YALE NATIONAL INITIATIVE
to strengthen teaching in public schools®

Curriculum Units by Fellows of the National Initiative
2026 Volume I: The Kids are not the Threat

Representation Matters: Math Literacy and Power

Curriculum Unit 26.01.04, published September 2026
by Raven Dorman

School Demographics

John Hayden Johnson Middle School is a long-standing public school located in the Ward 8 community of southeast Washington, DC. According to the most recent demographics posted, the school population is 98% Black and 2% Hispanic/Latinx; 23% of students receive special education services, and 78% of students are considered “at-risk.” The indicators of the at-risk category include qualifying for Temporary Assistance for Needy Families (TANF) or the Supplemental Nutrition Assistance Program (SNAP), having been identified as homeless during the academic year, or being under the care of Child and Family Services Agency (John Hayden Johnson School Profile 2025). According to 2024-2025 DC CAPE (Comprehensive Assessments of Progress in Education) English Language Arts results, 2% of students exceeded expectations, 11% met expectations and 24% approached expectations; in math, 1% of students met expectations and 14% approached expectations. The students at Johnson are not a monolith; they have varied interests, hopes, strengths, and skills.

Pedagogical Philosophy

The inclusion of demographic information should not lead the reader to believe they have a complete picture of the school community at Johnson. While 82% of students fall in the “at-risk” category, 100% of students can learn when they receive the appropriate supports, both academically and socio-emotionally. Bob Moses and Charles Cobb, largely known for their SNCC activism and leadership, argue in *Radical Equations: Math Literacy and Civil Rights* that due to its connection to economic freedom, math literacy is the key to the future for disenfranchised people of color, and that the pursuit of that literacy is as vital as was the fight for voting rights in the 1960s. Boutte argued in *Educating African American Students*, “there has been an overemphasis on what is wrong with Black students and communities…the intent is to focus on what we as educators can change and what strengths already exist that we may build on.”[1] Bearing this responsibility in mind as an educator, Culturally Relevant Pedagogy (CRP) will be foremost in guiding the Representation Matters unit. This pedagogical approach makes space for the diversity of strengths among students within the subgroup. Further, it emphasizes meeting students where they are to provide context for building understanding but not

staying at that level in perpetuity.

Moses also argues for a culturally relevant pedagogical approach which starts where children are in *Radical Equations*. Moses recommends a framework that causes students to reflect on their shared experiences, but in his framework, the educator can create a shared experience with a physical event that can reveal something about math. Following the event, students will draw "on their common culture, then form abstract conceptualizations out of their reflection, and then apply the abstraction back on their experience."[2] This process affords students the opportunity to grapple with what they know and come to new understandings, while being open to learning from others. Students must connect with the material to internalize it and transfer their learning in novel situations. In the DC Public Schools district, the use of Stanford University's Math Language Routines (MLRs) is encouraged to promote student concept internalization. Cobb and Moses similarly recognize the importance of students being able to represent their internalization of learning through language. They describe the following steps as crucial to the learning process: a physical event, pictorial representation/modeling, *intuitive language/people talk*, structured language/feature talk, and symbolic representation. The placement of pictorial representation and intuitive talk (a student's everyday language) at the early stages of the process provides entry points for students who are resistant to diving straight into the math. In fact, they assert that students should feel ownership over their descriptions in these two stages. After achieving some success in the earlier stages with building context, students will be better prepared to ask and answer questions that can be answered by math application.

In the Representation Matters unit, students will learn to represent data they observe in various ways; with the educator legitimizing both the ways in which students express the data intuitively and the ways their presentations change as they uncover new forms of representation.

Background and Content Rationale

The Kids are not the Threat seminar highlights the radical activism of young people in the struggle for civil rights. In his assessment of SNCC, Howard Zinn describes the young as the most dependable in a revolution. Although the wake of the Black Lives Matter movement led many to look back fondly to applaud the former SNCC chairman John Lewis for getting into *good trouble*, Dr. King (2010) reminds us in his lecture, Youth and Social Action, that the older generation was critical of the young—wondering why they were "so unfathomable, so alienated, and frequently so freakish." Despite the criticisms, Dr. King asserts that the youth birthed a new spirit of resistance. The young in today's generation are under scrutiny as in generations past. In a May 2026 press conference, DC US Attorney Jeanine Pirro argued that *teen takeovers* (large teen gatherings in public spaces coordinated and streamed on social media "are not harmless gatherings; they are violent, and they are disruptive."[3] She dismissed the idea that the youth need alternative activities, arguing that community centers are open. She then proceeded to advocate for prosecuting the parents of teens who commit crimes—a measure that would undoubtedly disproportionately affect low-income families. Though these gatherings are undesirable to adults, the ability to use social media to galvanize and influence large groups is a remarkable feat for these young people and leads one to wonder how they can harness their influence.

In schools, student test, attendance, and suspension data is scrutinized to predict their postsecondary outcomes. According to the Office of the State Superintendent of Education website, scoring at a level 4 or 5

on CAPE indicates that students are college and career ready, while scoring at a level 2 indicates that students have “much of the skills necessary to be successful in future grades and in post-secondary pathways.” Johnson’s math CAPE data would therefore lead to the conclusion that 1% of students are college and career ready, 14% are ready for a *pathway*, and the remaining 85% do not even receive a descriptor on the website. As Dr. King encouraged the three groups of youth he described (including those who rejected society) to mobilize together for social change, this unit aims to motivate students (including those who aren’t deemed college/career/*pathway* ready) to view command of data representation as power. Students should be empowered to interpret the data collected about them, and use data to effect change, in the world at large and in their respective future outcomes as math literate adults.

Representation takes on many meanings in the unit—statistically speaking, it refers both to those represented in a population sample as well as the ways in which students choose to represent the data in visual form to persuade the dissenting or apathetic population. Further, representation refers to the cultural relevance students will experience seeing themselves in young changemakers of the past, and in turn, envisioning themselves as the new kids who can investigate ideas and articulate their findings. In Algebra I, students must expand their understanding of statistics from middle school study to differentiate between statistical versus non-statistical questions and categorical versus numerical data. They are expected to represent and interpret various representations of data and describe distributions using statistical terminology. Students must learn that standard deviation is a measure of variability and interpret the meaning of outliers in a data set. Further, they will examine how one measure of central tendency e.g. mean, median, mode and interquartile range can illustrate their stance more clearly than another measure.

Students will examine the intentionally easily readable infographics created by W.E.B Du Bois at the turn of the 20th century as well as the contemporary infographics created and posted on Instagram by Mona Chalabi. Students will examine how both artists/activists represent data in a digestible and impactful format for their audiences a century apart. Presenting students with this style of visual representation will serve as an entry point for students to understand that an observer should be able to glean specific information from an infographic. Those who struggle with reading traditional graphs can practice close reading with the infographics and learn to translate the data they gather into another form of statistical representation. They will follow the process of explaining what they notice while being prompted to ask mathematical questions, considering how the information can be represented differently. Given various graphs, students will consider what statistical question is being answered, draw conclusions supported by the data, find measures of central tendency and/or generate equations for lines of best fit. These exercises should help them discover how graphs can be used to highlight the necessity for change.

To conclude the unit, students will be tasked with writing a statistical question to investigate a matter of importance to them. Questions could range from suspension data across middle schools to gathering opinions about school lunch options and uniforms. Students will then decide how to represent their data to change-makers and stakeholders visually, using traditional graphs and/or infographics, and in writing. Notably, the writing component can include song composition, reminiscent of the protest music of the civil rights era. The culminating activity aims to illustrate to students how representations of data can serve to legitimize the claims and concerns of young people who might otherwise be written off as idealistic and irrational. Ending the unit with public exhibition or a student-organized rally showcasing student findings to invited stakeholders will further encourage students to believe in the power of their voices in representation.

Reclaiming Data

“Many poor and minority kids know how far behind they are; it is part of what frightens them. But their response is not to organize for change, or to make plans for direct action.” [4]

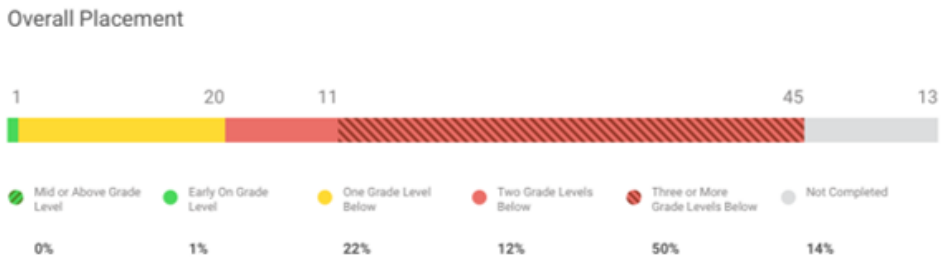
At the opening of school year 2025-2026, after breakfast and icebreakers, administrative staff directed teacher attention to a smart board to share staggering statistics about the end-of-year (EOY) state math test results. The slides displayed graphs that were overwhelmingly covered in red with a splash of yellow, allowing even self-proclaimed non-*math people* to discern that the lack of green signified there was a major problem. Another slide made the message clear: One percent proficient.

As educators, we often hear that instruction should be data driven. To that end, we administer diagnostic tests and display the newest edition of green-deficient data charts in our classrooms to remind ourselves and students of the tireless pursuit of proficiency. Image 1 displays the 2025 beginning-of-year (BOY) diagnostic data that was posted for students on an in-classroom data wall. But what is the effect of the posted data representations on students? What does *1% proficient* mean to a student who cannot interpret or calculate the percent of a number? They know that one is a low number, that green is a desired color on a graph, that there *is* a problem; but the gaps in their math literacy impacts their ability to ascertain what the graph reveals to stakeholders and what information is missing.

There are arguments both for and against using data walls in classrooms, outlining their effect on morale, but I don’t make an argument for either position here. I argue that our students can answer the question for themselves but first they must be asked. If a teacher chooses or is mandated to post class data, the teacher should be sure to give students repeated opportunities to reflect on the data, its meaning, and their affective response to it. Students should be questioned about what the colors signify to them and what they believe the data communicates or what additional investigation it calls for.

Proficiency graphs fail to highlight student growth; students who scored on 2nd grade level at BOY and at 5th grade level at EOY, will still find their data represented by *red* on the graph (red categorizes scores two or more grade levels below proficiency). While the students will have made substantial gains, it will appear to stakeholders as if nothing has changed for these students—highlighting the need for a different type of data representation to tell the untold story.

Figure 1. *Screenshot of Fall 2025 i-Ready diagnostic data[5]*



Data points can highlight demand, but students must envision themselves as shapers of the demand. While policymakers can use student data to anticipate a demand for fewer opportunities in advanced mathematics, parents and students can point to the same data as evidence that more opportunities are needed. Results of a parent survey conducted by Moses, asking Black parents whether they believed their children should take

Algebra I, were overwhelmingly affirmative as parents tended to believe their own children could rise to the occasion regardless of their standardized test scores.[6] Maybe parents and students still desire access to advanced math but we will only know if we ask the people we serve. If teachers can latch on to the moments when parents and students are most confident about student ability to grapple with difficult content, a movement calling for sustained rigor can be galvanized.

What if the data is not calling for remediation but for deeper content contextualization and internalization that leads to ownership? Whose opinions are represented in determining the answer? Students should consider these questions as they begin developing their own statistical question as part of the culminating activity.

Student Demand

"We seem to be interviewing the fish in the sea to find out what the birds in the heavens are doing" – E.E. Schattschneider[7]

We must get our answers from the students we serve—we must see students as capable of providing answers worthy of adult attention. Moses argues "Here, where kids are falling wholesale through the cracks— or chasms— dropping out of sight, becoming fodder for jails, people say they do not want to learn. The only ones who can dispel that notion are the kids themselves." The language here is reminiscent of Denis Mora of the Fort Hood Three, who in his statement disavowing the Vietnam War recognizes that the Pentagon views him and his fellow soldiers as merely cannon fodder. He however asserts that cannon fodder *can talk* and that the message of the fodder is anti-propaganda, anti-war and anti-genocide. Likewise, students, if they are to be treated like fodder, must become loud talking fodder. While Moses doesn't refer to the Fort Hood Three in Radical Equations, he draws a parallel between the assumptions made by those in power about sharecroppers demanding the right to vote as apathetic, and the assumptions made about students that their dysfunction inhibits their education.[8] He asserts that if significant change will happen in math literacy for disenfranchised students, it will be because those students demand the literacy that systems claim students do not want.

Students must be given the tools to represent themselves. Youth activist, Margolin, muses, "what we get in trouble most for at school is usually questioning the rules. But questioning the rules may actually be where our greatest power lies."[9] Questioning is key to students being able to make sense of the world and build lasting understanding—so long as students remain curious, they can and will learn.

Questioning will lead students to identify an investigative statistical question that matters to them. Dr. Rod Ferguson, in his seminar "The Kids are not the Threat" often reminded us that an axiom of organizing is that all organizing is local. For students to engage with issues that are important to them, the teacher will serve as an organizer. It is not the role of the teacher or organizer to impose ideas onto students but rather to assist them in acquiring the tools to express their own observations as their ideas and understandings evolve.

Teachers as Organizers

When the Council of Federated Organizations (COFO) comprised of the four major civil rights groups (SNCC, CORE, NAACP, SCLC) along with hundreds of northern students arrived in 1964 Mississippi, they learned that the rural community was not interested in lunch counter sit-ins and bus boycotts as forms of resistance because they did not have public transportation systems or lunch counters. With less than 5% of the state's Black population registered to vote, compared to the 50-70% registration in other southern states, the local community's greatest need was ending voter suppression.[10] The visiting students embedded themselves in

the community, staying in the locals' homes, working alongside them, while establishing freedom schools to prepare the locals academically and politically. In becoming part of the community, organizers become aware of its strengths, concerns, and customs. Unlike a colonizer, the organizer does not arrive with a *complete answer,* rather they co-construct a solution with the community, helping members build consensus through sharing opinions and questioning one another.[11]

Cobb (who later continued his partnership with Bob Moses on *Radical Equations*) proposed the formation of Freedom Schools in 1963, understanding that schools in Mississippi were "part of the apparatus of oppression."[12] In 1964, 41 Freedom Schools opened in Mississippi to serve the needs of native Mississippians from pre-school age children to lifelong field working elders. Classes were held in churches and under trees and while they had little to no funding, their curriculum was comprehensive and impactful. The curriculum focused on teaching reading, writing, and math through an experiential and multidisciplinary approach.

Curriculum writers believed that content and methodology should be responsively adjusted to maintain student interest and that positive relationships between teachers and students were tantamount. This represented a break from the ideas of established school systems which sought to maintain compliance and conformity. Group discussion and questioning decentered the teacher, both spatially, as they sat in circles, and ideologically. Students were taught to see themselves and their classmates as agents of social change. Through review of case studies, students were provided with documents and data and asked to draw on their own experiences to relate the case studies to what was happening in their communities. This is precisely the work that students will engage in throughout this unit. Driven by their ability to make connections between infographics with which they are presented and their lived experiences, students will learn data representation methods that empower them to make social change. An excerpt from a mathematics curriculum offers teachers the following advice: "The standard method of teaching math in Mississippi is through routine drill, and more routine drill. If your course tends to seem routine, like regular school, the students will tend to loose [*sic*] interest and you may loose [*sic*] them. Be creative. Experiment. The kids will love it."[13] This 1960s advice is more relevant than ever as educators must take care not to contribute to the *apparatus of oppression.*

In the Pedagogy of the Oppressed, Freire advises teachers against turning students into *receptacles* to be filled by the teacher. He refers to this practice as the *banking* concept of education, in which student learning and growth is determined by the degree to which they can memorize and demonstrate their memorization on demand. Transferrable knowledge is attained through asking questions, failure, invoking creativity, and problem solving. The stakes are too high to abandon student-centered learning for memorization in hopes of seeing higher standardized test scores. Freire warns, "the more students work at storing the deposits entrusted to them, the less they develop the critical consciousness which would result from their intervention in the world as transformers of that world." [14] When students grapple with content and make mistakes in a math classroom, they build the critical thinking skills necessary to solve problems they encounter in adulthood. They can come to understand that knowledge is always being created and consequently, they can begin to envision their future selves in cutting edge problem-solving careers. When they discover knowledge in a classroom setting with the teacher serving as facilitator, they become empowered to believe that they can become discoverers of knowledge in various fields. The Algebra Project sees student enrollment in higher level math courses as necessary to being able to participate meaningfully in society both economically and civically. A student who has been spoon-fed facts is less likely to develop new technologies in the future because they have not developed risk-taking skills through trial and error. As society consistently grows toward new technological advancement, a lack of algebra proficiency is not only a barrier to student

enrollment in higher math classes, but a barrier to citizenship in the technologically advanced society. Students with lower math skills are positioned to be merely consumers of the technology rather than its shapers.

In a school with poor test data, tracking students and rushing through material for those who can get it quickly is a seductive but inequitable path. Utilization of the banking method even as an interim measure "justified on grounds of expediency, with the intention of later behaving in a genuinely revolutionary fashion" is a betrayal of true revolutionary education—preventing students from developing empowering thought processes. True acquisition of knowledge can be evidenced by learning transfer, or the ability to apply knowledge to novel situations. The banking method churns out students who are only prepared to answer standardized test questions presented in familiar formats while remaining ill-equipped to think critically across contexts.

Problem-based learning, such as the use of case studies in the Freedom Curriculum, promote learning transfer as students spend time extracting information, relating it to their experiences, and representing the information in various ways. Student exposure to multiple contexts in their instruction allows students to develop a flexible representation of knowledge, making them more likely to find the similarities between unique problem scenarios by abstracting the relevant features of shared concepts.[15] A study on algebraic word problems revealed that compared to students who are trained to perform specific task components, recipients of abstract training demonstrated learning transfer presented with new problems involving analogous relations.[16]

While content expertise is invaluable, teachers must also be guided by the way young people think. Their ways of thinking should guide teachers to reconceptualize math in terms that allow students to connect. For this to occur, teachers must be willing to show up as an organizer who is willing to listen and respond to the needs of students. Teacher commitment to increasing content expertise should not result in the teacher's knowledge and ways of communicating becoming increasingly inaccessible to the student. On the contrary, stronger content knowledge should contribute to the teacher's ability to communicate content on various levels—recognizing the threads connecting basic math and higher-level concepts.

Radical Equations highlights a story about Ari, a student who was performing significantly below grade level on standardized assessments. Though he could not multiply, he was inspired to enroll in Algebra I because his friends were enrolled. As a proponent of algebra for all, Moses allowed him to participate, and while Ari required additional tutoring services, he was committed to consistently attempting difficult math because his friends were building a culture that valued higher level content offerings.

In referencing Ari's story, I do not imply that students enrolled in my Algebra I class will not require intervention to acquire missed skills, rather that the promotion of disconnected rote memorization is not meaningful intervention. Realistically, memorization will likely not be effective for a student in 8th grade if it was ineffective 6 years ago. A lack of calculation fluency does not preclude a student from understanding a real-life concept. In fact, preventing student access to higher order thinking questions says to a student that they are not ready for life even though life will be inevitably ready for them. Taxes will be taken from their first summer job check whether they know how to multiply or not—predatory lenders will offer them financing even if they don't understand percentages. Central to this unit, is the idea that data is collected and used against them whether they have acquired the skills to analyze the conclusions drawn or not.

A second-grade student's recitation of multiplication facts does not mean they are cognitively prepared to

understand pay rates. Older students, however, have experiential knowledge with money that can be leveraged to strengthen their application of multiplication even when they lack fluency. Further, where they lack experience, they are cognitively prepared to glean information from a teacher-created shared experience. Teachers can reinforce gaps in student understanding while exposing students to higher level concepts through problem-based learning. Rather than exchanging grade-level content for drills before investigating pay rates on a histogram, the teacher should leverage their advanced content knowledge to contextualize the material in such a way that clarifies the relevance of multiplicative comparisons for the student. Ideally, the student can discover reason to improve their multiplication fluency after coming to understand the relevance and connection between seemingly disjointed math skills and their lived experiences.

Why Statistics?

The development of statistics literacy is particularly essential for participation in STEM fields—not merely as prerequisite coursework for science programs, but because the critical thinking that results from statistical inquiry is a part of the daily work of engineers, scientists, project managers, and other problem-analyzing/solving careers.[17] Presenting this as an answer to the *why do I need to know this?* question will inevitably result in at least one student stating their disinterest in STEM professions. Career aspirations aside, however, statistical information is ubiquitous in the media and is presented as a guiding factor for citizen participation in daily life. Endorsed by the American Statistical Association (2005), the Guidelines for Assessment and Instruction in Statistics was developed to promote statistical literacy. The writers argue, “every high school graduate should be able to use sound statistical reasoning to intelligently cope with the requirements of citizenship, employment, and family and to be prepared for a healthy, happy, and productive life.”[18]

The publication of the GAISE II in 2020 came in the wake of the Covid 19 pandemic and the rising notoriety of the Black Lives Matter movement. The writers more than acknowledged this fact, emphasizing that at the time of publication “demands for statistical literacy have never been greater” as students should graduate being prepared to evaluate the legitimacy of conclusions being presented to them and formulate their own analyses.[19] To this end, students must learn to interrogate data to detect its weaponization against them and their future opportunities.

While the GAISE I focused on traditional quantitative and categorical data, the GAISE II posits that data and their representations today are *multidimensional* and often interactive. They include social media text and collections of sounds and videos in the data category. In alignment with this acknowledgement, the Representation Matters unit includes the investigation and analysis of the accessible data representations created by W.E.B Du Bois and Mona Chalabi, respectively. Offering song/jingle composition as a pathway for the written component and video content creation as a presentation option demonstrates the vastness of data. Transforming data representation into a form they encounter more often helps students uncover how data are inextricable from their everyday lives and how it shows up.

Upper elementary teachers tend to disproportionately focus on calculation and graphing procedures without intentionally building conceptual understanding of interpreting data through statistical investigation.[20] Attempting to teach all missing skills in isolation prior to exposing students to grade level statistics

underestimates the effect of contextualization on cementing skills for students.

Teaching Strategies

As this unit is student-focused and problem-based, the development of consensus through questioning is tantamount. Building a communal classroom culture is dependent upon group work. Breaking students up into small groups provides opportunity for students to share ideas in a less threatening space. The teacher should avoid ability grouping in the construction of the groups, encouraging students to see the value in the perspectives of students who have not been labeled high achievers and those who have labeled themselves "not math people." Mixed-ability grouping necessitates teacher check-in and frameworks for promoting equity of voice.

The teacher and students should establish and monitor for the implementation of student discourse agreements which promote a safe space for academic risk-taking and strategy sharing. Students should be encouraged to ask questions of one another before asking the teacher to promote critical thinking, sense-making through trial, and ultimately, learning transfer. Mixed-ability grouping messages to students that all members of the classroom community are math people because we are all problem solvers who are worthy of demystifying the language of data that can hide or promote oppression. To assist students in acquiring and using this language, the following teaching strategies will be used.

Notice and Wonder- Students are presented with an idea via media such as images, videos, graphs, or quotes and asked to record what they notice or wonder about the media. This routine, which does not prioritize producing a *right* answer provides a low-stakes entry point for students with high leverage for student engagement and contextualization. Notice and Wonder activities involving data visualizations can promote the development of interpretive, critical thinking, analytical, and visual literacy skills[21]

The following strategies are Math Language Routines (MLRs), developed by the Stanford Center for Assessment, Learning, and Equity, were created to support sense-making, optimize output, cultivate conversation, and maximize meta-awareness as students acquire mathematical language.[22]

Stronger and Clearer Each Time- Students will think about and preferably write a response to data or visuals with which they are presented. Then, in at least two rounds of successive pair sharing, students will have multiple opportunities to clarify and revise their response.

Collect and Display- The teacher listens to and scribes student responses and displays the collection to students. The teacher may revoice or make connections to formal vocabulary to promote sense-making. The collection can occur during a whole group discussion or while a teacher circulates listening to small group conversations.

Critique, Correct, and Clarify- Students will be provided with an incomplete, incorrect, or ambiguous piece of mathematical solutions and will reflect on how errors can be corrected. The teacher will model through meta-think-alouds how to respectfully critique others' work.

Information Gap- This strategy prompts students to identify additional data that is needed to solve a problem. At times, the teacher may provide members of a group with different types of information, and they must

work together to create a complete picture to answer a question posed. They determine why additional information is needed and learn to articulate the need for more data.

Co-Craft Questions and Problems- Given a situation or visual, students will write down possible mathematical questions that might be asked about the visual. This strategy is especially helpful when students are presented with primary sources and are expected to extract the math.

Compare and Connect- This strategy prompts students to compare mathematical approaches, and specifically for this unit, various types of representations. Students are expected to reflect on why certain choices were made and how different choices could affect how the information is received by an audience.

Content Objectives

- Students will pose and answer a statistical question based on their lived experience by designing an experiment, collecting data, and analyzing data.
- Students will make use of structure (MP7) to connect visual representations of data sets and reason abstractly and quantitatively (MP2) by interpreting values in the given contexts.[23]
- Students will create and interpret data displays such as histograms, dot plots, and box plots as well as calculate and interpret measures of center (mean and median) and measures of variability (interquartile range and mean absolute deviation).
- Students will construct and interpret two-way tables using survey data.
- Students will represent bi-variate data as scatterplots, determining the line of best fit, its equation and residuals.

Activity 1: Polling as an Experiential Entry Point

A straw poll, an unofficial vote that is taken to discover what people think about an idea or problem, can provide a false presentation of public opinion as its administration does not require appropriate sampling. Straw polls, however, can help groups reach consensus and provide an entry point for students to become interested in the process of collecting data, especially when the polling is connected to a community concern or belief. To this end, students will be tasked with collecting community opinion data about teen takeovers and Marrion Barry's famed legacy in DC. The collection of shared data as a class serves to create a shared physical experience upon which to build the learning. While the experience won't take place in a field trip setting, as Moses espoused, through the investigative survey process, students will carry their learning from the classroom to the community and back again. In learning to interpret and represent the data, they will connect their learning to the value of community voice and will be empowered with the skills to amplify it.

Students will need to discover how to develop a specific investigative question. Through think-alouds, the teacher should guide students to refine their questions from general to specific. Students should consider: What questions could be posed other than *what's your opinion about teen takeovers?* or *how do you feel about Marrion Barry*?"

After giving students time in groups of 3-4 to create a list of questions (general and specific), the teacher should collect and display the list of questions. Some students might draft questions asking:

Do you think teen takeovers are violent? Why do you think teen takeovers are happening? How should teen takeovers be stopped? Do you like Marrion Barry? Did you vote for him? How many times did you vote for him? Do you agree that Marrion Barry deserved the title "mayor for life?" Why do you think he deserved that title?

Students will consider whether the answer to the questions listed will provide enough information to answer our query about community belief and concerns. *Will a yes or no question provide the data you are looking for as a surveyor? Students should discuss reasons why they would prefer to ask one question over another?*

The teacher should clarify that a question is statistical if it is written to expect *variability* among the answers. Students with mathematics difficulty benefit from explicit vocabulary instruction with the inclusion of nonexamples to combat overgeneralization.[24] Vocabulary introduced throughout the unit should be added to a visual lasting display in the classroom and referenced by the teacher when revoicing less formal or *intuitive language* student responses. To address an overgeneralization of variability, the teacher can highlight the following nonexample. While the question "Was Marrion Barry ever the mayor of DC?" could result in more than one answer—a person could say no out of their ignorance of the fact—the question is not statistical because there *is* an invariable correct answer to the question.

In groups, students will consider which questions in the list may result in more variability than others. They will also consider whether asking the question they identified as their preference in the last discussion will result in higher or lower variability of data. They may make a connection between their reasons for selecting a question and their new understanding of variability.

To contribute to the creation of a shared experience and to implement consensus-building community organizing principles, the teacher will poll students to determine 2-4 questions to be asked by all students. At minimum, one (1) open-ended question about each topic should be selected. Two additional yes/no questions may be added to the survey. So, the teacher must be sure to poll and tally votes accordingly. Students should be reminded to collect demographic information from their participant, including age, gender, and race.

The teacher will task each student to collect survey data from at least one person and bring their results to the next class. Students will likely collect data from their friends, family, and neighbors. In analyzing the data, they should consider whether this method of polling provides an adequate *sample* of the community's opinions about the subjects. Here, students have an opportunity to derive the meaning of a *population* and *sample*. Students will need to narrow down categories until they get to the most appropriate description for their shared participants. Narrowing down from DC parents to Southeast parents to Ward 8 parents to parents of Johnson Middle School students and so on.

Literary Digest famously published the results of a straw poll inaccurately predicting victory for Alf Landon in the presidential election of 1936; meanwhile polls utilizing random sampling correctly predicted that Franklin Delano Roosevelt would be victorious. The success of the random sampling polls led to the notoriety of pioneers, Crossley, Gallup, and Elmo Roper as they developed the science of opinion polling from market research methods.[25]

Students will consider the limitations of the ways in which they collected data and ascertain a reason for a more scientific way of sampling. Would the sampling be more scientific if the participants were randomly

selected? Further, students will consider the difference between qualitative and quantitative data. They will then be tasked with considering how to represent qualitative data in a quantitative manner. For instance, creating categories based on responses and determining what percentage of responses fall under each category. Students may determine the need for refining their question, providing multiple choice or check all that apply options based on the categories they uncovered from their qualitative results. In refining their survey questions, students should include questions that request numerical data about community engagement, for example: *How much time per week do you spend consuming local news? How many parent-teacher conferences have you attended in the past 2 years? How many local council meetings have you attended in the past 10 years?*

The multiple data points collected during this shared polling experience should be used throughout the unit to model the various ways numerical and categorical data can be represented visually. We will refer to our amassed collection as the *Shared Experience Data Bank (SEBD)*. Using our SEDB, the class will learn to create a five-number summary for numerical data and create representative box plots. They will be able to make conclusions about data using statistical language. Saying for instance: *The median amount of time per week consuming data was 62 minutes.* The shared experience provides context and grounding for students as they learn new information.

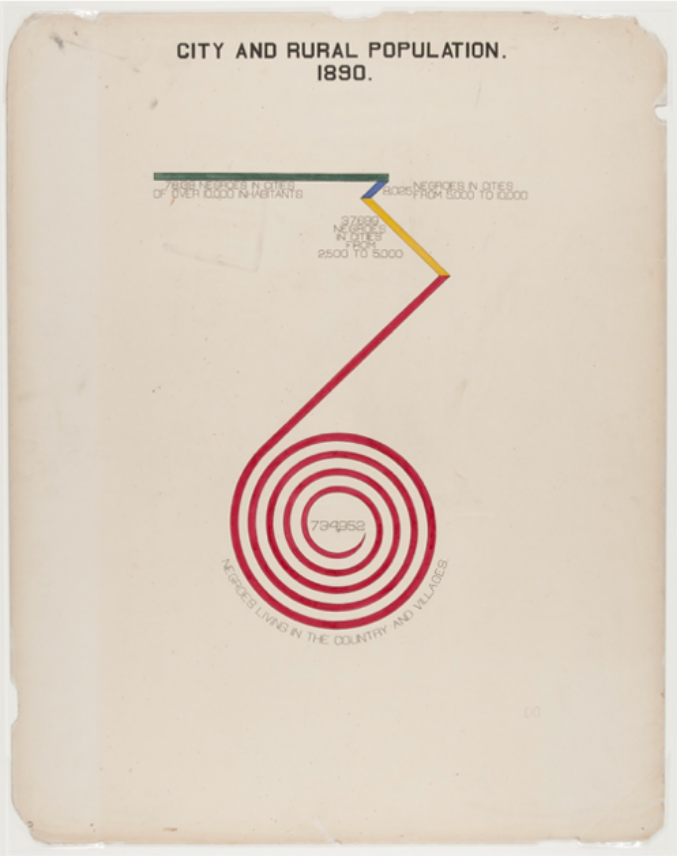
Infographic Accessibility Activities

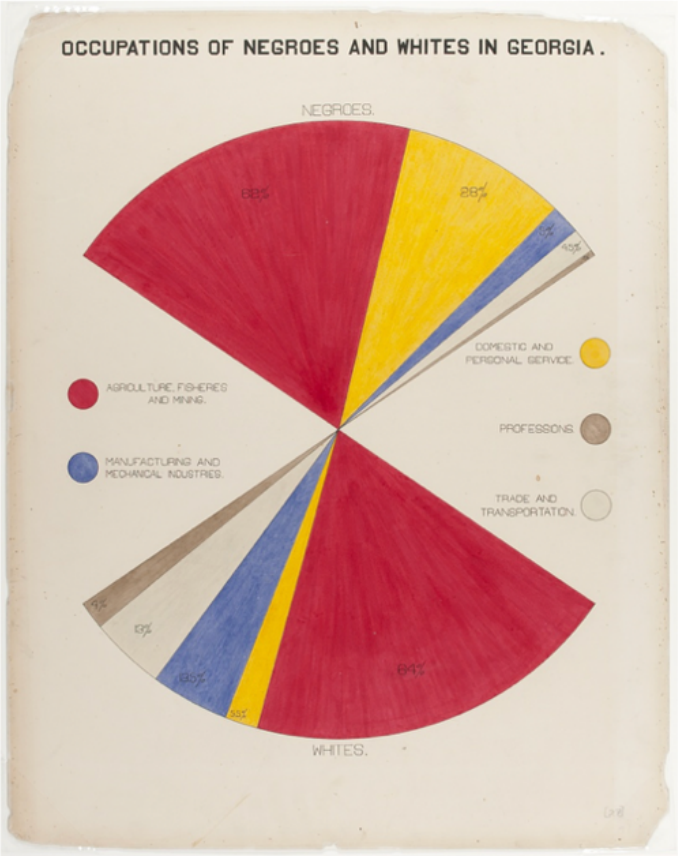
Unlike the primary data collected by students via poll, secondary data are information that has already been collected. This data can be presented as a list, on data cards, in a table, or the data set can be extracted from a visual representation of data such as a scatterplot. When beginning with secondary data, the first step is to interrogate the data selection and its meaning. Through attempting to determine what question the data presented is meant to answer, the student can pose new statistical questions and consider whether they can be answered with the data. Data problem solvers "utilize questioning throughout the statistical problem-solving process to make decisions with confidence, understanding that the art of communication with data is essential."[26] Throughout the unit, students will identify what they notice and wonder to craft questions. Students can refer to the shared polling experience when confronted with new forms and wonder about the connections.

W. E. B. Du Bois used infographics to present complex socioeconomic data accessibly and compellingly. He sought to showcase the achievements, humanity, dignity, and potential of Black Americans in the face of racism, believing that "visual data could be a powerful weapon against racial prejudice."[27] Du Bois gathered population demographic, education level, employment rate, and land ownership data. He and his students hand-colored the graphics to increase readability.[28]

Infographic Activity 1

Image 2. *Examples of Infographics created by W.E.B Du Bois*[29]





The teacher will share the images as examples of infographics created by W.E.B Du Bois to display data. Students will be presented with the images above and consider what they notice and wonder about the images. Students will independently jot their ideas down then share their ideas with 2 partners. While students are in small groupings, the teacher will record student responses and then display them when calling the small groups back to whole group.

Students will closely consider the *City and Rural Population 1890* infographic. Challenge students to look for pattern or reasoning. Students should consider the following: *How does this representation of data differ from other representations you have seen? Why might Du Bois choose to use bright colors?* There are two sets of numbers in the green, blue, yellow, and red section. To help students discover the two variables in this graph, the teacher may need to prompt them to read the green section where there is a more complete caption written. Then students should be better positioned to recognize that the variables are the number of Black people living in an area and the population range of the area. *What information is Du Bois trying to communicate?*

Students should consider what the data point 734, 952 means in this context. *Why is a spiral used for that number/category while lines are used for the city populations? What does the size of the sections communicate?* Students may notice that the yellow section representing 37,699 appears to be drawn to scale compared to the green section representing 78,139 people; the green section is twice the size of the yellow just as 78,139 is approximately 2.07 times larger than 37,699.

What is missing from the graph? Students should notice that the population range of "the country and villages" category isn't listed. What can be inferred about the population size of rural areas based on this graph? *Rural populations probably meant less than 2,500 people.* Students should pose a statistical question

they believe this graph can answer: *What survey question could have been asked to Black people in 1890 to categorize them the way they are represented in the infographic?* Students may suggest that Black people were asked the following: *What is the population of the city or town you live in?Howmany people live in your city or town?* Students should produce a statistical question that investigates the Black population in rural and urban areas.

The teacher should display pictorial representations of histograms as a reminder of their features and inform students that they must attempt to represent the infographic data with a histogram. Students should consider what information is necessary to construct a histogram. A histogram is a way to represent data by grouping data values into intervals with the height of each bar showing the frequency of data values in its respective interval. Students must determine the intervals to use on the x-axis and how to measure the frequency on the y-axis.

Students may easily notice that since ranges are already provided in the infographic, they should be used in the histogram construction. They should consider the difficulty of representing a frequency of 8,025 and 734,952 on the same graph. *How else might we represent the frequency other than using raw data?* The teacher may prompt students by referring to the display listing previous student observations about the size of each section. Students should be prompted to consider the part to whole relationships evident in the infographic. All the colors and segments combined constitute the whole. Students should recognize that each color is a part of the whole and recall that part to whole relationships are represented as percentages. The teacher guides students to discover that percentages can represent frequency in a histogram. Students should fill in missing components of the table below.

Table 1. *A frequency table to be completed by students.*

Overall Population	Raw Count of Black Residents	$\frac{blackresidents}{totalblackpopulation} = \%$
		Frequency (%)
1 – 2,500	734,952	$\frac{734,952}{858,815} \approx 0.856 \approx 85.6\%$
2,500 – 5,000	37,699	
5,000 – 10,000	8,025	
10,000 –	78,139	

In completing the table, students should notice that the population interval is incomplete—the maximum is not provided. 78,139 provides the number of Black people who lived in cities with populations over 10,000 in Georgia but the 1890 census indicates that cities with populations over 10,000 included Columbus with 17, 303 residents and as high as 65,533 residents in Atlanta. Students will realize that the last interval cannot be graphed because it is not an even interval and would result in a distorted graph.

Infographic Activity 2

Students will continue their study of pictorial representations of data with Mona Chalabi's work. She says, "The way that I often start analyzing data is through relatively simple calculations that other people can replicate.

In a way this makes the data that I'm using much more reliable."[30] Chalabi argues that data visualization makes things feel more visceral as it zooms in on a specific aspect of the data. Students will analyze Mona Chalabi's Instagram post of her *Space in America* infographic which compares the average parking space to the average solitary confinement cell in the United States. This illustration provides an ideal opportunity for students to conceptualize what the artist is communicating and to do the simple calculations to which she refers. The grid presents an opportunity for students to determine the area of each space in square units by simply counting. Given that the key indicates that each box represents 10 in x 10 in, students can determine the scale to be 1:100 and calculate the actual area using the scale drawing. Students will consider the following: *How does the zoomed-in approach make data clear to the observer? What does the zoomed-in approach leave you wondering?How can zooming-in on data by making a quick sketch help you visualize what's happening?*

The second Chalabi infographic (Image 3) provides students with more data to analyze. They will compare five types of activities, across two household types and two genders. Teacher will provide examples of *segmented bar graphs* and students will compare Chalabi's representation and determine whether her representation can be categorized as such. Given this much to unpack, students will spend considerable time close reading the infographic and the teacher will formally continue with the notice/wonder protocol.

Image 3. *Screenshot of Instagram post[31]*

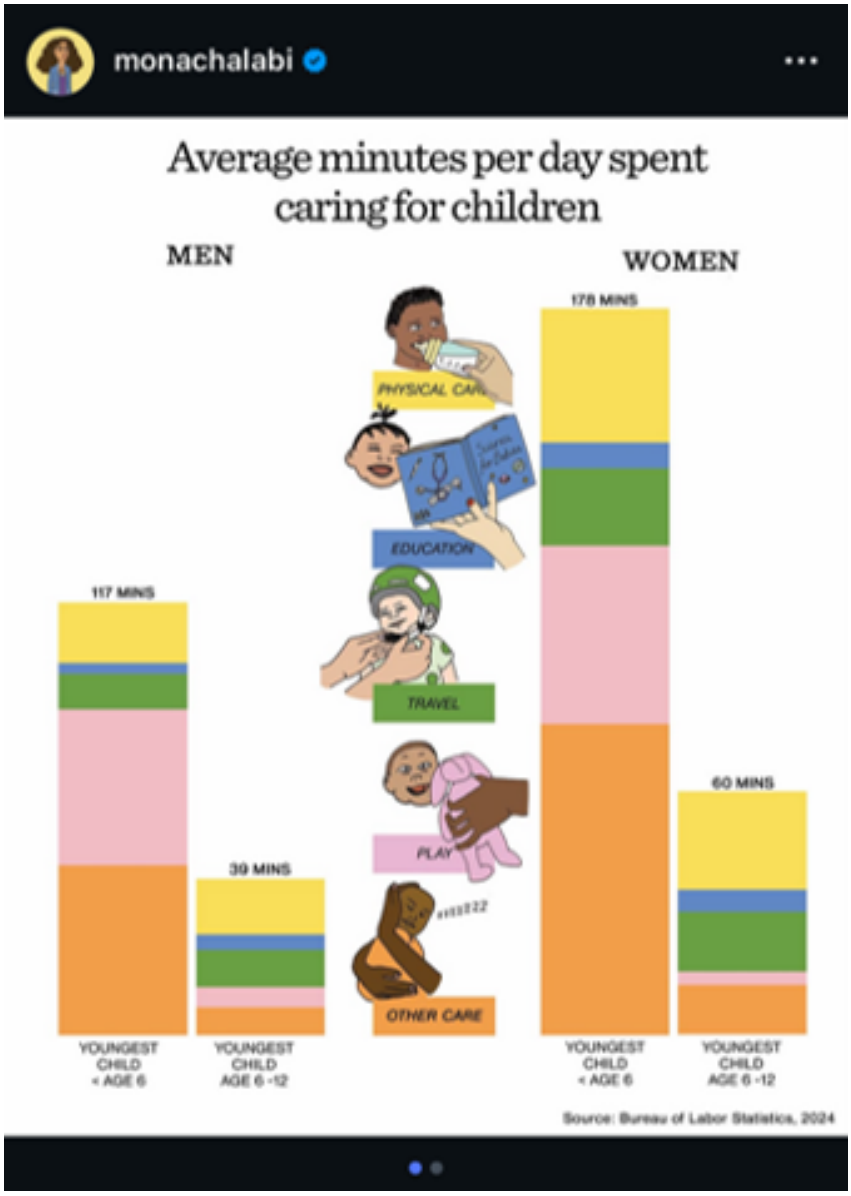
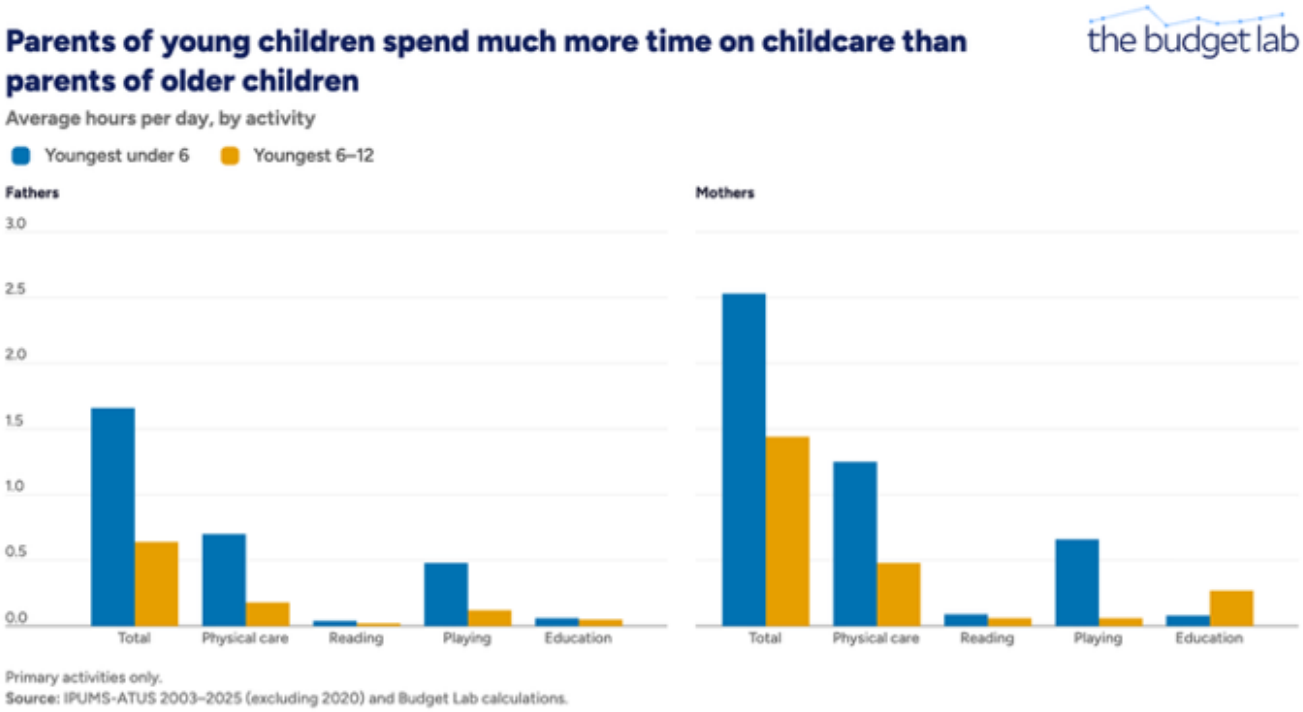


Image 4. *Budget Lab childcare graph[32]*



Students will then proceed considering the following questions if they have not been raised by students in discussion: *What conclusions can be made with the information provided?* Ensure that students understand each category, including what is meant by the inequality symbol, and prompt them to look for trends and comparisons. Students should notice that parents tend to spend more time caring for children when the youngest child in the household is younger than six. Teacher should check for understanding, asking students to identify the form of care that both men and women spend nearly the same amount of time doing. Students should discuss and consider: *Where is there a gap in information? Is there a way to determine the exact number of minutes spent on each activity? How can you estimate the minutes spent per day on each activity? What could be added to the infographic to make it possible to precisely show the number of minutes spent on each activity?* The teacher will present students access to chart produced and posted by the Budget Lab (see resources). Students will investigate and compare the Budget Lab's representation of data to Chalabi's. Notably the chart represents 2025 data, so the point of analyzing is not to check for consistency but to compare data across representation forms. *What trends seem to be consistent?* The Lab's representation has numbers on the y-axis unlike Chalabi's; *what might these numbers represent?* Students will notice that they can toggle to view the chart data presented as a table instead of the chart image. Given this raw data, *why was the range of numbers selected for the y-axis*?

Data Interpretation Activities

Activity 1

The table below, highlighting the disparity in education attainment by race, is excerpted from the Freedom School Curriculum. By practice, curriculum writers provided relevant documents and data to students to engage them in mathematics inquiry. Freedom School students had stake in understanding how to make

sense of the information because it applied to them. To provide historical context for how data analysis was taught to empower the disenfranchised, students will be given time to close-read the data and list what they notice and wonder. The teacher can consider reading the data aloud for students if they find the format confusing and unfamiliar, but the teacher should not explain what the numbers and categories mean until students have adequate time to discuss. The teacher should build on information that students provide and prompt students as necessary.

Table 2. *Years of School Completed by Persons 25 or Older, 1960 U.S. Bureau of the Census*

	Years Completed						
	none	1-4	5-6	7	8	9-11	12
NON-WHITE (383,017)							
percentage	8.4	31.3	20.2	9.1	12.4	11.1	4.2
WHITE (681,959)							
percentage	1.2	5.9	7.6	5.6	14.4	23	24.6

Median grade: Nonwhite = grade 6; White = grade 11

Students should consider what data is missing (Information Gap) and reason about what inferences can or cannot be made given the data provided. They may notice the title or named categories and wonder about the overall structure of the table. They may make comparisons within a column, noticing that about 31% of non-white people aged 25 or older completed between 1-4 years of schooling compared to only 5.9% of white people. They will have to interpret what a lower percentage means in this context, considering they may assume a low percentage is unfavorable. They may wonder how to determine the exact number for each category when given the percentage. After collecting and displaying student responses, the teacher will ask students to determine the number of people in each category given the percentage. The teacher will provide calculators and students will work in triads to attempt to determine the number that corresponds to each percentage. The teacher will circulate and offer suggestions only after students attempt and consider whether the number they calculated makes sense in the context of the table. If a student has not inquired, the teacher should ask students to consider how the median information printed below the table is supported by the data in the table. The teacher will prompt the students to find the minimum, maximum, and the lower, upper and inner quartiles of the data. The teacher will ask students to consider whether they have enough data to construct a box plot to show this spread. If they answer no, then they should share what information they believe to be missing (Information Gap).

What can students say about the spread of data? Students should consider how to represent the data visually. Students should notice that the grade ranges are not consistent and should consider how to make equal intervals. How can the data be represented in a more accessible manner? Students may choose to re-create the table with the ranges they select and create a histogram.

Next, students will consider this information in their reality. What could be the consequences of lower education attainment? What might you hypothesize could have an *association* with the amount of schooling an individual completes? Students will investigate an association between the median salary and years of educational attainment by analyzing *data tables from the U.S. Census Bureau*.[33] Students will create and interpret scatterplots given the *bivariate* data. Students will draw a line of best fit, estimate the slope of the

line they drew, and write an equation for the line. They should be provided access to graphing calculators or applications such as Desmos to check their work against a computer-generated scatterplot. *What do the slope and y-intercept of the line tell us in this context?* Students will notice that the y-intercept is a negative number; Does interpreting the y-intercept make sense in this situation? *Our first data point is 10 years of education and what happens at 10 years is very different than what happens at 0 years.*

Students will make two additional scatterplots from tables that filter for demographics and make observations. For instance, students will make a scatterplot comparing median salary for Black men and years of education and one for another demographic.

Emphasize that correlation is not about determining causation but about looking for trends. Students can compare two variables to see if there is a strong, weak, or no correlation between the variables. In a subsequent activity, students will proceed with graphing residuals and determining the correlation coefficient with technology.

Culminating Activity

Armed with the skills to create and interpret graphs, students will analyze data trends around issues that matter to them. With the help of the teacher as organizer, the class will compile a list of important issues and compose a statistical question they want to investigate further in their groups. To help students realize the power of their data representation, the teacher should reach out to local councilmembers and encourage their attendance in a student data showcase or rally.

While Chalabi and Du Bois use census data in some representations, they also do their own calculations to visually highlight what they wish to communicate. Likewise, students will use primary and secondary data sources in the development of their investigative question. They will refer to primary data using our SEDB, and secondary data using the U.S. Census Bureau collection and the 2020-2021 Civil Rights Data Collection (CRDC).[34] The CRDC, issued by the U.S Department of Education, will allow students to read data and see how it is used in reports. This process reinforces the purpose of being able to interpret data published about students and families and interrogate it. The following questions are just sample student activation points and by nature of the task, are in no way extensive: *What additional data points do you wonder about?What do you think your community thinks about this data? What data have we collected already that seems to represent something different? What data would you collect from your community to determine public opinion? What kinds of school offerings would parents, students, or other stakeholders like to see?*

In keeping with the spirit of the Freedom Schools, I am leaving space for student choice. Through community organizing principles, I will model for students how to generate questions and help them determine how to investigate them. Students can choose to collect additional data from the community via survey and represent categorical data visually using for instance, two-way tables or segmented bar graphs. Provided access to the University of Illinois Community Survey Tool, students will explore a collection of questionnaire templates for their survey needs. Alternatively, they may choose to explore various associations using bivariate SEDB data to create scatterplots.

Perhaps students will want to investigate the claim that students don’t want to learn. They can ask survey

questions to compare the value students reportedly place on learning versus on other activities. The student could ask the following: *How many hours do you think students should spend practicing math in a day?* and *how many hours do you think students should spend on social media in a day?* Students can then create a scatterplot of the data they collected and determine whether conclusions can be drawn.

Though the culminating activity has flexibility, the following components should be included as evidence of learning:

- Stated investigative question and reasoning
- Data collection method and results
- Data analysis calculations applicable to chosen representation (e.g. determining percentages, five-number summary, slope of the line of best fit) Note: Even the construction of infographics require calculations to justify sizing or scale.
- Construction of visual data representations of the data
- Written reflection to include statistically significant calculations and/or equations used to support conclusions drawn and reasoning for the method of representation(s) selected
- Presentation (participation in a data showcase/rally, video recording, song composition)

At the conclusion of this unit, students should be empowered to continually think critically about data and envision themselves as worthy shapers of what the data demands.

Annotated Bibliography and Resources

The Budget Lab “The Budget Lab.” 2026. https://budgetlab.yale.edu/research/how-did-gen-x-and-millennial-parents-manage-their-time.

This resource should be used for Infographic Activity 2 and contains several graphic representations of time use data for teacher and student access.

U.S. Bureau of Labor Statistics. Review of *Daily time use in households with young children in 2024*. *Bureau of Labor Statistics*, July 2, 2025. https://www.bls.gov/opub/ted/2025/daily-time-use-in-households-with-young-children-in-2024.htm.

This resource can be used to provide various visual representations of data.

Stukes, Deseree S. “The Infographics of W.E.B. Du Bois at the 1900 Paris World Fair: A

Form of Activism.” *Global Africana Review* 8, no. 1 (March 22, 2024): 3–18. https://doi.org/10.17615/5thz-nj82.

Various Du Bois infographics are highlighted here, and the teacher can learn more about the representations.

Review of https://www2.census.gov/prod2/decennial/documents/1890a_v1-13.pdf

This pdf is the surviving data from the 1890 census, the first year the census included population of Black people in rural versus urban areas.

“NEW DATA RELEASE 2024 2020-21 Civil Rights Data Collection” n.d. https://www.ed.gov/sites/ed/files/about/offices/list/ocr/docs/crdc-student-access-enrollment.pdf.

Students can find up-to-date math enrollment data across demographics.

Illinois.Edu2026. https://tools.extension.illinois.edu/communitydevelopment/survey/.

Students can use this site to access questionnaires. Teachers can learn more about conducting community surveys through e-modules.

Appendix on Implementing District Standards

Beginning the school year with this unit sets the expectation for discovery and productive struggle in the classroom. Students will learn to make use of structure in connecting a community learning experience to the skills they must obtain according to district standards. In Algebra I students are expected to represent data with plots on the real number line (dot plots, histograms, and box plots), use appropriate measures of central tendency, and describe the spread of data. In the Representation Matters unit students will have multiple opportunities to interpret data and present it in various forms. In attempting to represent data, they learn the limitations of certain representations in favor of others which demonstrate the spread more clearly.

In the second half of the unit, students learn to represent bivariate data on scatterplots. Through the scatterplot construction activities, they will meet standards which require them to determine lines of best fit and reflect on the strength of correlation between the variables. Students will interpret the slope and y-intercept of the line of best fit to construct an equation. Discovering the importance of these equations through problem-based learning will help to create a throughline for the functions and linear equations units that follow and are considered the major work of the grade. The experience of creating equations to describe an association that students took interest in investigating, provides a point of reference when more difficult functions are later encountered.

Notes

[1] Boutte, Gloria. *Educating African American Students: And How Are the Children?* New York, NY: Routledge, 2022.

[2] Moses, Robert. *Radical Equations: Civil Rights from Mississippi to the Algebra Project*. With Charles Cobb. Beacon Press, 2002.

[3]

[4] Moses, Robert. *Radical Equations: Civil Rights from Mississippi to the Algebra Project*. With Charles Cobb. Beacon Press, 2002.

[5] I-Ready.com “I-Ready Dashboard.” 2026. https://login.iready.com/educator/reports/class/diagnostic/results/math

[6] Moses, Robert. *Radical Equations: Civil Rights from Mississippi to the Algebra Project*. With Charles Cobb. Beacon Press, 2002.

[7]

[8] Moses, Robert. *Radical Equations: Civil Rights from Mississippi to the Algebra Project*. With Charles Cobb. Beacon Press, 2002.

[9] Margolin, Jamie. *Youth to Power:Your Voice and How to Use It*. New York: Go, Hachette Books, 2020.

[10] Nelson Jr., Stanley, dir. *Freedom Summer*. Firelight Films, 2014. 113 minutes.

[11] Moses, Robert. *Radical Equations: Civil Rights from Mississippi to the Algebra Project*. With Charles Cobb. Beacon Press, 2002.

[12] Emery, Kathy, Sylvia Braselmann, and Linda Gold. Freedom School Curriculum. *Liberation* (1964): 7-12.

[13] Emery, Kathy, Sylvia Braselmann, and Linda Gold. Freedom School Curriculum. *Liberation* (1964): 7-12.

[14] Freire, Paulo. *Pedagogy of the Oppressed*. Penguin Education. Penguin, 1978.

[15] Dixon, Raymond A., and Ryan A. Brown. 2012. “Transfer of Learning: Connecting Concepts During Problem Solving.” *Journal of Technology Education* 24 (1). https://doi.org/10.21061/jte.v24i1.a.1.

[16] Bransford, John D, Ann L Brown, and Rodney R Cocking. 2000. *How People Learn: Brain, Mind, Experience, and School*. Washington, Dc: National Academy Press.

[17] Dahlstrom-Hakki, Ibrahim, and Michelle L. Wallace. “Teaching Statistics to Struggling Students: Lessons Learned from Students with LD, ADHD, and Autism.” *Journal of Statistics and Data Science Education* 30, no. 2 (2022): 127–37. https://doi.org/10.1080/26939169.2022.2082601.

[18] Franklin, Christine, Gary Kader, Denise Mewborn, Jerry Moreno, Roxy Peck, Mike Perry, and Richard Scheaffer. Review of Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report A Pre-K-12 Curriculum Framework Endorsed by the American Statistical Association, 2005. https://www.amstat.org/asa/files/pdfs/gaise/gaiseprek-12_full.pdf.

[19] Franklin, Christine, Gary Kader, Denise Mewborn, Jerry Moreno, Roxy Peck, Mike Perry, and Richard Scheaffer “Guidelines for Assessment and Instruction in Statistics Education (GAISE) Reports.” 2020. https://www.amstat.org/education/guidelines-for-assessment-and-instruction-in-statistics-education-(gaise)-reports.

[20] Sutherland, Marah, David Fainstein, Taylor Lesner, Georgia L. Kimmel, Ben Clarke, and Christian T. Doabler. “Teaching Statistical Literacy and Data Analysis to Students with Mathematics Difficulties.” *Teaching Exceptional Children* 57, no. 2 (2024): 160–69. https://doi.org/10.1177/00400599221118647.

[21] Hall, Macie. Review of *Notice and Wonder | The Innovative Instructor*. John Hopkins Innovative Instructor Blog, May 21, 2018. https://ii.library.jhu.edu/2018/05/21/notice-and-wonder/.

[22] Zwiers, J., Dieckmann, J., Rutherford-Quach, S., Daro, V., Skarin, R., Weiss, S., & Malamut, J. (2017). *Principles for the Design of Mathematics Curricula: Promoting Language and Content Development*. Retrieved from Stanford University, UL/SCALE website:

[23] www.thecorestandards.org. “Standards for Mathematical Practice | Common Core State Standards Initiative,” n.d. https://www.thecorestandards.org/Math/Practice/.

[24] Sutherland, Marah, David Fainstein, Taylor Lesner, Georgia L. Kimmel, Ben Clarke, and Christian T. Doabler. “Teaching Statistical Literacy and Data Analysis to Students with Mathematics Difficulties.” *Teaching Exceptional Children* 57, no. 2 (2024): 160–69. https://doi.org/10.1177/00400599221118647.

[25] Lee, Taeku. *Mobilizing Public Opinion: Black Insurgency and Racial Attitudes in the Civil Rights Era*. Studies in Communication, Media, and Public Opinion. Univ. of Chicago Press, 2002.

[26] Franklin, Christine, Gary Kader, Denise Mewborn, Jerry Moreno, Roxy Peck, Mike Perry, and Richard Scheaffer “Guidelines for Assessment and Instruction in Statistics Education (GAISE) Reports.” 2020. https://www.amstat.org/education/guidelines-for-assessment-and-instruction-in-statistics-education-(gaise)-reports.

[27] Stukes, Deseree S. “The Infographics of W.E.B. Du Bois at the 1900 Paris World Fair: A Form of Activism.” *Global Africana Review* 8, no. 1 (March 22, 2024): 3–18. https://doi.org/10.17615/5thz-nj82.

[28] Provenzo, Eugene F., Jr. 2013. *W.E.B. DuBois’s Exhibit of American Negroes: African Americans at the Beginning of the Twentieth Century*. Rowman & Littlefield Publishers.

[29] Edward, (William. “[The Georgia Negro] City and Rural Population. 1890..” *Loc.Gov*, 2026. https://www.loc.gov/pictures/resource/ppmsca.33873/.

[30] Chalabi, Mona, and Jonathan Gray. "25. Sketching With Data." *Towards a Critical Data Practice* (2021): 174.

[31]

[32] Review of *Parents of young children spend much more time on childcare than parents of older children*. Yale.edu, 2026. https://charts.budgetlab.yale.edu/atus-childcare/childcare-by-activity/.

[33] United States Census Bureau “Explore Census Data.” Census.Gov, 2026. https://data.census.gov/table/ACSDT1Y2019.B20004?q=B20004:+MEDIAN+EARNINGS+IN+THE+PAST+12+MONTHS+(IN+2019+INFLATION-ADJUSTED+DOLLARS)+BY+SEX+BY+EDUCATIONAL+ATTAINMENT+FOR+THE+POPULATION+25+YEARS+AND+OVER.

[34] US Department of Education. Review of *New Data Release 2024 2020-21 Civil Rights Data Collection*, 2024. https://www.ed.gov/sites/ed/files/about/offices/list/ocr/docs/crdc-student-access-enrollment.pdf.

https://teachers.yale.edu
©2026 by the Yale-New Haven Teachers Institute, Yale University, All Rights Reserved. Yale National Initiative®, Yale-New Haven Teachers Institute®, On Common Ground®, and League of Teachers Institutes® are registered trademarks of Yale University.
For terms of use visit https://teachers.yale.edu/terms_of_use