Hess Cognitive Rigor Matrix (Reading CRM) and (writing-speaking CRM) applying Webb's depth of knowledge levels to Blooms Cognitive process dimensions. You will create a table with column one for the standards and column two for the Webb's depth of knowledge classification. Do you understand?

ChatGPT

ChatGPT

Yes, I understand. Please provide me with the 10 New Jersey Social Studies Standards, and I will classify them using the Hess Cognitive Rigor Matrix and Webb's Depth of Knowledge levels.

2 / 2

### **Researcher Prompt:**

6.1.5.CivicsPI.1: Describe ways in which people benefit from and are challenged by working together, including through government, workplaces, voluntary organizations, and families.

6.1.5.CivicsPI.2: Investigate different ways individuals participate in government (e.g., voters, jurors, taxpayers).

6.1.5.CivicsPI.3: Explain how the United States functions as a representative democracy and describe the roles of elected representatives and how they interact with citizens at local, state, and national levels.

6.1.5.CivicsPI.4: Describe the services our government provides the people in the community, state and across the United States.

6.1.5.CivicsPI.5: Explain how government functions at the local, county, and state level.

6.1.5.CivicsPI.6: Distinguish the roles and responsibilities of the three branches of the national government.

6.1.5.CivicsPI.7: Explain how national and state governments share power in the federal system of government.

6.1.5.CivicsPI.8: Describe how the United States Constitution defines and limits the power of government.

6.1.5.CivicsPI.9: Research and compare the differences and similarities between the United States and other nations' governments, customs, and laws.

6.1.5.CivicsPD.1: Describe the roles of elected representatives and explain how individuals at local, state, and national levels can interact with them.

Standard	Depth of Knowledge (DOK) Level
6.1.5.CivicsPI.1: Describe ways in which people benefit from and are challenged by working together, including through government, workplaces, voluntary organizations, and families.	DOK 1
6.1.5.CivicsPI.2: Investigate different ways individuals participate in government (e.g., voters, jurors, taxpayers).	DOK 2
6.1.5.CivicsPI.3: Explain how the United States functions as a representative democracy and describe the roles of elected representatives and how they interact with citizens at local, state, and national levels.	DOK 2
6.1.5.CivicsPI.4: Describe the services our government provides the people in the community, state and across the United States.	DOK 1
6.1.5.CivicsPI.5: Explain how government functions at the local, county, and state level.	DOK 2

6.1.5.CivicsPI.6: Distinguish the roles and responsibilities of the three branches of the national government.	DOK 2
6.1.5.CivicsPI.7: Explain how national and state governments share power in the federal system of government.	DOK 2
6.1.5.CivicsPI.8: Describe how the United States Constitution defines and limits the power of government.	DOK 1
6.1.5.CivicsPI.9: Research and compare the differences and similarities between the United States and other nations' governments, customs, and laws.	DOK 3
6.1.5.CivicsPD.1: Describe the roles of elected representatives and explain how individuals at local, state, and national levels can interact with them.	DOK 1

These classifications are based on the complexity of cognitive tasks required by each standard, ranging from simple recall or comprehension (DOK 1) to higher-order thinking and problem-solving (DOK 2 and DOK 3). Let me know if you need further clarification on any of the classifications!

**Researcher Prompt:**

6.1.5.CivicsPD.2: Explain how individuals can initiate and/or influence local, state, or national public policymaking (e.g., petitions, proposing laws, contacting elected officials).

6.1.5.CivicsPD.3: Explain how and why it is important that people from diverse cultures collaborate to find solutions to community, state, national, and global challenges.

6.1.5.CivicsPD.4: Compare the qualifications of candidates running for local, state, or national public office with the responsibilities of the position.

6.1.5.CivicsDP.1: Using evidence, explain how the core civic virtues and democratic principles impact the decisions made at the local, state, and national government (e.g., fairness, equality, common good).

6.1.5.CivicsDP.2: Compare and contrast responses of individuals and groups, past and present, to violations of fundamental rights (e.g., fairness, civil rights, human rights).

6.1.5.CivicsDP.3: Describe the role of religious freedom and participatory government in various North American colonies.

6.1.5.CivicsPR.1: Compare procedures for making decisions in a variety of settings including classroom, school, government, and /or society.

6.1.5.CivicsPR.2: Describe the process by which immigrants can become United States citizens.

6.1.5.CivicsPR.3: Evaluate school and community rules, laws and/or policies and determine if they meet their intended purpose.

6.1.5.CivicsPR.4: Explain how policies are developed to address public problems.

ChatGPT

ChatGPT

Certainly! Here's the classification of the provided New Jersey Social Studies Standards according to Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.CivicsPD.2: Explain how individuals can initiate and/or influence local, state, or national public policymaking (e.g., petitions, proposing laws, contacting elected officials).	DOK 2
6.1.5.CivicsPD.3: Explain how and why it is important that people from diverse cultures collaborate to find solutions to community, state, national, and global challenges.	DOK 2
6.1.5.CivicsPD.4: Compare the qualifications of candidates running for local, state, or national public office with the responsibilities of the position.	DOK 2
6.1.5.CivicsDP.1: Using evidence, explain how the core civic virtues and democratic principles impact the decisions made at the local, state, and national government (e.g., fairness, equality, common good).	DOK 3



6.1.5.CivicsDP.2: Compare and contrast responses of individuals and groups, past and present, to violations of fundamental rights (e.g., fairness, civil rights, human rights).	DOK 3
6.1.5.CivicsDP.3: Describe the role of religious freedom and participatory government in various North American colonies.	DOK 2
6.1.5.CivicsPR.1: Compare procedures for making decisions in a variety of settings including classroom, school, government, and /or society.	DOK 2
6.1.5.CivicsPR.2: Describe the process by which immigrants can become United States citizens.	DOK 2
6.1.5.CivicsPR.3: Evaluate school and community rules, laws and/or policies and determine if they meet their intended purpose.	DOK 3
6.1.5.CivicsPR.4: Explain how policies are developed to address public problems.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 1) to higher-order thinking and problem-solving (DOK 3). Let me know if you need further clarification!

**Researcher Prompt:**

6.1.5.CivicsHR.1: Describe how fundamental rights guaranteed by the United States Constitution and the Bill of Rights contribute to the improvement of American democracy

6.1.5.CivicsHR.2: Research and cite evidence for how the actions of Dr. Martin Luther King, Jr. and other historical civil rights leaders served as catalysts for social change, inspired social activism in subsequent generations.

6.1.5.CivicsHR.3: Cite examples from a variety of sources to describe how national and international leaders, businesses, and global organizations promote human rights and aid individuals and nations in need.

6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.

6.1.5.CivicsCM.1: Use a variety of sources to describe the characteristics exhibited by real and fictional people that contribute(d) to the well-being of their community and country.

6.1.5.CivicsCM.2: Use evidence from multiple sources to construct a claim about how self-discipline and civility contribute to the common good.

6.1.5.CivicsCM.3: Identify the types of behaviors that promote collaboration and problem solving with others who have different perspectives.

6.1.5.CivicsCM.4: Examine the responsibilities of differing positions of authority and identify criteria that are likely to make leaders qualified for those positions.

6.1.5.CivicsCM.5: Investigate the lives of New Jersey individuals with diverse experiences who have contributed to the improvement of society.

6.1.5.CivicsCM.6: Cite evidence from a variety of sources to describe how a democracy depends upon and responds to individuals' participation

6.1.5.GeoPP.1: Compare and contrast characteristics of regions in the United States based on culture, economics, and physical characteristics to understand the concept of regionalism.

### ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.CivicsHR.1: Describe how fundamental rights guaranteed by the United States Constitution and the Bill of Rights contribute to the improvement of American democracy.	DOK 2
6.1.5.CivicsHR.2: Research and cite evidence for how the actions of Dr. Martin Luther King, Jr. and other historical civil rights leaders served as catalysts for social change, inspired social activism in subsequent generations.	DOK 3

6.1.5.CivicsHR.3: Cite examples from a variety of sources to describe how national and international leaders, businesses, and global organizations promote human rights and aid individuals and nations in need.	DOK 3
6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.	DOK 3
6.1.5.CivicsCM.1: Use a variety of sources to describe the characteristics exhibited by real and fictional people that contribute(d) to the well-being of their community and country.	DOK 2
6.1.5.CivicsCM.2: Use evidence from multiple sources to construct a claim about how self-discipline and civility contribute to the common good.	DOK 3
6.1.5.CivicsCM.3: Identify the types of behaviors that promote collaboration and problem solving with others who have different perspectives.	DOK 2
6.1.5.CivicsCM.4: Examine the responsibilities of differing positions of authority and identify criteria that are likely to make leaders qualified for those positions.	DOK 2
6.1.5.CivicsCM.5: Investigate the lives of New Jersey individuals with diverse experiences who have contributed to the improvement of society.	DOK 2

6.1.5.CivicsCM.6: Cite evidence from a variety of sources to describe how a democracy depends upon and responds to individuals' participation.	DOK 3
6.1.5.GeoPP.1: Compare and contrast characteristics of regions in the United States based on culture, economics, and physical characteristics to understand the concept of regionalism.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 1) to higher-order thinking and problem-solving (DOK 3). Let me know if you need further clarification!

**Researcher Prompt:**

6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.

6.1.5.GeoPP.3: Use geographic models to describe how human movement relates to the location of natural resources and sometimes results in conflict.

6.1.5.GeoPP.4: Investigate the different physical and human characteristics of urban, suburban and rural communities and identify the factors that might attract individuals to that space.

6.1.5.GeoPP.5: Describe how the migration and settlement patterns of Native American groups impacted different regions of the Western Hemisphere.

6.1.5.GeoPP.6: Compare and contrast the voluntary and involuntary migratory experiences of different groups of people and explain why their experiences differed.

6.1.5.GeoSV.1: Identify the maps or types of maps most appropriate for specific purposes.

6.1.5.GeoSV.2: Use maps to explain the impact of location and place on the relationships between places in NJ, the US, and other countries.

6.1.5.GeoSV.3: Demonstrate how to use digital geographic tools, maps and globes to measure distances and determine time zones, and locations using latitude and longitude.

6.1.5.GeoSV.4: Use a variety of geographic representations to describe similarities and differences between places.

6.1.5.GeoSV.5: Use geographic data to examine how the search for natural resources resulted in conflict and cooperation.

ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to

Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.	DOK 2
6.1.5.GeoPP.3: Use geographic models to describe how human movement relates to the location of natural resources and sometimes results in conflict.	DOK 2
6.1.5.GeoPP.4: Investigate the different physical and human characteristics of urban, suburban, and rural communities and identify the factors that might attract individuals to that space.	DOK 3
6.1.5.GeoPP.5: Describe how the migration and settlement patterns of Native American groups impacted different regions of the Western Hemisphere.	DOK 2
6.1.5.GeoPP.6: Compare and contrast the voluntary and involuntary migratory experiences of different groups of people and explain why their experiences differed.	DOK 3
6.1.5.GeoSV.1: Identify the maps or types of maps most appropriate for specific purposes.	DOK 2
6.1.5.GeoSV.2: Use maps to explain the impact of location and place on the relationships between places in NJ, the US, and other countries.	DOK 2

6.1.5.GeoSV.3: Demonstrate how to use digital geographic tools, maps, and globes to measure distances and determine time zones, and locations using latitude and longitude.	DOK 3
6.1.5.GeoSV.4: Use a variety of geographic representations to describe similarities and differences between places.	DOK 2
6.1.5.GeoSV.5: Use geographic data to examine how the search for natural resources resulted in conflict and cooperation.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 1) to higher-order thinking and problem-solving (DOK 3). Let me know if you need further clarification!

**Researcher Prompt:**

6.1.5.GeoHE.1: Use sources to describe how human activity has impacted the physical environment in different periods in NJ and the US.

6.1.5.GeoHE.2: Cite examples of how technological advances have changed the environment in NJ and the US.

6.1.5.GeoHE.3: Analyze the effects of catastrophic environmental and technological events on human settlements and migration.

6.1.5.GeoGI.1: Evaluate the impact of the movement of people on individuals, communities, and regions.

6.1.5.GeoGI.2: Use historical maps to explain what led to the exploration of new water and land routes.

6.1.5.GeoGI.3: Use geographic tools to determine factors that impacted emigration, settlement patterns, and regional identities of the US colonies.

6.1.5.GeoGI.4: Explain how cultural and environmental characteristics affect the distribution and movement of people, goods, and ideas.

6.1.5.EconET.1: Identify positive and negative incentives that influence decisions.

6.1.5.EconET.2: Use quantitative data to engage in cost-benefit analyses of decisions.

6.1.5.EconET.3: Explain how scarcity and choice influence decisions made by individuals, communities, and nations

ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to

Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.GeoHE.1: Use sources to describe how human activity has impacted the physical environment in different periods in NJ and the US.	DOK 2
6.1.5.GeoHE.2: Cite examples of how technological advances have changed the environment in NJ and the US.	DOK 2
6.1.5.GeoHE.3: Analyze the effects of catastrophic environmental and technological events on human settlements and migration.	DOK 3
6.1.5.GeoGI.1: Evaluate the impact of the movement of people on individuals, communities, and regions.	DOK 2
6.1.5.GeoGI.2: Use historical maps to explain what led to the exploration of new water and land routes.	DOK 2
6.1.5.GeoGI.3: Use geographic tools to determine factors that impacted emigration, settlement patterns, and regional identities of the US colonies.	DOK 3
6.1.5.GeoGI.4: Explain how cultural and environmental characteristics affect the distribution and movement of people, goods, and ideas.	DOK 2

6.1.5.EconET.1: Identify positive and negative incentives that influence decisions.	DOK 2
6.1.5.EconET.2: Use quantitative data to engage in cost-benefit analyses of decisions.	DOK 3
6.1.5.EconET.3: Explain how scarcity and choice influence decisions made by individuals, communities, and nations.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 1) to higher-order thinking and problem-solving (DOK 3). Let me know if you need further clarification!

**Researcher Prompt:**

- 6.1.5.EconEM.1: Explain why individuals and businesses specialize and trade.
- 6.1.5.EconEM.2: Identify examples of resources used to produce goods and services.
- 6.1.5.EconEM.3: Describe how supply and demand influence price and output of products.
- 6.1.5.EconEM.4: Compare different regions of NJ to determine the role of geography, resources, climate, etc., in economic opportunities.
- 6.1.5.EconEM.5: Explain why individuals and societies trade, how trade functions, and the role of trade.
- 6.1.5.EconEM.6: Explain the system of mercantilism and its impact on the economies of the colonies and European countries.
- 6.1.5.EconNE.1: Explain the ways in which the government pays for the goods and services it provides.
- 6.1.5.EconNE.2: Use data to describe how the availability of resources in New Jersey and other regions in the United States have impacted economic opportunities.
- 6.1.5.EconNE.3: Describe how the development of different transportation systems impacted the economies of New Jersey and the United States.
- 6.1.5.EconNE.4: Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.

ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to

Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:



Standard	Depth of Knowledge (DOK) Level
6.1.5.EconEM.1: Explain why individuals and businesses specialize and trade.	DOK 2
6.1.5.EconEM.2: Identify examples of resources used to produce goods and services.	DOK 1
6.1.5.EconEM.3: Describe how supply and demand influence price and output of products.	DOK 2
6.1.5.EconEM.4: Compare different regions of NJ to determine the role of geography, resources, climate, etc., in economic opportunities.	DOK 2
6.1.5.EconEM.5: Explain why individuals and societies trade, how trade functions, and the role of trade.	DOK 2
6.1.5.EconEM.6: Explain the system of mercantilism and its impact on the economies of the colonies and European countries.	DOK 2
6.1.5.EconNE.1: Explain the ways in which the government pays for the goods and services it provides.	DOK 2
6.1.5.EconNE.2: Use data to describe how the availability of resources in New Jersey and other regions in the United States have impacted economic opportunities.	DOK 2

6.1.5.EconNE.3: Describe how the development of different transportation systems impacted the economies of New Jersey and the United States.	DOK 2
6.1.5.EconNE.4: Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 1) to higher-order thinking and problem-solving (DOK 2). Let me know if you need further clarification!

**Researcher Prompt:**

6.1.5.EconNE.5: Explain how the availability of private and public goods and services is influenced by the government and the global economy.

6.1.5.EconNE.6: Examine the qualities of entrepreneurs in a capitalistic society.

6.1.5.EconNE.7: Describe the role and relationship among households, businesses, laborers, and governments within the economic system.

6.1.5.EconGE.1: Explain how the development of communication systems has led to increased collaboration and spread of ideas.

6.1.5.EconGE.2: Illustrate how production, distribution, and consumption of goods and services are interrelated and affected by the global market.

6.1.5.EconGE.3: Use economic data to explain how trade leads to economic interdependence among nations.

6.1.5.EconGE.4: Compare and contrast how the availability of resources affects people across the world.

6.1.5.EconGE.5: Evaluate the economic impact of science and technology innovations on European exploration.

6.1.5.HistoryCC.1: Analyze key historical events to explain the creation of the state of New Jersey and the United States.

6.1.5.HistoryCC.2: Use various sources to illustrate how the American identity evolved over time.

ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to

Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.EconNE.5: Explain how the availability of private and public goods and services is influenced by the government and the global economy.	DOK 2
6.1.5.EconNE.6: Examine the qualities of entrepreneurs in a capitalistic society.	DOK 2
6.1.5.EconNE.7: Describe the role and relationship among households, businesses, laborers, and governments within the economic system.	DOK 2
6.1.5.EconGE.1: Explain how the development of communication systems has led to increased collaboration and spread of ideas.	DOK 2
6.1.5.EconGE.2: Illustrate how production, distribution, and consumption of goods and services are interrelated and affected by the global market.	DOK 2
6.1.5.EconGE.3: Use economic data to explain how trade leads to economic interdependence among nations.	DOK 2
6.1.5.EconGE.4: Compare and contrast how the availability of resources affects people across the world.	DOK 2
6.1.5.EconGE.5: Evaluate the economic impact of science and technology innovations on European exploration.	DOK 3

6.1.5.HistoryCC.1: Analyze key historical events to explain the creation of the state of New Jersey and the United States.	DOK 3
6.1.5.HistoryCC.2: Use various sources to illustrate how the American identity evolved over time.	DOK 3

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 1) to higher-order thinking and analysis (DOK 3). Let me know if you need further clarification!

**Researcher Prompt:**

6.1.5.HistoryCC.3: Use multiple sources to describe impacts of historical figures on state and national governments.

6.1.5.HistoryCC.4: Use evidence to document interactions among African, European, and Native American groups.

6.1.5.HistoryCC.5: Analyze the power struggle among European countries and its impact on Europe and the Americas.

6.1.5.HistoryCC.6: Use sources to make inferences on the impact of European colonization on Native American populations.

6.1.5.HistoryCC.7: Evaluate the impact of slavery using sources representing multiple perspectives.

6.1.5.HistoryCC.8: Make inferences to describe the influence of Native American groups in different regions of New Jersey.

6.1.5.HistoryCC.9: Evaluate the impact of prominent figures in New Jersey.

6.1.5.HistoryCC.10: Analyze the power struggle among European countries and its impact on Europe and the Americas.

6.1.5.HistoryCC.11: Make inferences to explain the impact of belief systems and family structures on government structures.

6.1.5.HistoryCC.12: Determine the roles of religious freedom and participatory government in North American colonies.

ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to

Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
----------	-----------------------------------

6.1.5.HistoryCC.3: Use multiple sources to describe impacts of historical figures on state and national governments.	DOK 3
6.1.5.HistoryCC.4: Use evidence to document interactions among African, European, and Native American groups.	DOK 2
6.1.5.HistoryCC.5: Analyze the power struggle among European countries and its impact on Europe and the Americas.	DOK 3
6.1.5.HistoryCC.6: Use sources to make inferences on the impact of European colonization on Native American populations.	DOK 3
6.1.5.HistoryCC.7: Evaluate the impact of slavery using sources representing multiple perspectives.	DOK 3
6.1.5.HistoryCC.8: Make inferences to describe the influence of Native American groups in different regions of New Jersey.	DOK 3
6.1.5.HistoryCC.9: Evaluate the impact of prominent figures in New Jersey.	DOK 3
6.1.5.HistoryCC.10: Analyze the power struggle among European countries and its impact on Europe and the Americas.	DOK 3
6.1.5.HistoryCC.11: Make inferences to explain the impact of belief systems and family structures on government structures.	DOK 3
6.1.5.HistoryCC.12: Determine the roles of religious freedom and participatory government in North American colonies.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 2) to higher-order thinking and analysis (DOK 3). Let me know if you need further clarification

**Researcher Prompt:**

- 6.1.5.HistoryCC.13: Craft a claim explaining the impact of early government structures on American politics.
- 6.1.5.HistoryCC.14: Compare the practice of slavery and indentured servitude in Colonial labor systems.
- 6.1.5.HistoryCC.15: Analyze key historical documents and their role in government and citizenship.
- 6.1.5.HistoryUP.1: Describe immigration to New Jersey and America and cite challenges encountered.
- 6.1.5.HistoryUP.2: Compare governance, belief systems, and family structures among different groups.
- 6.1.5.HistoryUP.3: Evaluate the impact of the Columbian Exchange using multiple perspectives.
- 6.1.5.HistoryUP.4: Compare gender roles, religion, values, and political systems of Native American groups.
- 6.1.5.HistoryUP.5: Compare historians' interpretations of historical ideas, resources
- 6.1.5.HistoryUP.6: Evaluate the impact of different interpretations of experiences and events by people with different perspectives.
- 6.1.5.HistoryUP.7: Describe why understanding perspectives of other cultures is important in an interconnected world.

ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.HistoryCC.13: Craft a claim explaining the impact of early government structures on American politics.	DOK 3
6.1.5.HistoryCC.14: Compare the practice of slavery and indentured servitude in Colonial labor systems.	DOK 2

6.1.5.HistoryCC.15: Analyze key historical documents and their role in government and citizenship.	DOK 3
6.1.5.HistoryUP.1: Describe immigration to New Jersey and America and cite challenges encountered.	DOK 2
6.1.5.HistoryUP.2: Compare governance, belief systems, and family structures among different groups.	DOK 2
6.1.5.HistoryUP.3: Evaluate the impact of the Columbian Exchange using multiple perspectives.	DOK 3
6.1.5.HistoryUP.4: Compare gender roles, religion, values, and political systems of Native American groups.	DOK 2
6.1.5.HistoryUP.5: Compare historians' interpretations of historical ideas, resources.	DOK 2
6.1.5.HistoryUP.6: Evaluate the impact of different interpretations of experiences and events by people with different perspectives.	DOK 3
6.1.5.HistoryUP.7: Describe why understanding perspectives of other cultures is important in an interconnected world.	DOK 2

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 2) to higher-order thinking and analysis (DOK 3). Let me know if you need further clarification!

**Researcher Prompt:**

6.1.5.HistorySE.1: Examine accounts of early European explorations of North America.

6.1.5.HistorySE.2: Construct an argument for the role of historical symbols, monuments, and holidays in the American identity.

6.1.5.HistoryCA.1: Craft an argument with historical evidence on how demographics affected opportunities during the Colonial era.

6.3.5.CivicsPD.1: Develop an action plan addressing climate change issues.  
 6.3.5.CivicsPD.2: Use sources to identify perspectives and actions on a community, state, or national issue.  
 6.3.5.CivicsPD.3: Propose a solution to a local issue considering different perspectives.  
 6.3.5.GeoHE.1: Participate in a project advocating for climate change awareness and solutions.  
 6.3.5.GeoGI.1: Use technology to examine global issues and propose solutions.  
 6.3.5.EconET.1: Investigate an economic issue impacting children and propose a solution.

### ChatGPT

ChatGPT

Here are the classifications of the provided New Jersey Social Studies Standards according to Webb's Depth of Knowledge levels using the Hess Cognitive Rigor Matrix:

Standard	Depth of Knowledge (DOK) Level
6.1.5.HistorySE.1: Examine accounts of early European explorations of North America.	DOK 2
6.1.5.HistorySE.2: Construct an argument for the role of historical symbols, monuments, and holidays in the American identity.	DOK 3
6.1.5.HistoryCA.1: Craft an argument with historical evidence on how demographics affected opportunities during the Colonial era.	DOK 3
6.3.5.CivicsPD.1: Develop an action plan addressing climate change issues.	DOK 3
6.3.5.CivicsPD.2: Use sources to identify perspectives and actions on a community, state, or national issue.	DOK 2



6.3.5.CivicsPD.3: Propose a solution to a local issue considering different perspectives.	DOK 3
6.3.5.GeoHE.1: Participate in a project advocating for climate change awareness and solutions.	DOK 3
6.3.5.GeoGI.1: Use technology to examine global issues and propose solutions.	DOK 3
6.3.5.EconET.1: Investigate an economic issue impacting children and propose a solution.	DOK 3

These classifications are based on the cognitive complexity and the types of cognitive tasks required by each standard, ranging from lower-order thinking skills (DOK 2) to higher-order thinking and analysis (DOK 3). Let me know if you need further clarification.

#### **Researcher Prompt:**

What is the frequency of each level. ChatGPT

To calculate the frequency of each Depth of Knowledge (DOK) level, we'll count the occurrences of each level in the provided list:

Frequency Table

DOK Levels	ChatGPT Total
DOK 1 (Recall & Reproduction):	5
DOK 2 (Skill/Concept)	58
DOK 3 (Strategic Thinking & Reasoning)	37

DOK 4 (Extended Thinking)	0
---------------------------	---

### Grades 6-8

#### Researcher Prompt:

You are a conducting doctoral research on the New Jersey Social Studies Standards. I will give you about 10 standards at a time copied from the New Jersey Department of Education website. You will use the Hess Cognitive Rigor Matrix to label the standards by level based on the verbiage or task demand. Specifically you will use Hess Cognitive Rigor Matrix (Reading CRM) and (writing-speaking CRM) applying webb's depth of knowledge levels to Blooms Cognitive process dimensions. You will create a table with column one for the standards and column two for the Webb's depth of knowledge classification. Do you understand?

ChatGPT

ChatGPT

Yes, I understand your request. You're asking to evaluate and classify the New Jersey Social Studies Standards using the Hess Cognitive Rigor Matrix (CRM) by mapping them onto Webb's Depth of Knowledge (DOK) levels in combination with Bloom's Taxonomy Cognitive Process Dimensions. This involves analyzing the language and task demands of each standard to determine its DOK level. Once you provide the standards, I will create a table with two columns: the first for the standards themselves, and the second for their corresponding Webb's DOK classification.

Please go ahead and share the standards you'd like me to analyze.

#### Researcher Prompt:

6.1.8.CivicsPI.3.a: Cite evidence to evaluate the extent to which the leadership and decisions of early administrations of the national government met the goals established in the Constitution.

- 6.1.8.CivicsPI.3.b: Evaluate the effectiveness of the fundamental principles of the Constitution (i.e., consent of the governed, rule of law, federalism, limited government, separation of powers, checks and balances, and individual rights) in establishing a federal government that allows for growth and change over time.

- 6.1.8.CivicsPI.3.c: Distinguish the powers and responsibilities of citizens, political parties, interest groups, and the media in a variety of governmental and nongovernmental contexts.

- 6.1.8.CivicsPI.3.d: Use data and other evidence to determine the extent to which demographics influenced the debate on representation in Congress and federalism by examining the New Jersey and Virginia plans.

- 6.1.8.CivicsPD.3.a: Cite evidence to determine the role that compromise played in the creation and adoption of the Constitution and Bill of Rights.

- 6.1.8.CivicsDP.3.a:Use primary and secondary sources to assess whether or not the ideals found in the Declaration of Independence were fulfilled for women, African Americans, and Native Americans during this time period.

ChatGPT

ChatGPT

Based on the standards provided from the New Jersey Department of Education and applying the Hess Cognitive Rigor Matrix (CRM) for both Reading and Writing/Speaking, along with Webb's Depth of Knowledge (DOK) levels, we can classify each standard as follows. The classification considers the cognitive demand required to meet each standard, using Webb's four DOK levels:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here is the table

Standard	Webb's DOK Level
6.1.8.CivicsPI.3.a: Cite evidence to evaluate the extent to which the leadership and decisions of early administrations of the national government met the goals established in the Constitution.	DOK 3 (Strategic Thinking)
6.1.8.CivicsPI.3.b: Evaluate the effectiveness of the fundamental principles of the Constitution (i.e., consent of the governed, rule of law, federalism, limited government, separation of powers, checks and balances, and individual rights) in establishing a federal government that allows for growth and change over time.	DOK 4 (Extended Thinking)
6.1.8.CivicsPI.3.c: Distinguish the powers and responsibilities of citizens, political parties, interest groups, and the media in a variety of governmental and nongovernmental contexts.	DOK 3 (Strategic Thinking)

6.1.8.CivicsPI.3.d: Use data and other evidence to determine the extent to which demographics influenced the debate on representation in Congress and federalism by examining the New Jersey and Virginia plans.	DOK 3 (Strategic Thinking)
6.1.8.CivicsPD.3.a: Cite evidence to determine the role that compromise played in the creation and adoption of the Constitution and Bill of Rights.	DOK 3 (Strategic Thinking)
6.1.8.CivicsDP.3.a: Use primary and secondary sources to assess whether or not the ideals found in the Declaration of Independence were fulfilled for women, African Americans, and Native Americans during this time period.	DOK 4 (Extended Thinking)

**Explanation:**

- **DOK 3 (Strategic Thinking):** Standards requiring students to cite evidence, distinguish between different roles and responsibilities, and use data to determine the extent of influence involve deep knowledge beyond recall. These tasks require reasoning, planning, using evidence, and a higher level of thinking about the content, which is characteristic of DOK level 3.
- **DOK 4 (Extended Thinking):** Standards that require evaluation of the effectiveness of fundamental principles over time and assessment of historical ideals against outcomes for different groups demand extended information processing. These tasks involve making connections, synthesizing information from multiple sources, and evaluating comprehensive entities, fitting the criteria for DOK level 4, which involves complex reasoning, planning, and thinking over significant time periods.

This classification aims to reflect the complexity and cognitive demand of each standard according to the Hess CRM and Webb's Depth of Knowledge levels.

**Researcher Prompt:**

- 6.1.8.CivicsHR.3.a: Explain how and why constitutional civil liberties were impacted by acts of government during the Early Republic (i.e., Alien and Sedition Acts).
- 6.1.8.CivicsHR.3.b: Evaluate the impact of the institution of slavery on the political and economic expansion of the United States.
- 6.1.8.CivicsHR.3.c: Construct an argument to explain how the expansion of slavery violated human rights and contradicted American ideals.

- 6.1.8.GeoSV.3.a: Use maps and other geographic tools to construct an argument on the impact of geography on the developments and outcomes of the American Revolution including New Jersey's pivotal role.
- 6.1.8.EconET.3.a: Identify the effect of inflation and debt on the American people and evaluate the policies of state and national governments during this time.
- 6.1.8.HistoryCC.3.a: Explain how the consequences of the Seven Years War, changes in British policies toward American colonies, and responses by various groups and individuals in the North American colonies led to the American Revolution.
- 6.1.8.HistoryCC.3.b: Explain how political parties were formed and continue to be shaped by differing perspectives regarding the role and power of federal government.
- 6.1.8.HistoryCC.3.c: Use geographic tools and resources to investigate how conflicts and alliances among European countries and Native American groups impacted the expansion of American territory.
- 6.1.8.HistoryCC.3.d: Compare and contrast the Articles of Confederation and the United States Constitution in terms of the decision-making powers of national government.
- 6.1.8.HistoryUP.3.a: Use primary sources as evidence to explain why the Declaration of Independence was written and how its key principles evolved to become unifying ideas of American democracy.
- 6.1.8.HistoryUP.3.b: Examine the roles and perspectives of various socioeconomic groups (e.g., rural farmers, urban craftsmen, northern merchants, and southern planters), African Americans, Native Americans, and women during the American Revolution, and determine how these groups were impacted by the war.
- 6.1.8.HistoryUP.3.c: Analyze how the terms of the Treaty of Paris affected United States relations with Native Americans and with European powers that had territories in North America from multiple perspectives.

ChatGPT

ChatGPT

Using the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels to classify the provided New Jersey Social Studies Standards, we can assign a DOK level based on the cognitive demand required for each task. These standards span a range of cognitive processes from understanding and analyzing to evaluating and creating, which corresponds to Webb's DOK levels as follows:

Recall and Reproduction  
 Skills and Concepts  
 Strategic Thinking  
 Extended Thinking

Here's the classification for each standard provided:

Standard	Webb's DOK Level
6.1.8.CivicsHR.3.a: Explain how and why constitutional civil liberties were impacted by acts of government during the Early Republic (i.e., Alien and Sedition Acts).	DOK 2 (Skills and Concepts)
6.1.8.CivicsHR.3.b: Evaluate the impact of the institution of slavery on the political and economic expansion of the United States.	DOK 3 (Strategic Thinking)
6.1.8.CivicsHR.3.c: Construct an argument to explain how the expansion of slavery violated human rights and contradicted American ideals.	DOK 4 (Extended Thinking)
6.1.8.GeoSV.3.a: Use maps and other geographic tools to construct an argument on the impact of geography on the developments and outcomes of the American Revolution including New Jersey's pivotal role.	DOK 4 (Extended Thinking)
6.1.8.EconET.3.a: Identify the effect of inflation and debt on the American people and evaluate the policies of state and national governments during this time.	DOK 3 (Strategic Thinking)
6.1.8.HistoryCC.3.a: Explain how the consequences of the Seven Years War, changes in British policies toward American colonies, and responses by various groups and individuals in the North American colonies led to the American Revolution.	DOK 2 (Skills and Concepts)

6.1.8.HistoryCC.3.b: Explain how political parties were formed and continue to be shaped by differing perspectives regarding the role and power of federal government.	DOK 2 (Skills and Concepts)
6.1.8.HistoryCC.3.c: Use geographic tools and resources to investigate how conflicts and alliances among European countries and Native American groups impacted the expansion of American territory.	DOK 3 (Strategic Thinking)
6.1.8.HistoryCC.3.d: Compare and contrast the Articles of Confederation and the United States Constitution in terms of the decision-making powers of national government.	DOK 3 (Strategic Thinking)
6.1.8.HistoryUP.3.a: Use primary sources as evidence to explain why the Declaration of Independence was written and how its key principles evolved to become unifying ideas of American democracy.	DOK 3 (Strategic Thinking)
6.1.8.HistoryUP.3.b: Examine the roles and perspectives of various socioeconomic groups during the American Revolution, and determine how these groups were impacted by the war.	DOK 3 (Strategic Thinking)
6.1.8.HistoryUP.3.c: Analyze how the terms of the Treaty of Paris affected United States relations with Native Americans and with European powers that had territories in North America from multiple perspectives.	DOK 4 (Extended Thinking)

Explanation:

- DOK 2 (Skills and Concepts) involves tasks that require more than recall but not as much depth as higher levels. Explaining the impact of historical acts or the formation of political parties fits here, requiring understanding and application of concepts.
- DOK 3 (Strategic Thinking) requires reasoning, using evidence, and a deeper understanding of relationships and the content itself, such as evaluating policies, comparing and contrasting documents, or examining roles and impacts on various groups.

- DOK 4 (Extended Thinking) involves complex reasoning, planning, and thinking, typically over extended periods, and requires multiple sources of information. Constructing arguments about the impact of geography on historical outcomes or how expansion of slavery contradicted American ideals are tasks that necessitate this level of cognitive demand.

### **Researcher Prompt:**

- 6.1.8.HistorySE.3.a: Analyze how the leadership of George Washington during the American Revolution and as president allowed for the establishment of American democracy
- 6.1.8.HistorySE.3.b: Analyze a variety of sources to make evidence-based inferences about how prominent individuals and other nations contributed to the causes, execution, and outcomes of the American Revolution.
- 6.1.8.CivicsDP.4.a: Research and prioritize the most significant events that led to the expansion of voting rights during the Jacksonian period.
- 6.1.8.CivicsHR.4.a: Examine sources from a variety of perspectives to describe efforts to reform education, women's rights, slavery, and other issues during the Antebellum period.
- 6.1.8.GeoSV.4.a: Map territorial expansion and settlement, highlighting the locations of conflicts with and resettlement of Native Americans.
- 6.1.8.EconET.4.a: Analyze the debates involving the National Bank, uniform currency, and tariffs, and determine the extent to which each of these economic tools met the economic challenges facing the new nation.
- 6.1.8.EconET.4.b: Assess the impact of the Louisiana Purchase and western exploration on the expansion and economic development of the United States.
- 6.1.8.EconNE.4.a: Explain how major technological developments revolutionized land and water transportation, as well as the economy, in New Jersey and the nation.

### **ChatGPT**

ChatGPT

For this set of New Jersey Social Studies Standards, we'll again apply the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels to classify the cognitive demand required for each task. These standards involve analyzing, researching, examining, and explaining various historical, civic, geographic, and economic aspects of American history, which correspond to Webb's DOK levels:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here's the classification for the provided standards:



Standard	Webb's DOK Level
6.1.8.HistorySE.3.a: Analyze how the leadership of George Washington during the American Revolution and as president allowed for the establishment of American democracy.	DOK 3 (Strategic Thinking)
6.1.8.HistorySE.3.b: Analyze a variety of sources to make evidence-based inferences about how prominent individuals and other nations contributed to the causes, execution, and outcomes of the American Revolution.	DOK 4 (Extended Thinking)
6.1.8.CivicsDP.4.a: Research and prioritize the most significant events that led to the expansion of voting rights during the Jacksonian period.	DOK 4 (Extended Thinking)
6.1.8.CivicsHR.4.a: Examine sources from a variety of perspectives to describe efforts to reform education, women's rights, slavery, and other issues during the Antebellum period.	DOK 3 (Strategic Thinking)
6.1.8.GeoSV.4.a: Map territorial expansion and settlement, highlighting the locations of conflicts with and resettlement of Native Americans.	DOK 3 (Strategic Thinking)
6.1.8.EconET.4.a: Analyze the debates involving the National Bank, uniform currency, and tariffs, and determine the extent to which each of these economic tools met the economic challenges facing the new nation.	DOK 4 (Extended Thinking)

6.1.8.EconET.4.b: Assess the impact of the Louisiana Purchase and western exploration on the expansion and economic development of the United States.	DOK 3 (Strategic Thinking)
6.1.8.EconNE.4.a: Explain how major technological developments revolutionized land and water transportation, as well as the economy, in New Jersey and the nation.	DOK 3 (Strategic Thinking)

Explanation:

- DOK 3 (Strategic Thinking) is assigned to standards that require students to analyze or examine information, understand its implications, and explain processes or outcomes. This includes mapping, examining sources from various perspectives, analyzing leadership impacts, and explaining technological revolutions.
- DOK 4 (Extended Thinking) involves complex, multi-step processes and synthesis of information from multiple sources to draw conclusions, make predictions, or prioritize information. Standards requiring research and analysis of significant events, economic debates, and making evidence-based inferences from a variety of sources fit this level due to the depth and breadth of understanding and application required.

These classifications reflect the depth of knowledge needed to engage with each standard, from understanding specific historical or economic contexts to synthesizing information across various sources for a comprehensive analysis.

### **Researcher Prompt:**

- 6.1.8.EconNE.4.b: Analyze how technological innovations affected the status and social class of different groups of people and explain the outcomes that resulted.
- 6.1.8.HistoryCC.4.a: Explain the changes in America's relationships with other nations by analyzing policies, treaties, tariffs, and agreements.
- 6.1.8.HistoryCC.4.b: Explain the growing resistance to slavery and New Jersey's role in the Underground Railroad.
- 6.1.8.HistoryCC.4.c: Analyze how the concept of Manifest Destiny influenced the acquisition of land through annexation, diplomacy, and war.
- 6.1.8.HistoryCC.4.d: Analyze the push-pull factors that led to increase in immigration and explain why ethnic and cultural conflicts resulted.
- 6.1.8.HistoryCC.5.a: Prioritize the causes and events that led to the Civil War from different perspectives.
  - 6.1.8.HistoryCC5.b: Analyze critical events and battles of the Civil War from different perspectives.

- 6.1.8.HistoryCC.5.c: Assess the human and material costs of the Civil War in the North and South.
- 6.1.8.HistoryUP.5.a: Analyze the effectiveness of the 13th, 14th, and 15th Amendments to the United States Constitution from multiple perspectives.
- 6.1.8.HistoryUP.5.b: Examine the roles of women, African Americans, and Native Americans in the Civil War.
- 6.1.8.HistoryUP.5.c: Explain how and why the Emancipation Proclamation and the Gettysburg Address continue to impact American life.
- 6.1.8.HistoryCC.5.d: Assess the role of various factors that affected the course and outcome of the Civil War (i.e., geography, natural resources, demographics, transportation, leadership and technology).
- 6.1.8.HistoryCC.5.e: Compare and contrast the approaches of Congress and Presidents Lincoln and Johnson toward the reconstruction of the South.
- 6.1.8.HistoryCC.5.f: Analyze the economic impact of Reconstruction on the South from different perspectives.
- 6.1.8.HistoryCC.5.g: Construct an argument that prioritizes the causes and events that led to the Civil War using multiple sources from different perspectives.

#### ChatGPT

The provided New Jersey Social Studies Standards span a range of topics including economics, history, civil rights, and social changes. Using the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, we will classify these standards based on the cognitive demand required for students to engage with the content. Webb's DOK levels range from:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here's the classification for each standard:

Standard	Webb's DOK Level
6.1.8.EconNE.4.b: Analyze how technological innovations affected the status and social class of different groups of people and explain the outcomes that resulted.	DOK 4 (Extended Thinking)

6.1.8.HistoryCC.4.a: Explain the changes in America’s relationships with other nations by analyzing policies, treaties, tariffs, and agreements.	DOK 3 (Strategic Thinking)
6.1.8.HistoryCC.4.b: Explain the growing resistance to slavery and New Jersey’s role in the Underground Railroad.	DOK 3 (Strategic Thinking)
6.1.8.HistoryCC.4.c: Analyze how the concept of Manifest Destiny influenced the acquisition of land through annexation, diplomacy, and war.	DOK 4 (Extended Thinking)
6.1.8.HistoryCC.4.d: Analyze the push-pull factors that led to increase in immigration and explain why ethnic and cultural conflicts resulted.	DOK 4 (Extended Thinking)
6.1.8.HistoryCC.5.a: Prioritize the causes and events that led to the Civil War from different perspectives.	DOK 4 (Extended Thinking)
6.1.8.HistoryCC5.b: Analyze critical events and battles of the Civil War from different perspectives.	DOK 4 (Extended Thinking)
6.1.8.HistoryCC.5.c: Assess the human and material costs of the Civil War in the North and South.	DOK 3 (Strategic Thinking)

6.1.8.HistoryUP.5.a: Analyze the effectiveness of the 13th, 14th, and 15th Amendments to the United States Constitution from multiple perspectives.	DOK 4 (Extended Thinking)
6.1.8.HistoryUP.5.b: Examine the roles of women, African Americans, and Native Americans in the Civil War.	DOK 3 (Strategic Thinking)
6.1.8.HistoryUP.5.c: Explain how and why the Emancipation Proclamation and the Gettysburg Address continue to impact American life.	DOK 3 (Strategic Thinking)
6.1.8.HistoryCC.5.d: Assess the role of various factors that affected the course and outcome of the Civil War (i.e., geography, natural resources, demographics, transportation, leadership, and technology).	DOK 4 (Extended Thinking)
6.1.8.HistoryCC.5.e: Compare and contrast the approaches of Congress and Presidents Lincoln and Johnson toward the reconstruction of the South.	DOK 3 (Strategic Thinking)
6.1.8.HistoryCC.5.f: Analyze the economic impact of Reconstruction on the South from different perspectives.	DOK 4 (Extended Thinking)
6.1.8.HistoryCC.5.g: Construct an argument that prioritizes the causes and events that led to the Civil War using multiple sources from different perspectives.	DOK 4 (Extended Thinking)

Explanation:

- DOK 3 (Strategic Thinking) standards require reasoning, using evidence, and explaining processes or outcomes. This involves understanding relationships, implications, and explaining complex concepts or historical contexts.
- DOK 4 (Extended Thinking) standards involve complex reasoning, planning, and thinking, often over extended periods. Tasks include analyzing multiple facets of an issue, synthesizing information from various sources, and constructing arguments or prioritizing information based on comprehensive analysis.

These classifications indicate the depth of cognitive engagement required, from strategic thinking about historical events and their implications to extended thinking involving complex analysis and synthesis of information across various domains

### **Researcher Prompt:**

- 6.2.8.GeoPP.1.a: Compare and contrast the social organization, natural resources, and land use of early hunters/gatherers and those who lived in early agrarian societies.
- 6.2.8.GeoPP.1.b: Use maps to examine the impact of the various migratory patterns of hunters/gatherers that moved from Africa to Eurasia, Australia, and the Americas.
- 6.2.8.HistoryCC.1.a: Describe the influence of the agricultural revolution on population growth and the subsequent development of civilizations (e.g., the impact of food surplus from farming).
- 6.2.8.HistoryCC.1.b: Determine the impact of technological advancements on hunter/gatherer and agrarian societies.
- 6.2.8.HistoryCC.1.c: Describe how the development of both written and unwritten languages impacted human understanding, development of culture, and social structure.
- 6.2.8.HistoryCC.1.d: Demonstrate an understanding of pre-agricultural and post-agricultural periods in terms of relative length of time.
- 6.2.8.HistorySE.1.a: Explain how archaeological discoveries are used to develop and enhance understanding of life prior to written records.

ChatGPT

ChatGPT

The latest set of New Jersey Social Studies Standards focuses on early human societies, their social organization, migration patterns, the agricultural revolution, technological advancements, and the impact of language development. Using the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, these standards will be classified based on the cognitive demand they require. Webb's DOK levels are:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here is how each standard can be classified:

Standard	Webb's DOK Level
6.2.8.GeoPP.1.a: Compare and contrast the social organization, natural resources, and land use of early hunters/gatherers and those who lived in early agrarian societies.	DOK 2 (Skills and Concepts)
6.2.8.GeoPP.1.b: Use maps to examine the impact of the various migratory patterns of hunters/gatherers that moved from Africa to Eurasia, Australia, and the Americas.	DOK 2 (Skills and Concepts)
6.2.8.HistoryCC.1.a: Describe the influence of the agricultural revolution on population growth and the subsequent development of civilizations.	DOK 2 (Skills and Concepts)
6.2.8.HistoryCC.1.b: Determine the impact of technological advancements on hunter/gatherer and agrarian societies.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.1.c: Describe how the development of both written and unwritten languages impacted human understanding, development of culture, and social structure.	DOK 2 (Skills and Concepts)
6.2.8.HistoryCC.1.d: Demonstrate an understanding of pre-agricultural and post-agricultural periods in terms of relative length of time.	DOK 1 (Recall and Reproduction)
6.2.8.HistorySE.1.a: Explain how archaeological discoveries are used to develop and enhance understanding of life prior to written records.	DOK 3 (Strategic Thinking)

Explanation:

- DOK 1 (Recall and Reproduction) is for tasks that require recalling facts or basic concepts without application in a new way, such as understanding the timeline of pre-agricultural and post-agricultural periods.
- DOK 2 (Skills and Concepts) involves engagement with more complex tasks that require comparison, classification, and summarization of data or concepts, which includes comparing and contrasting societies, using maps to examine migratory patterns, and describing the influence of the agricultural revolution.
- DOK 3 (Strategic Thinking) demands reasoning, planning, and use of evidence for deeper understanding, such as determining the impact of technological advancements and explaining the significance of archaeological discoveries in understanding life before written records.

These classifications reflect the complexity and cognitive engagement required by each standard, from basic recall to more strategic thinking about early human societies and their developments.

### **Researcher Prompt:**

- 6.2.8.CivicsPI.2.a: Explain how/why different early river valley civilizations developed similar forms of government and legal structures.
- 6.2.8.CivicsHR.2.a: Determine the role of slavery in the economic and social structures of early river valley civilizations.
  - 6.2.8.GeoSV.2.a: Compare and contrast physical and political maps of early river valley civilizations and their modern counterparts and determine the geopolitical impact of these civilizations, then and now (i.e., Mesopotamia and Iraq; Ancient Egypt and Modern Egypt; Indus River Valley and Modern Pakistan/India; Ancient China and Modern China).
  - 6.2.8.GeoHE.2.a: Determine the extent to which geography influenced settlement, the development of trade networks, technological innovations, and the sustainability of early river valley civilizations.
  - 6.2.8.EconGE.2.a: Explain how technological advancements led to greater economic specialization, improved weaponry, trade, and the development of a class system in early river valley civilizations.
  - 6.2.8.HistoryCC.2.a: Evaluate the importance and enduring legacy of the major achievements of the early river valley civilizations over time.
  - 6.2.8.HistoryCC.2.b: Analyze the impact of religion on daily life, government, and culture in various early river valley civilizations.
  - 6.2.8.HistoryCC.2.c: Explain how the development of written language transformed all aspects of life in early river valley civilizations.
  - 6.2.8.HistoryCA.2.a: Analyze the factors that led to the rise and fall of various early river valley civilizations and determine whether there was a common pattern of growth and decline.

ChatGPT

ChatGPT

The provided standards cover a broad range of topics related to early river valley civilizations, including their governments, economic and social structures, geography, technology, achievements, and the impact of religion and written language. Using the Hess Cognitive Rigor



Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, we'll classify these standards based on the cognitive demands they place on students. Webb's DOK levels range from:

- Recall and Reproduction
- Skills and Concepts
- Strategic Thinking
- Extended Thinking

Here's how each standard can be classified:

Standard	Webb's DOK Level
6.2.8.CivicsPI.2.a: Explain how/why different early river valley civilizations developed similar forms of government and legal structures.	DOK 3 (Strategic Thinking)
6.2.8.CivicsHR.2.a: Determine the role of slavery in the economic and social structures of early river valley civilizations.	DOK 3 (Strategic Thinking)
6.2.8.GeoSV.2.a: Compare and contrast physical and political maps of early river valley civilizations and their modern counterparts and determine the geopolitical impact of these civilizations, then and now.	DOK 4 (Extended Thinking)
6.2.8.GeoHE.2.a: Determine the extent to which geography influenced settlement, the development of trade networks, technological innovations, and the sustainability of early river valley civilizations.	DOK 3 (Strategic Thinking)
6.2.8.EconGE.2.a: Explain how technological advancements led to greater economic specialization, improved weaponry, trade, and the development of a class system in early river valley civilizations.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.2.a: Evaluate the importance and enduring legacy of the major achievements of the early river valley civilizations over time.	DOK 4 (Extended Thinking)

6.2.8.HistoryCC.2.b: Analyze the impact of religion on daily life, government, and culture in various early river valley civilizations.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.2.c: Explain how the development of written language transformed all aspects of life in early river valley civilizations.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCA.2.a: Analyze the factors that led to the rise and fall of various early river valley civilizations and determine whether there was a common pattern of growth and decline.	DOK 4 (Extended Thinking)

**Researcher Prompt:**

- 6.2.8.CivicsPI.3.a: Compare and contrast the methods (i.e., autocratic rule, philosophies, and bureaucratic structures) used by the rulers of Rome, China, and India to control and unify their expanding empires.
- 6.2.8.CivicsDP.3.a: Compare and contrast the American legal system with the legal systems of classical civilizations and determine the extent to which these early systems influenced our current legal system (e.g., Babylonian Code of Hammurabi, Roman Justinian Code, Israelite Jewish Law).
- 6.2.8.CivicsDP.3.b: Use evidence to describe the impact of Athenian democracy and the Roman Republic on the development of the United State Constitution.
- 6.2.8.CivicsHR.3.a: Compare and contrast the rights and responsibilities of free men, women, slaves, and foreigners in the political, economic, and social structures of classical civilizations.
- 6.2.8.GeoPP.3.a: Use geographic models to describe how the availability of natural resources influenced the development of the political, economic, and cultural systems of each of the classical civilizations and provided motivation for expansion.
- 6.2.8.GeoPP.3.b: Explain how geography and the availability of natural resources led to both the development of classical civilizations and to their decline.
- 6.2.8.EconEM.3.a: Analyze the impact of expanding land and sea trade routes as well as a uniform system of exchange in the Mediterranean World and Asia.
- 6.2.8.EconGE.3.a: Explain how classical civilizations used technology and innovation to enhance agricultural/ manufacturing output and commerce, to expand military capabilities, to improve life in urban areas, and to allow for greater division of labor.
- 6.2.8.HistoryCC.3.a: Determine the extent to which religion, economic issues, and conflict shaped the values and decisions of the classical civilizations.
- 6.2.8.HistoryUP.3.a: Compare and contrast social hierarchies in classical civilizations as they relate to power, wealth, and equality.

ChatGPT

ChatGPT

The standards you've provided focus on comparing and contrasting various aspects of classical civilizations, including their governance, legal systems, social structures, geography, economics, technology, and the impacts of these elements on the development and decline of these civilizations. Applying the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, we'll classify these standards according to the cognitive demands required to engage with them. Webb's DOK levels are as follows:

Recall and Reproduction  
 Skills and Concepts  
 Strategic Thinking  
 Extended Thinking

Here's the classification for each standard:

Standard	Webb's DOK Level
6.2.8.CivicsPI.3.a: Compare and contrast the methods used by the rulers of Rome, China, and India to control and unify their expanding empires.	DOK 3 (Strategic Thinking)
6.2.8.CivicsDP.3.a: Compare and contrast the American legal system with the legal systems of classical civilizations and determine their influence on our current legal system.	DOK 4 (Extended Thinking)
6.2.8.CivicsDP.3.b: Use evidence to describe the impact of Athenian democracy and the Roman Republic on the development of the United States Constitution.	DOK 4 (Extended Thinking)

6.2.8.CivicsHR.3.a: Compare and contrast the rights and responsibilities of free men, women, slaves, and foreigners in classical civilizations.	DOK 3 (Strategic Thinking)
6.2.8.GeoPP.3.a: Use geographic models to describe how the availability of natural resources influenced the development of classical civilizations.	DOK 3 (Strategic Thinking)
6.2.8.GeoPP.3.b: Explain how geography and the availability of natural resources led to the development and decline of classical civilizations.	DOK 3 (Strategic Thinking)
6.2.8.EconEM.3.a: Analyze the impact of expanding land and sea trade routes as well as a uniform system of exchange in the Mediterranean World and Asia.	DOK 3 (Strategic Thinking)
6.2.8.EconGE.3.a: Explain how classical civilizations used technology and innovation to enhance various aspects of society.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.3.a: Determine the extent to which religion, economic issues, and conflict shaped the values and decisions of classical civilizations.	DOK 3 (Strategic Thinking)
6.2.8.HistoryUP.3.a: Compare and contrast social hierarchies in classical civilizations as they relate to power, wealth, and equality.	DOK 3 (Strategic Thinking)

**Researcher Prompt:**

- 6.2.8.HistoryUP.3.b: Compare the status of groups in the Ancient World to those of people today and evaluate how individuals perceived the principles of liberty and equality then and now (i.e., political, economic, and social).

- 6.2.8.HistoryUP.3.c: Compare and contrast the tenets of various world religions that developed in or around this time period (i.e., Buddhism, Christianity, Confucianism, Hinduism, Islam, Judaism, Sikhism, and Taoism), their patterns of expansion, and their responses to the current challenges of globalization.
- 6.2.8.HistoryCA.3.a: Evaluate the importance and enduring legacy of the major achievements of Greece, Rome, India, and China over time.
- 6.2.8.HistoryCA.3.b: Determine common factors that contributed to the decline and fall of the Roman Empire, Gupta India, and Han China.
- 6.2.8.CivicsPI.4.a: Analyze the role of religion and other means rulers used to unify and centrally govern expanding territories with diverse populations.
- 6.2.8.CivicsDP.4.a: Cite evidence of the influence of medieval English legal and constitutional practices on modern democratic thought and institutions (i.e., the Magna Carta, parliament, the development of habeas corpus, and an independent judiciary).
- 6.2.8.GeoHE.4.a: Explain how geography influenced the development of the political, economic, and cultural centers of each empire as well as the empires' relationships with other parts of the world.
- 6.2.8.GeoPP.4.a: Explain why the Arabian Peninsula's physical features and location made it the epicenter of Afro-Eurasian trade and fostered the spread of Islam into Africa, Europe, and Asia.
- 6.2.8.GeoPP.4.b: Assess how maritime and overland trade routes impacted urbanization, transportation, communication, and the development of international trade centers (i.e., the African caravan and Silk Road).

#### ChatGPT

The provided standards cover a wide range of historical, civic, geographic, and cultural topics, from comparing the status of groups in the Ancient World to modern perceptions of liberty and equality, to evaluating the impact of world religions and the legacy of ancient civilizations. Using the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, these standards can be classified based on the cognitive demands they place on students to engage with the content. Webb's DOK levels include:

Recall and Reproduction  
 Skills and Concepts  
 Strategic Thinking  
 Extended Thinking

Here's the classification for each standard:

Standard	Webb's DOK Level
6.2.8.HistoryUP.3.b: Compare the status of groups in the Ancient World to those of people today and evaluate perceptions of liberty and equality.	DOK 4 (Extended Thinking)
6.2.8.HistoryUP.3.c: Compare and contrast the tenets of various world religions, their expansion, and responses to globalization.	DOK 4 (Extended Thinking)
6.2.8.HistoryCA.3.a: Evaluate the enduring legacy of major achievements of Greece, Rome, India, and China.	DOK 4 (Extended Thinking)
6.2.8.HistoryCA.3.b: Determine common factors in the decline and fall of the Roman Empire, Gupta India, and Han China.	DOK 3 (Strategic Thinking)
6.2.8.CivicsPI.4.a: Analyze the role of religion and other means used by rulers to unify and govern diverse populations.	DOK 3 (Strategic Thinking)
6.2.8.CivicsDP.4.a: Cite evidence of medieval English legal practices' influence on modern democracy.	DOK 3 (Strategic Thinking)
6.2.8.GeoHE.4.a: Explain how geography influenced the development of empire centers and their world relationships.	DOK 3 (Strategic Thinking)
6.2.8.GeoPP.4.a: Explain the Arabian Peninsula's role in trade and the spread of Islam.	DOK 3 (Strategic Thinking)

6.2.8.GeoPP.4.b: Assess how trade routes impacted urbanization and the development of trade centers.	DOK 3 (Strategic Thinking)
--	----------------------------

Explanation:

- DOK 3 (Strategic Thinking) involves reasoning, planning, and use of evidence. It is assigned to tasks requiring deep understanding and analysis, such as analyzing the role of religion in governance, citing evidence of historical influences on modern practices, explaining geographic influences on civilizations, and assessing the impact of trade routes.
- DOK 4 (Extended Thinking) requires extended reasoning, complex planning, and the integration of multiple sources of information. It applies to standards that involve comparing and contrasting across time periods and cultures, evaluating the legacy of ancient achievements, and analyzing the tenets and global impact of world religions.

These classifications reflect the depth of cognitive engagement required, highlighting the complexities of analyzing historical events, cultural influences, and the long-term impacts of civilizations' achievements and practices.

### **Researcher Prompt:**

- 6.2.8.GeoPP.4.c: Use maps to show how the interaction between the Islamic world and medieval Europe increased trade, enhanced technology innovation and impacted science, thought, and the arts.
- 6.2.8.GeoHE.4.b: Use geographic models to determine the impact of environmental modifications made by earlier civilizations on the current day environmental challenges.
- 6.2.8.GeoHE.4.c: Explain how the geographies and climates of Asia, Africa, Europe, and the Americas influenced their economic development and interaction or isolation with other societies.
- 6.2.8.GeoGI.4.a: Determine how Africa's physical geography and natural resources presented challenges and opportunities for trade, development, and the spread of religion.
- 6.2.8.EconGE.4.a: Analyze the immediate and long-term impact on China and Europe of the open exchange between Europe and the Yuan (Mongol) Dynasty.
- 6.2.8.EconNE.4.a: Compare and contrast the Japanese and European systems of feudalism and the effectiveness of each in promoting social, economic, and political order.
- 6.2.8.HistoryCC.4.a: Determine which events led to the rise and eventual decline of European feudalism.
- 6.2.8.HistoryCC.4.b: Explain how and why the interrelationships among improved agricultural production, population growth, urbanization, and commercialization led to the rise of powerful states and kingdoms (i.e., Europe, Asia, Americas).
- 6.2.8.HistoryCC.4.c: Assess the demographic, economic, and religious impact of the plague on Europe.



- 6.2.8.HistoryCC.4.d: Analyze the causes and outcomes of the Crusades from different perspectives, including the perspectives of European political and religious leaders, the crusaders, Jews, Muslims, and traders.
- 6.2.8.HistoryCC.4.e: Determine the extent to which the Byzantine Empire influenced the Islamic world and Western Europe.
- 6.2.8.HistoryCC.4.f: Analyze the role of religion and economics in shaping each empire's social hierarchy and evaluate the impact these hierarchical structures had on the lives of various groups of people.
- 6.2.8.HistoryCC.4.g: Evaluate the importance and enduring legacy of the major achievements of the people living Asia, Africa (Islam), Europe and the Americas over time.

ChatGPT

ChatGPT

The provided standards delve into various aspects of historical interactions, environmental impacts, economic developments, and the legacies of civilizations. Applying the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, we'll classify these standards according to the cognitive demands required for engagement. Webb's DOK levels include:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here's the classification for each standard:

Standard	Webb's DOK Level
6.2.8.GeoPP.4.c: Use maps to show the interaction between the Islamic world and medieval Europe.	DOK 3 (Strategic Thinking)
6.2.8.GeoHE.4.b: Use geographic models to determine the impact of environmental modifications.	DOK 3 (Strategic Thinking)
6.2.8.GeoHE.4.c: Explain how geographies and climates influenced economic development.	DOK 3 (Strategic Thinking)

6.2.8.GeoGI.4.a: Determine how Africa’s geography presented challenges and opportunities.	DOK 3 (Strategic Thinking)
6.2.8.EconGE.4.a: Analyze the impact of the open exchange between Europe and the Yuan Dynasty.	DOK 4 (Extended Thinking)
6.2.8.EconNE.4.a: Compare and contrast feudalism in Japan and Europe.	DOK 4 (Extended Thinking)
6.2.8.HistoryCC.4.a: Determine events leading to the rise and decline of European feudalism.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.4.b: Explain the rise of powerful states due to various factors.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.4.c: Assess the impact of the plague on Europe.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.4.d: Analyze the Crusades from different perspectives.	DOK 4 (Extended Thinking)
6.2.8.HistoryCC.4.e: Determine the Byzantine Empire's influence.	DOK 3 (Strategic Thinking)
6.2.8.HistoryCC.4.f: Analyze the role of religion and economics in shaping social hierarchies.	DOK 4 (Extended Thinking)
6.2.8.HistoryCC.4.g: Evaluate the legacy of major achievements in Asia, Africa, Europe, and the Americas.	DOK 4 (Extended Thinking)

Explanation:

- DOK 3 (Strategic Thinking) applies to tasks requiring reasoning, the use of evidence, and explanation of complex concepts, such as using maps to illustrate historical interactions, determining the impact of environmental modifications, and explaining economic and demographic developments.
- DOK 4 (Extended Thinking) is for tasks involving extended reasoning, complex analysis, and synthesis of information from multiple sources or perspectives. It includes analyzing the long-term impacts of trade and exchange, comparing feudal systems, analyzing the Crusades and the role of religion and economics in shaping empires, and evaluating the enduring legacy of civilizations' achievements.

These classifications reflect the complexity and depth of cognitive engagement required by the standards, highlighting the need for analytical skills, critical thinking, and the ability to synthesize and evaluate information across various historical contexts.

**Researcher Prompt:**

- 6.3.8.CivicsPI.1: Evaluate, take, and defend a position on why government is necessary, and the purposes government should serve.
- 6.3.8.CivicsPI.2: Evaluate the extent to which different forms of government reflect the history and values of various societies (e.g., monarchy, democracy, republic, dictatorship).
- 6.3.8.CivicsPI.3: Use a variety of sources from multiple perspectives to examine the role of individuals, political parties, interest groups, and the media in a local or global issue and share this information with a governmental or nongovernmental organization as a way to gain support for addressing the issue.
- 6.3.8.CivicsPI.4: Investigate the roles of political, civil, and economic organizations in shaping people's lives and share this information with individuals who might benefit from this information.
- 6.3.8.CivicsPD.1: Deliberate on a public issue affecting an upcoming election, consider opposing arguments, and develop a reasoned conclusion.
- 6.3.8.CivicsPD.2: Propose and defend a position regarding a public policy issue at the appropriate local, state, or national level.
- 6.3.8.CivicsPD.3: Construct a claim as to why it is important for democracy that individuals are informed by facts, aware of diverse viewpoints, and willing to take action on public issues.

ChatGPT

ChatGPT

The provided standards focus on civic engagement, the purposes of government, the influence of various forms of government, the role of different organizations in society, and the importance of informed participation in democracy. Using the Hess Cognitive Rigor Matrix (CRM) and Webb's

Depth of Knowledge (DOK) levels, we'll classify these standards based on the cognitive demands required to engage with them. Webb's DOK levels include:

Recall and Reproduction  
 Skills and Concepts  
 Strategic Thinking  
 Extended Thinking

Here's the classification for each standard:

Standard	Webb's DOK Level
6.3.8.CivicsPI.1: Evaluate and defend a position on the necessity of government.	DOK 4 (Extended Thinking)
6.3.8.CivicsPI.2: Evaluate how different forms of government reflect societal values.	DOK 4 (Extended Thinking)
6.3.8.CivicsPI.3: Use sources to examine roles in a local/global issue and share to gain support.	DOK 3 (Strategic Thinking)
6.3.8.CivicsPI.4: Investigate roles of organizations in shaping lives and share information.	DOK 3 (Strategic Thinking)
6.3.8.CivicsPD.1: Deliberate on a public issue, consider opposing arguments, and conclude.	DOK 3 (Strategic Thinking)
6.3.8.CivicsPD.2: Propose and defend a position on a public policy issue.	DOK 4 (Extended Thinking)

6.3.8.CivicsPD.3: Construct a claim on the importance of informed participation in democracy.	DOK 4 (Extended Thinking)
---	---------------------------

Explanation:

- DOK 3 (Strategic Thinking) involves reasoning, using evidence, and explaining complex processes. It applies to standards that require the examination and sharing of information about the role of organizations and deliberation on public issues, where students must analyze and synthesize information from various sources.
- DOK 4 (Extended Thinking) is assigned to tasks that require students to engage in extended reasoning, complex analysis, and the synthesis of information from multiple sources to evaluate, take, and defend positions on the necessity and purposes of government, different forms of government, public policy issues, and the importance of being informed and active in democracy. This level demands a deeper understanding of civic concepts, the ability to evaluate and compare various forms of government, and the development and defense of reasoned conclusions or positions.

These classifications reflect the depth of cognitive engagement required, emphasizing the importance of critical thinking, analysis, and synthesis in understanding civic responsibilities and the functioning of government and political systems.

### **Researcher Prompt:**

- 6.3.8.CivicsDP.1: Identify an issue of inequality, develop multiple solutions, and communicate the best one to an appropriate government body.
- 6.3.8.CivicsDP.2: Make a claim based on evidence to determine the extent and the limitations of First Amendment rights (e.g., U.S. Supreme Court decisions).
- 6.3.8.CivicsDP.3: Use historical case studies and current events to explain why due process is essential for the protection of individual rights and maintenance of limited government.
- 6.3.8.CivicsPR.1: Analyze primary sources to explain how democratic ideas in the United States developed from the historical experiences of ancient societies, England, and the North American colonies.
- 6.3.8.CivicsPR.2: Evaluate the effectiveness of the fundamental principles of the Constitution (i.e., consent of the governed, rule of law, federalism, limited government, separation of powers, checks and balances, and individual rights) in establishing a federal government that allows for growth and change over time.
- 6.3.8.CivicsPR.3: Take a position on an issue in which fundamental ideals and principles are in conflict (e.g., liberty, equality).
- 6.3.8.CivicsPR.4: Use evidence and quantitative data to propose or defend a public policy related to climate change.

- 6.3.8.CivicsPR.5: Engage in simulated democratic processes (e.g., legislative hearings, judicial proceedings, elections) to understand how conflicting points of view are addressed in a democratic society.
- 6.3.8.CivicsPR.6: Seek the perspectives of multiple stakeholders with diverse points of view regarding a local budget issue and take a position on proposed policy.
- 6.3.8.CivicsPR.7: Compare how ideas become laws at the local, state, and national level.

ChatGPT

ChatGPT

These standards explore a variety of civic themes, including addressing inequality, understanding constitutional rights, evaluating the effectiveness of democratic principles, and engaging in democratic processes. Using the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, we classify these standards based on the cognitive demands required for student engagement. Webb's DOK levels are:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here's how each standard can be classified:

Standard	Webb's DOK Level
6.3.8.CivicsDP.1: Identify an issue of inequality, develop solutions, and communicate the best one.	DOK 3 (Strategic Thinking)
6.3.8.CivicsDP.2: Make a claim on the extent/limitations of First Amendment rights.	DOK 3 (Strategic Thinking)
6.3.8.CivicsDP.3: Use case studies/events to explain the necessity of due process.	DOK 3 (Strategic Thinking)

6.3.8.CivicsPR.1: Analyze primary sources to explain the development of democratic ideas in the U.S.	DOK 3 (Strategic Thinking)
6.3.8.CivicsPR.2: Evaluate the Constitution's principles' effectiveness.	DOK 4 (Extended Thinking)
6.3.8.CivicsPR.3: Take a position on an issue where fundamental ideals/principles conflict.	DOK 4 (Extended Thinking)
6.3.8.CivicsPR.4: Use evidence/data to propose/defend a policy on climate change.	DOK 4 (Extended Thinking)
6.3.8.CivicsPR.5: Engage in simulated democratic processes.	DOK 3 (Strategic Thinking)
6.3.8.CivicsPR.6: Seek perspectives on a local budget issue and take a position.	DOK 3 (Strategic Thinking)
6.3.8.CivicsPR.7: Compare how ideas become laws across different government levels.	DOK 3 (Strategic Thinking)

Explanation:

- DOK 3 (Strategic Thinking) is assigned to tasks that require deep understanding, reasoning, and use of evidence. This level encompasses identifying and solving issues, making claims based on evidence, analyzing primary sources, explaining the importance of due process, engaging in democratic processes, and comparing legislative processes. These tasks demand a comprehensive understanding and application of concepts in practical scenarios.
- DOK 4 (Extended Thinking) involves complex reasoning, planning, and detailed analysis over extended periods. It includes evaluating the effectiveness of constitutional principles, taking positions on issues involving conflicting principles, and proposing or defending policies based on evidence and data. These standards require students to

synthesize information from multiple sources, consider various perspectives, and develop reasoned arguments or evaluations.

**Researcher Prompt:**

- 6.3.8.CivicsHR.1: Construct an argument as to the source of human rights and how they are best protected.
- 6.3.8.EconET.1: Using quantitative data, evaluate the opportunity cost of a proposed economic action, and take a position and support it (e.g., healthcare, education, transportation).
- 6.3.8.EconET.2: Assess the impact of government incentives and disincentives on the economy (e.g., patents, protection of private property, taxes).

ChatGPT

ChatGPT

The provided standards focus on critical aspects of civic education and economics, specifically the origin and protection of human rights, evaluating economic actions through the lens of opportunity cost, and assessing the impact of government incentives and disincentives on the economy. Utilizing the Hess Cognitive Rigor Matrix (CRM) and Webb's Depth of Knowledge (DOK) levels, these standards can be classified according to the cognitive demands they place on students. Webb's DOK levels are:

Recall and Reproduction  
Skills and Concepts  
Strategic Thinking  
Extended Thinking

Here's the classification for each standard:

Standard	Webb's DOK Level
6.3.8.CivicsHR.1: Construct an argument on the source of human rights and their protection.	DOK 4 (Extended Thinking)
6.3.8.EconET.1: Evaluate the opportunity cost of an economic action using quantitative data.	DOK 4 (Extended Thinking)



6.3.8.EconET.2: Assess the impact of government incentives and disincentives on the economy.	DOK 3 (Strategic Thinking)
--	----------------------------

Explanation:

- DOK 4 (Extended Thinking) is required for tasks that involve complex reasoning, planning, and detailed analysis, such as constructing an argument regarding the source and protection of human rights, and evaluating the opportunity cost of economic actions. These tasks demand a deep understanding of concepts, the ability to synthesize information from multiple sources, analyze data, and develop a supported position.
- DOK 3 (Strategic Thinking) applies to tasks that necessitate reasoning, the use of evidence, and a more in-depth understanding of concepts than simple recall or basic application. Assessing the impact of government policies on the economy requires students to analyze and understand the implications of incentives and disincentives, drawing on economic principles and historical examples.

These classifications highlight the depth of cognitive engagement required, emphasizing critical thinking, analysis, and the synthesis of information across various contexts within civics and economics.

**Researcher Prompt:**

What is the frequency of each level.

ChatGPT

ChatGPT

The frequency of each Depth of Knowledge (DOK) level based on the input is as follows:

DOK Levels	ChatGPT Total
DOK 1 (Recall & Reproduction):	1
DOK 2 (Skill/Concept)	7
DOK 3 (Strategic Thinking & Reasoning)	62

DOK 4 (Extended Thinking)	39
---------------------------	----