

Pre/Post Assessment Data Review Project

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Introduction

The purpose of this project is to examine how assessment data can be used to inform and improve instruction through pre- and post-assessments in a fourth-grade Social Studies unit on the American Revolution. The goal is to explore and understand the process of analyzing data and adapting plans and instruction practices from that data. Reviewing this data offers valuable experience for teachers to interpret student learning trends, evaluate assessment tools, and identify strengths and gaps. For this project, I selected the Grade 4 Social Studies data set, which focuses on a unit covering key concepts related to the American Revolution, including the causes of the war, early democratic foundations, and geographic knowledge. The data set included pre- and post-assessment scores, student work samples, and contextual information for a class of 22 students.

Initial analysis of the assessment data showed that most students demonstrated moderate growth in understanding the historical content, with a few students either maintaining strong performance or showing only modest improvement. The use of consistent assessment formats (e.g., multiple choice) across both pre- and post-tests likely contributed to the accuracy of measuring student learning. However, the data also revealed areas where instructional support could be enhanced, particularly for students who did not show measurable improvement. Based on these findings, recommendations will focus on differentiated support for struggling learners, enrichment opportunities for high performers, and adjustments to assessment design to ensure equity and understanding for all the students. This paper will also present an evaluation of the curriculum, assessment tools, and student learning patterns, followed by a reflection after the recommendations.

Background Information

The Grade 4 Social Studies data set includes important demographic, environmental, and instructional context that should be considered when reviewing the data. The data was collected from a fourth-grade classroom in an affluent, suburban community in Westchester County, New York. The school serves approximately 620 students in grades 2 through 5 and places a strong emphasis on inclusive and differentiated instruction. The class observed includes 22 students, 12 girls and 10 boys, with a range of academic and support needs. Four students are classified with exceptionalities: two with ADHD, one high-functioning autistic student, and one hearing-impaired student. A special education teacher co-teaches during core instructional blocks to ensure all learners receive adequate support.

The unit of study explored themes related to the American Revolution, including historical causes, geographic influences, colonial life, and early democratic principles. Lessons were scaffolded to build background knowledge and promote student engagement. Instruction began with vocabulary development and progressed through the study of pivotal events, figures, and philosophical ideas. The unit was interdisciplinary, incorporating elements of English Language Arts (e.g., analyzing primary sources and expository writing) and Math (e.g., timelines and data interpretation).

The materials used include a Smartboard, classroom library/books, desktop computers, and assistive technology like a voice amplification system. They also have access to storage cubbies of classroom supplies such as paper, markers, crayons, rulers, tape, and glue. Students worked in flexible seating arrangements that encouraged collaboration and inquiry-based learning. The classroom setting and instructional approach appear intentionally designed to support engagement, comprehension, and equitable access to content for all students.

These environmental and instructional factors create a strong foundation for equitable and differentiated learning. Overall, the classroom environment seems highly conducive to support student learning. This context is valuable for interpreting the data and student work samples that follow and evaluating student outcomes and the effectiveness of the assessment tools.

Curriculum

This thematic unit centers on the American Revolution, tracing events from the enactment of the Stamp Act through the British surrender at Yorktown. It was designed to build upon prior instruction on the French and Indian War and to lead into the next unit on the founding of the United States. The curriculum emphasized historical empathy, cause and effect, and the formation of political systems, with students developing an understanding of the Revolution through multiple perspectives, especially those of the colonists and the British.

The unit addressed a wide range of interdisciplinary learning objectives, incorporating standards from social studies, English language arts, and mathematics. Social studies instruction was guided by both National and New York State standards, specifically focusing on U.S. and New York history, geography, and civics. Students learned about the political, social, and economic causes of the Revolution, key battles and figures, foundational democratic principles, and the impact of geography on war strategy.

The American Revolution unit is closely aligned with both national and New York State standards across social studies, math, and English language arts. In social studies, instruction is built on National Standards 1, 3, and 5, which emphasize understanding key historical developments, geographic factors, and civic principles. Students explore topics such as the

Stamp Act, the causes and consequences of revolution, colonial and British perspectives, and key battles including Saratoga and Yorktown. New York State standards further support this focus with attention to the Revolutionary War's impact on New York, colonial lifestyles, and the formation of democratic ideals as articulated in the Declaration of Independence.

Mathematics standards were meaningfully integrated into this unit by exploring the economic and logistical aspects of the American Revolution. The teacher description is not specific but it did mention examining the role of taxes, strength in numbers, and economic factors which are likely areas where she could have incorporated the math standards that she highlighted. For instance, students might examine the role of taxation and its impact on colonists by working through word problems to apply multiplication/division skills for topics involving trade, income, or resource distribution, aligning with standards 4.N.16 and 4.N.17. The idea of “strength in numbers” might also be explored mathematically by using equivalent fractions and ratios (4.N.8) to represent how collaboration among the colonies contributed to collective resistance and eventual victory. Students could also measure distances between colonies or battle routes using standard units (4.M.2, 4.M.3), helping them visualize geographic relationships while reinforcing their understanding of measurement.

Likewise, English language arts skills are reinforced throughout the unit via reading, writing, speaking, and listening tasks that support historical understanding. Students summarize informational texts, take structured notes, and engage in cause-and-effect writing to analyze the events of the war (Standard 1). They also produce imaginative and reflective narratives (Standard 2), such as writing from the perspective of a colonist or Loyalist. Standards 3 and 4 are addressed through class discussions, the evaluation of primary and secondary sources, and the use of textual evidence to explain relationships and historical viewpoints.

This interdisciplinary approach supports deeper content understanding and allows students to demonstrate learning through multiple formats. This benefits students with different learning preferences and encourages critical thinking and development across multiple subject areas. A significant emphasis was placed on collaborative work, with students seated in pods and frequent use of group tables for teacher-led instruction and peer interaction. Lessons were scaffolded to support the needs of diverse learners, including students with ADHD, autism, and hearing impairments. Assistive technologies, visuals, and flexible instructional spaces (e.g., rugs, smartboards, and library corners) supported engagement and accessibility.

Assessment tools included informal observations, project-based tasks, and formal pre- and post-tests. The pre- and post-assessments consisted of multiple-choice questions tied directly to the unit's learning objectives and essential questions. While some test items were identical, others were parallel in structure and content, offering a consistent yet varied measurement of student growth. These assessments aligned closely with the unit's instructional goals, focusing on key areas such as colonial grievances, major Revolutionary events, and geography's influence on the war. While multiple-choice has limits in its ability to assess deeper analytical thinking, it does provide an efficient and objective method to track factual understanding and content retention over time (Mertler, 2003).

Assessment Tool

The primary assessment tools used in this unit were a traditional pre-test and post-test, designed to evaluate student understanding before and after instruction. As defined in the course textbook, a test is “a formal set of questions or tasks, often administered to a group of students, that address particular cognitive capabilities learned in a specific course or subject area”

(Mertler, 2003). These assessments targeted specific learning objectives and standards aligned with the Social Studies unit on the American Revolution.

The primary assessment tools used in this unit were a pre-test and post-test, both structured as multiple-choice assessments. These tools were designed to measure student understanding of key unit concepts, including the causes of the American Revolution, geographic context, and the emergence of democratic ideals. The pre-test was administered at the beginning of the unit to gauge students' prior knowledge, while the post-test served as a summative evaluation of student learning after instruction.

Both assessments share strong similarities. Some questions were identical, while others were parallel in nature, addressing the same learning targets with reworded phrasing or alternative examples. This blend of identical and parallel items allowed for a more reliable comparison of student progress while minimizing the likelihood of student success based purely on memorization. Each question also corresponded to a specific learning objective from the unit, ensuring alignment with the curriculum.

The format of the assessment tools allowed for efficient scoring and easy data comparison across the class. Multiple-choice tests are also widely recognized as effective for assessing factual recall and comprehension across large groups of students (Popham, 2017). However, this format presents some limitations. It does not allow students to explain their reasoning, demonstrate historical thinking skills, or express understanding of complex themes such as multiple perspectives or civic engagement, which are core goals of the unit.

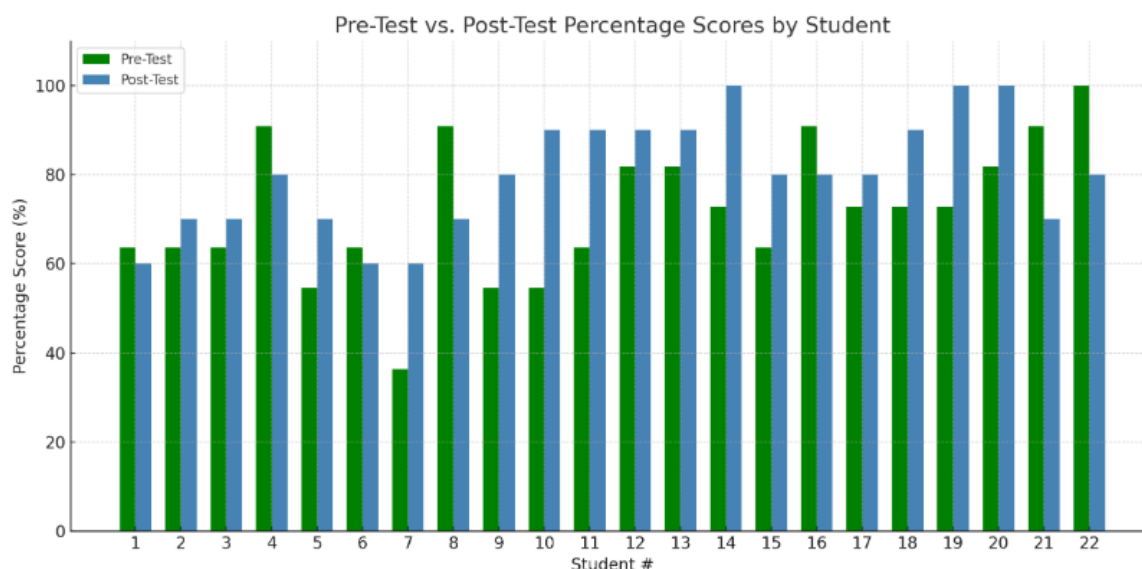
While the assessments were appropriately aligned to the unit content, they may not fully reflect the depth of student understanding, or the broader range of skills emphasized during

instruction. A more comprehensive approach could include written-response questions or performance-based assessments, such as reflections, debates, or presentations. These alternative formats would allow for a richer demonstration of learning and provide additional insight into students' analytical thinking, especially for those who struggle with standardized test formats (Mertler, 2003).

Patterns of Student Learning

The overall class results from the fourth-grade Social Studies pre- and post-assessments demonstrated evidence of learning, with an increase in student achievement across most of the class. All 22 students in the class completed both a pre-test (scored out of 11) and a post-test (scored out of 10). The data in Figure 1 shows that 15/22 students improved their scores from the beginning to the end of the unit on the American Revolution, with only 7/22 slightly declining in performance. This improvement suggests that the instruction was generally effective in building both content knowledge and historical understanding, however, roughly one third of the class had a drop in scores, which indicates a clear room for improvement in the instruction practices.

Figure 1: Individual Student Test Scores



These improvements are reflected in the overall measures of central tendency as well. The average pre-test score was approximately 70.3%, while the average post-test score rose to 80.5%, indicating a mean gain of over 10%. The median also increased from 72.7% on the pre-test to 90% on the post-test, while the mode shifted from a pre-test score of 7/11 to post-test scores of 8/10 and 9/10. Overall, these results show that the overall student performance improved after instruction, suggesting that instructional goals were generally met.

A few students did not demonstrate notable growth or slightly declined in performance. This could be attributed to factors like test fatigue or minor confusion with revised test wording. However, it more likely indicates that there are gaps in instructional alignment, especially for particular subgroups. Intriguingly, the majority of the students who declined in performance were students who were among the top performers on the pre-test, which could indicate that the teacher over-corrected their instruction based on the pre-test results, prioritizing extra help for those who struggled, while those that did well got less attention. For instance, five of the seven students who declined in performance (shown in red in Table 1) received a 90% or higher on the pre-test, while each of them dropped to an 80% or lower on the post-test. Conversely, the four

lowest performing students on the pre-test (shown in green in Table 1) each saw significant improvements on the post-test. Overall, that group improved their mean score from 50% to 75%.

Table 1: Student Assessment Data

Student #	Gender	Pre score	Pre total	Percentage	Post score	Post total	Percentage
1	B	7	11	0.63636364	6	10	0.6
2	G	7	11	0.63636364	7	10	0.7
3	B	7	11	0.63636364	7	10	0.7
4	B	10	11	0.90909091	8	10	0.8
5	B	6	11	0.54545455	7	10	0.7
6	G	7	11	0.63636364	6	10	0.6
7	G	4	11	0.36363636	6	10	0.6
8	B	10	11	0.90909091	7	10	0.7
9	B	6	11	0.54545455	8	10	0.8
10	B	6	11	0.54545455	9	10	0.9
11	B	7	11	0.63636364	9	10	0.9
12	G	9	11	0.81818182	9	10	0.9
13	G	9	11	0.81818182	9	10	0.9
14	G	8	11	0.72727273	10	10	1
15	G	7	11	0.63636364	8	10	0.8
16	G	10	11	0.90909091	8	10	0.8
17	B	8	11	0.72727273	8	10	0.8
18	B	8	11	0.72727273	9	10	0.9
19	G	8	11	0.72727273	10	10	1
20	G	9	11	0.81818182	10	10	1
21	G	10	11	0.90909091	7	10	0.7
22	G	11	11	1	8	10	0.8

Nevertheless, the overall data supports the conclusion that students gained a clearer understanding of the unit's key concepts. A review of the post-assessment results and student work samples revealed several student strengths. Most students showed strong comprehension of colonial motivations and the causes of the war. Questions involving key vocabulary and the identification of significant events were answered correctly by most of the class. Student Work Samples #1 and #2 showed mastery of major concepts and suggest increased confidence with terminology and content recall. Many students also showed success in understanding geographic factors, such as the positioning of major colonies and the strategic significance of battle routes.

However, the data also revealed common errors and misconceptions. Several students struggled to differentiate between similar British legislative acts, such as the Stamp Act and the Townshend Acts. This issue also appeared in Student Work Sample #2, indicating some widespread confusion about these acts.

According to the unit's learning objectives, students were expected to identify causes of the Revolution, recognize the structure and purpose of colonial government, understand geographic influences, and describe early democratic ideals such as those expressed in the Declaration of Independence. Most students met these goals, as reflected in post-assessment scores and evidence from their written work. Nonetheless, a small subset of students—especially those whose progress resembled Sample #3—did not demonstrate consistent mastery. This highlights a need for instructional follow-up, such as targeted reteaching and the use of alternative assessment formats, to more accurately assess and support student understanding.

Target Students Analysis

To gain a deeper understanding of individual student learning within this unit, three target student work samples were analyzed. These students represent a range of performance levels and patterns of growth between the pre- and post-assessments. The following analysis explores each student's strengths, misconceptions, and instructional implications based on their work and assessment data.

Unfortunately, the teacher did not provide any specific feedback on the student assessments as they simply put a + or x to indicate right or wrong answers, see Figure 2 as an example. While this is understandable given the nature of multiple choice questions, I still believe it would have

been beneficial to the students for the teacher to correct their mistakes and provide a brief explanation/recap of why the other option was correct. This could have aided their understanding and made them less likely to repeat mistakes on the post-assessment.

Figure 2

8/20/2021 American Revolution 4th grade Print - Quizizz

4. Why did the Revolution happen? why did the war happen

The American Revolution began in 1775 as a war fought between the United States colonies and Great Britain. The revolution was a struggle for the colonies to become an independent nation. The war ended in 1783 with the signing of the Treaty of Paris, which recognized the United States as an independent nation.

☒ a) They wanted to be independent

☐ b) They did not like each other

☐ c) They stole

☐ d) They wanted to just fight

5. Before the War After the War how many colonies were there after the war

☐ a) 17

☒ c) 13

☐ b) 9

☐ d) 85

6. what year did the war end

☐ a) 1875

☒ b) 1836

☐ c) 1783

☐ d) 1299

7. was there slavery in 1775

☐ a) no

☒ b) yes

☐ c) i don't know

☐ d) none of the above

Target Student 1

This student demonstrated strong performance on both the pre-test and post-test, indicating a solid foundational understanding of key concepts throughout the unit. The pre-test showed that the student correctly answered most questions, reflecting either prior knowledge or effective inference skills. This proficiency was maintained and slightly improved upon in the post-test, where the student displayed consistent accuracy and confidence in their responses.

- *Strengths:*
 - Clear grasp of cause-and-effect relationships, such as the impact of taxation on colonial resistance.
 - Accurate identification of important figures and significant events of the American Revolution.
- *Areas for Growth:*
 - A minor error on the post-test suggests some confusion between similar Revolutionary War battles. This may be addressed with instructional supports such as visual timelines or maps to reinforce spatial and chronological understanding.

Target Student 2

This student showed moderate growth from the pre- to post-assessment. Initial pre-test results revealed some misconceptions, including difficulties distinguishing the roles of various British laws and limited ability to connect geographic features to military strategies. However, by the post-test, the student demonstrated noticeable improvement, correctly answering several questions previously missed.

- *Strengths:*
 - Enhanced recognition of major colonial grievances and the democratic ideals that emerged from the Revolution.
 - Improved accuracy on geography-based questions, reflecting better understanding of the spatial context of key events.
- *Areas for Growth:*
 - Continued confusion remains between specific British Acts, such as the Stamp Act versus the Townshend Acts.
 - Challenges with sequencing events in chronological order suggest a need for reinforcing timeline skills.

Target Student 3

This student exhibited low performance on the pre-test with only marginal improvement by the post-test. Their work indicates significant gaps in understanding foundational content and a general lack of confidence or clarity when interpreting assessment questions.

- *Strengths:*
 - Demonstrated some awareness of differing perspectives, notably between colonists and British leaders, as shown by correctly answering a question about motivations for war.
- *Areas for Growth:*
 - Difficulty identifying key events and figures of the Revolutionary War.

- Confusion regarding the relationship between geography and military outcomes.
- Inconsistent use of effective test-taking strategies, such as process-of-elimination, leading to guessing.

Together, these three target students highlight the diversity of learning profiles within the classroom. Their varied strengths and challenges underscore the importance of differentiated instructional approaches, the integration of clearer and more frequent formative feedback, and the use of varied assessment formats to more fully capture and support student learning.

Next Steps

Based on the results of the assessment data and student work analysis, instructional next steps should focus on both whole-class reinforcement and individualized support. Although the majority of students demonstrated significant growth from the pre- to post-assessment, a closer look at specific errors and patterns reveals areas that would benefit from additional instruction.

For the whole class, reinforcing content related to chronological sequencing, the distinction between British legislative acts, and geography's influence on Revolutionary War outcomes is essential. These areas appeared to be the largest points of confusion across assessments. Revisiting these concepts with the aid of visual timelines and interactive maps would help students develop stronger understanding and connections. In addition, incorporating active learning strategies such as role-playing and structured debates can deepen students' understanding of multiple perspectives and foster historical empathy. This is supported by Vygotsky's emphasis on learning through social interaction (Vygotsky, 1978).

To ensure continued growth, the teacher should embed formative assessment practices such as exit tickets, quick writes, and think-pair-share activities throughout upcoming units.

These will allow real-time instructional adjustments and align with Black and Wiliam's (1998) formative assessment theory, which highlights the importance of timely, actionable feedback.

At the individual level, each of the three target students requires a tailored approach. Target Student 1 would benefit from enrichment activities such as independent research on lesser-known historical figures or events. Target Student 2 would benefit from small-group instruction with visual supports such as graphic organizers and guided timelines to solidify understanding of British policies and event sequencing. Target Student 3 demonstrated minimal growth and continues to struggle with foundational content. Thus, more intensive support is needed. The teacher should consider providing instruction in a small group or 1:1 setting, and using modeling and guided practice to build comprehension (Mertler, 2003).

Lastly, I would recommend the teacher to provide more substantial and specific feedback on their assessments and to utilize more diverse forms of assessment, rather than simply relying on multiple choice. Incorporating written assessments, oral assessments, and/or performance assessments could benefit diverse learners and better reflect student understanding and performance (Mertler, 2003). Ultimately, instruction for this unit was relatively successful, but the data suggests a need for differentiated next steps that address varying levels of mastery. A combination of visual supports, active learning, targeted feedback, and individualized scaffolding will help ensure that all students continue progressing toward a deeper and more lasting understanding of the American Revolution.

Reflection

The pre- and post-assessments used in this unit provided valuable insight into student learning, particularly in terms of factual knowledge, vocabulary, and cause-and-effect

relationships surrounding the American Revolution. The multiple-choice format allowed for efficient administration and scoring, contributing to consistency in measurement across the class. Because many items were identical or parallel in structure, the tools demonstrated moderate reliability, as they yielded comparable results across different points in time (Mertler, 2003).

In terms of validity, the assessments displayed strong content validity, as the test items were clearly aligned to the unit's stated objectives and addressed the key standards being taught (Mertler, 2003). However, the construct validity was somewhat limited. While the assessments measured factual recall effectively, they did not fully capture higher-order cognitive skills such as analysis, interpretation, or historical empathy. According to Mertler (2003), a valid assessment should not only reflect what was taught, but also how it was taught and the level of thinking emphasized. Including performance-based tasks or written responses would have improved the construct validity of the assessment.

Potential bias was minimal in the test design, but there are still concerns about fairness. Multiple choice questions can encourage rote memorization or guessing, which may not accurately reflect student understanding. Additionally, the one-style format may have disadvantaged students with diverse learning needs, such as those with IEPs, language processing differences, or attention difficulties. As Mertler (2003) notes, equitable assessments should be accessible to all learners and free from unnecessary barriers to success. Future assessments would benefit from more universally designed elements, such as visual supports, simplified language, or alternative response formats.

Overall, the assessments used in this unit provided a helpful snapshot of student learning and were appropriately aligned to the content being taught. However, the results also highlighted the need for a more balanced approach to assessment design. Personally, this experience has

reinforced the importance of crafting assessments that are not only reliable and valid, but also inclusive, varied, and authentically reflective of instructional goals (Mertler, 2003).

References

- Black, P., & Wiliam, D. (1998). *Inside the black box: Raising standards through classroom assessment*. *Phi Delta Kappan*, 80(2), 139–148.
- Mertler, C. (2003). *Classroom assessment: A practical guide for educators*. Taylor & Francis Group.
- New York State Education Department. (n.d.). *K-12 Social Studies framework*.
<https://www.nysed.gov/curriculum-instruction/k-12-social-studies-framework>
- Popham, W. J. (2001). *The truth about testing: An educator's call to action*. Association for Supervision & Curriculum Development.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.