



**Bridging the Mathematical Gap:
Using Math to Teach Social Justice Problem Solving**

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This curriculum unit is recommended for:
5th Grade Mathematics

Keywords: white privilege, social justice, mathematics

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: *Bridging the Gap.* As educators, we are always looking for ways to bridge the gap between our students. This unit focuses on how to bridge the gap between white male mathematics test scores and black mathematics test scores. The unit is a problem-based learning unit that takes place over the course of an entire year. The unit will be completed as part of math workshops and morning meetings throughout the school year. The students will explore one social justice problem each quarter, use North Carolina State Standards for Mathematics to research, and analyze the problems and solutions. The goal of the unit is to help students explore the statistics of privilege in America using a mathematical lens. They will mathematically explore concepts such as unequal wealth, immigration, incarceration rates and more. They will then apply the information gained from their research and findings and use it to look for solutions to problems people of color face in our society.

I plan to teach this unit during the coming year to 50 5th grade students in mathematics and morning meetings throughout quarters 1-4.

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Ashley Robinson

Introduction

Rationale

The intention of this unit is to bridge the gap with students of color in the mathematics classroom. In my classroom of mostly minority students, 72% of them feel inadequate in their mathematical practices and lack confidence in their ability to be successful in math. I do not believe that this is due to a lack of ability but rather a lack of connection to the material. I think that if we can focus on a way to make math more meaningful for our students we can help them see math in a new and exciting way. This will help to create a deeper understanding of mathematical concepts and help them see possibilities to change the world as well. I want to integrate my mathematics curriculum with a social justice focus. By creating real world math problems focused on injustices in our community, I believe it will interest students to solve the problems both in the math classroom as well as begin searching for solutions to bigger world problems. Allowing students to see how integrated math and their world are will only deepen their interest in the subject. Once they see they can solve the problems of interest and that directly affect them, their confidence in their own mathematical abilities will flourish. It will also allow them the opportunity to help solve a larger problem of privilege, institutional white supremacy, and education. They will have the power to begin making real changes.

This unit will take place over the course of the 2020-2021 school year. We will focus on a different social injustice topic each quarter and tie our math instruction into the social issues. This unit will be implemented during morning meetings, math direct instruction, and math workshop time. As the facilitator of the unit, I will teach students the mathematical concepts needed to complete the work and meet state and local standards. In addition to the traditional classroom model, I will allow students to develop their own understanding of math by focusing on the world around them. There will be guidance to help steer the students in correct direction and I will facilitate classroom discussions about social justice and white privilege, but the students will do the real work. These assignments will be done in a problem based learning format.

School Demographics

Reedy Creek Elementary is located in the Northeast learning community of Charlotte Mecklenburg Schools.¹ Reedy Creek is a Pre-K through fifth grade school. Reedy Creek is a neighborhood school located in east Charlotte. Reedy Creek has about 840 students. We have six classes per grade levels Kindergarten thru 5th grade and three Pre-K classes. We also have two SAC/AU classes. Our school employs one principal, one assistant principal, one dean of students, 2 literacy facilitators, 55 certified teachers and 8 instructional assistants. The faculty at

Reedy Creek has a very low turnover and is highly qualified. Over a third of the staff have National Board Certification or Master's Degrees.

Reedy Creek is a school that focuses on teaching the whole child. In order to meet the needs of as many students as possible and teach the whole child Reedy Creek has incorporated the following classes, Art, Science lab, Dance, Music, Computer, Media, P.E. and the Caring School Community Curriculum. Reedy Creek has also introduced a number of clubs and activities afterschool to meet student's needs. Some of the clubs include, cheerleading, basketball, inventors, chorus, recorder, dance, booster, art, 3-D printing, and piano. We also celebrate the differences of our diverse population by having a yearly International Festival where student's cultures are celebrated.

Reedy Creek's population is very diverse. Approximately 10% of students are white, 56% African American, 3.9% Asian/Pacific Islander, 24.7% Hispanic, and 4.9% are multi-racial. 65% of the student population are identified as economically disadvantaged. 6% of the students at Reedy Creek are identified as gifted and talented. Students with learning disabilities represent 9.2% of the school population. Students with Limited English Proficiency make up 10.4% of the school population.

Reedy Creek has implemented a school wide "house" program. This is a wonderful way to encourage community and positive behavior across the school. Once a quarter the students participate in 'House Day' where students meet with other students from all different grade levels to complete STEAM activities and team building skills. The students work throughout the quarter to earn the most points for positive and respectful behavior throughout the school environment. On House Day, the winning house is celebrated with prizes. This encourages not only positive individual behavior but also a sense of community and doing what is the best for the larger population.

Reedy Creek has also implemented the AVID program for 3rd – 5th grade classrooms. AVID is a program that helps to prepare students for college by developing the organizational and study skills needed for success.ⁱⁱ AVID stands for Advancement Via Individual Determination. The AVID program helps students organize, take effective notes, develop study habits and skills and develops higher order thinking. The 2019-2020 school year is our school's pilot year in this program. We are focusing on using a binder system to help keep students organized with their schoolwork. This will help them keep up with their responsibilities and hold them accountable for their individual work and success. We are also focusing on specific note taking skills this year. We are working on helping the students develop the study skill necessary to be successful in school and help them analyze their world and surroundings.

Teachers at Reedy Creek have 55-minute planning periods to plan their lessons 3 days a week. The other two days the teachers meet as a grade level and content area to go over large plans and analyze data. Reedy Creek believes in strong and rigorous lessons that are data driven. We follow a workshop model and focus on small group instruction to target specific learning needs of each individual student. We also have four all day planning sessions a year. During these planning sessions, the teachers look over their data from Common Formal Assessments of material taught to date. We use this time to analyze data

and plan intentional re-teaching plans to meet students' needs specifically. One of the positive things about working at Reedy Creek is our staff does not believe in a one size fits all education. We are flexible in our teaching strategies and are willing to change it up and develop new and innovative ideas as needed in order to best meet the needs of our students.

Unit Goals

At the end of this unit, my goal is to help students see the benefits of math in their real world. I want to develop the connection that the material we learn will benefit them and guide them to see that connection. I also want them to develop an understanding of our society and how privilege works to benefit some and debilitate others. Once students have a deeper understanding of how the world works and why they can begin to have educated conversations around change. They can work on looking for solutions to combat the issues and develop strategies to begin fixing the problems. I hope to also create a love for math through this unit. I want students to see math as more than just numbers. Math is a solution to so much and if we help students see the deeper meaning of math, test scores will rise. I chose to use a problem-based learning approach to this unit because research has stated this style of learning will benefit students in the classroom. My goal is to develop skills not only in math but also for the real world. This type of learning makes the lessons more enjoyable and creative for students. Although it will take time to develop because students are not prepared for these experiences right away and it may be "messy" it will benefit them in the end. They will develop skills needed for real life and careers and begin to see their abilities in many different areas.ⁱⁱⁱ

Content Research

White privilege is a social concept that affects all aspects of American society. The definition of white privilege according to the Oxford English dictionary is "the inherent advantages possessed by a white person on the basis of their race in a society characterized by racial inequality and injustice."^{iv} Peggy McIntosh discusses how white privilege affects our society in her article "White Privilege: Unpacking the Invisible Knapsack"^v She compares white privilege to a knapsack that white people carry with them to grant them privileges sometimes not realized until you begin unpacking the sack. These are privileges that white people are born with, advantages that benefit whites and disadvantage minorities. If we do not acknowledge these advantages and work to undo these privileges minorities will continue to be affected and whites will continue to live in denial. These privileges can be as simple as finding Band-Aids that match your skin to deeper issues such as finding housing and employment.

Unfortunately, white privilege is just as prevalent in American schools as it is in the rest of our society. I have seen first-hand how this privilege affects students of color in the mathematics classroom. Students often enter the classroom with an assumption that they are not good at math. They believe that based on biased questioning and test scores they are unsuccessful in that subject and that negative thinking continues to perpetuate the achievement gap between minority students and their white peers. In the education field, there is often a discussion on how to close the achievement gap between white and minority students. However, there is rarely a discussion

on how white privilege and social injustices affect the achievement gap. That is what I hope this curriculum will do.

Mathematics education is a large part of success in school and preparation for college readiness and career success. In Secretary Richard Riley's paper, he stated, "Students with a strong grasp of mathematics have an advantage in academics and in the job market."^{vi} This has been evidenced even more recently with the large growth of STEAM schools and curriculums in the United States of America. Regardless of the advancement of new programs and the adapted Common Core State Standards, the evidence of the achievement gap has not become smaller. Black students continue to perform below white students and are significantly less likely to be placed in advanced classes. Black male students' account for 9% of the student population, "however, they make up 20% of all students in special education... and they only represent 4% of those in gifted and talented programs."^{vii} "Furthermore, black boys had been expelled at a rate 13 times higher than that of white boys. These disciplinary disparities may account for the high drop out and prison rates of black males."^{viii} Therefore, the question is how do we truly work to bridge the gap that exists in our schools. Wilson-Akubude states, "The reality is that schools are subsets of society and in a wider society the normative belief is that Blacks are academically inferior to Whites." Therefore, it is a question of how do we change the societal belief that whites are academically superior and begin to look at education and math in a new and different way. A way where all students can truly be successful, see their abilities and use their knowledge to make our society a better place for all people.

I believe in order to truly begin closing the achievement gap in education and particularly in math, we need to begin with two things. First, we need to look at teacher bias and bias in research. Teachers are part of the same society that forms the negative belief patterns about students of color and therefore tend to enter the profession with preconceived ideas about what students are better at what subjects. Research in math education does not look at the larger society but rather the "perfect classroom". It becomes difficult to make the research fit the needs of students, classrooms and schools that do not fit the mold. The second thing we need to focus on in Mathematics is exploring math through a critical mathematics pedagogy. Exploring my with a critical mathematics pedagogy means learning math by exploring it in social, political, and economic situations. It allows learners to understand how understanding math and statistics can help them learn about oppressive situations and help them develop solutions to the problems. This approach helps the learner see that math is a direct link to social problem solving and relatable problems. Math is often seen as a set of problems unrelated to learners' lives and this approach connects them with the learning in a deeper and more relatable way. This is done through social justice teaching with a strong project- based focus. Taking this approach with math allows students to explore how math is connected with their world, develop critical thinking approaches to math, and develop strategies to help understand and combat social injustices that they are faced with.

Let us begin by discussing teacher bias in Mathematics. "One of the most dominant refers to the presumed male superiority in math ability."^{ix} This is a bias that has existed for centuries. You will often hear people say that boys are better at math or that math is a male dominated

subject. You see this from elementary school all the way through into the career fields. Males dominate math centered college degree programs and hold a higher number of jobs in the math field including accounting and engineering. However, this advantage does not include all males. It specifically refers only to white males. Minority students also experience negative stereotypes in the math classroom.^x This is evidenced by the lack of minority students represented in advanced math classes. According to a 2013 report, only 5.9% of black males were represented in AP calculus classes versus 59.6% of white males. In high school classes, black males are the least likely group to be represented in advanced classes. This bias starts in elementary school with imperfect test scores that are biased based on the questioning used. Riegle-Crumb states that this bias continues year after year continuing to feed the belief that minority students are less able to become successful in mathematics. She explains that the bias teachers have developed is conditional and based on test scores. She continues by stating that this conditional bias is based on the questioning bias, which in turn produces lower grades and test scores for students of color. Unfortunately, teachers are often unaware of this implicit bias and the implication it has on minority students.

Mueller and Maher state that although teachers like to believe they teach students using the equity principle it is evidenced that this is not the case when “minority students continue to lag behind white students in mathematics achievement.”^{xi} These deep-rooted biases are engrained in our society. Battey and Franke discuss the origin of these assumptions that minority students are not as capable or successful as white students are.^{xii} They concluded that this belief dates back to the origin of our country and slavery. They then go on to discuss how modern IQ tests continue to reinforce the idea of white superiority. The media and their portrayal of blacks and Latinos then reinforce many of the thoughts teachers already have based on deeply engrained biases passed from generation to generation. Teachers come into education with these cultural beliefs and often do not realize the negative implications they have on the students they teach.

Battey and Franke continue by discussing how we combat the beliefs teachers bring to the classroom. They suggest professional development for teachers that focuses on the “intellectual contributions of students of color in their mathematics classroom.”^{xiii} They would then take this teacher knowledge about their students to help to begin “focusing teachers on what they could do to draw on these student capabilities.” In order to help make math more equitable for students of color we need to address it with teachers during professional development. We must begin rewriting the narrative that whites are superior to minorities. This has to be done carefully however. Battey and Franke discuss that our society no longer likes to think of itself as blatantly racist so when our racist judgements are brought to the forefront we will often shut down and remove ourselves from the discussion. This is a perfect example of what Robin DiAngelo talks about in her article “White Fragility”.^{xiv} She explains that white fragility is when “even a minimum amount of racial stress becomes intolerable, triggering a range of defensive moves.” Battey and Franke suggest professional developments focus on taking teacher narratives of their minority students and the metanarratives developed by society and using it to rewrite the narrative that we have developed.^{xv} We also need to stop diluting mathematics instruction for minority students. As educators, we need to move from a skill and procedure idea of mathematics to a more creative and problem solving focus. If we allow students to develop ideas

about math from a creative stand, they are more likely to develop the necessary ideas and concepts about math. When we make subject material relate to the learners life they are also more likely to retain the information for future use.

There is not just bias in teacher perceptions of what students are able to do. There are also biases in the type of research done on mathematics education. According to Skovsmose, “90% of research in mathematics education concentrates on the 10% of the most affluent classroom environments in the world, while 10% of the research addresses the remaining 90% of the classrooms.”^{xvi} He also explains that although America is not a Third World Country there are many schools here that are not part of the 10% most affluent. He continues by explaining the types of classrooms where researchers are conducting most of the mathematical education research. These prototypical classrooms do not display the same problems that many 90% of the world’s classrooms have. He describes these prototypical classrooms as affluent and in good order with no disruptive student behaviors. These classrooms have very few hungry, sick, or mentally ill students. There are not barriers in place such as war zones, missing parents, homelessness, etc that impede the completion of homework. In other words, these almost perfect settings do not represent the large number of students throughout America and the world. When the research that is available for teachers to use to help plan lessons, develop curriculum, and understand their students is created with biases it only continues to perpetuate the inherent biases teachers already have about minority students. Skovsmose says, that this “research in mathematics education involves a problematic bias with serious implications...”^{xvii}

Skovsmose explains that if we want to truly understand and research mathematics education we need to look at the foreground of the students we teach. This is different from the individual background of students. The foreground is the opportunities that the social, political, economic, and cultural situation provides for people. Most often, white scholars do the research done on mathematics education. They look at the achievements of students and determine that black achievement is lower than white achievement. Skovsmose wants us to question this research and look at the foreground of the children we are researching. In other words, what societal barriers are in place that are preventing all students regardless of their race to be successful? Skovsmose says, “Weak performances in learning can be provoked by a ruined foreground, which in turn can be caused by socio-political acts of exclusion and suppression.” If we look at the foreground and barriers in place, we may begin thinking about the data with a very different outlook.^{xviii}

This brings me to my second point of focus, which is to explore mathematical concepts by focusing on a critical mathematics pedagogy. However, let me make clear that this is not easily done. Teachers are told to teach critical thinking and to help students develop intellectual virtues but this way of thinking is opposite the way teacher are taught to “teach” math. The math classroom focuses on skill, procedures, and mechanics, not on critical thinking or social justice. As Brwester states, “Mathematics is seen as wholly divorced from social concerns.”^{xix} In fact even when I began the research I did not realize how intertwined math and social justice were and how effectively math could help develop understanding and solutions to solve many social issues America faces.

So the question is how do educators use math to bridge the achievement gap, change the biases of students and help develop social justice reforms? We need to focus on critical thinking and problem-posing pedagogies. We need to refocus our thinking and understand that “math is not divorced from social and democratic concerns, it is integral to them.” In order for this to work, we must make the teaching and learning relate to the lives and experiences of our individual students.^{xx}

In order to accomplish this you need to facilitate students learning through problem-posing pedagogies. Gustein found that “using real world projects students gained a deeper understanding of mathematical concepts and this helped them change their perspective about math and their abilities.”^{xxi} This pedagogy is very different from the current way math is done in the typical school setting. Ole Skovsmose states, “During their time in school, most children will be solving 10,000 exercises.” Although that may seem like plenty of problems to develop the key mathematical concepts needed to become successful mathematicians they are not. This is because these problems are formed in a bubble where all “measures are exact” and there is only one correct answer. Math is also often taught in a procedural way where students are made to believe that there is only one way to reach the correct answer and that is the way the teacher shows the students. When we think about the way the world functions we realize that there is rarely one way of looking at things and there is almost always more than one correct answer. If this is the case, why do we not view math with a similar approach?

Minority students often feel like math is not relatable to their lives and find no connection between the subject and the real world. Although teaching with a critical math and social justice focus is difficult, it is crucial to the success of students in math. By connecting students experiences with social justice and white privilege concepts such as unequal wealth distribution, police brutality, immigration reform and many other societal problems we can make the learning meaningful. It is those connections that help students see math as an important subject that connects with their real life and well-being.

This problem-based approach to teaching not only helps build success in math it also helps to create connections between other subjects and the real world that students are living in daily. As educators, we strive to help our students become critical thinkers and positive participating citizens. What better way to help them develop the skills needed to be informed social justice advocates? Mchamee puts it beautifully when he says, “one of the main purposes of encouraging our students to read the world with mathematics is to enable them to interpret the social, political, and economic complexities they face. By doing this we bring interest, understanding, and cognitive development to our math students. In return, we along with our students get a deeper understanding of the mathematical concepts because we have truly connected to the students we teach and their worlds.

Instructional Implementation

Teaching Strategies

The following list is an assortment of teaching strategies to use throughout the unit.

1. Direct Instruction – explicit teaching where the teacher teaches and the students listen
2. Cooperative Learning – teams of students from varying ability groups working together
3. Classroom Discussions – Open and flexible discussion about the material, learning, and content
4. Accountable Talk – Sharing thoughts with others in a respectful and thoughtful way
5. Socratic Seminars – a formal group discussion where students get to share thoughts about a text and respond respectfully to others thoughts
6. Academic Vocabulary – explicitly taught vocabulary typically used in the academic setting
7. Jigsaw – Students form expert teams where they research a particular point of a larger topic and present their expert knowledge to the rest of the class
8. Problem Based Learning – Student centered learning where they work to solve an open-ended problem
9. Presentations – students prepare information learned to present to class in a variety of methods (PowerPoint, video, song, poem, etc.)
10. Video and Movies – teacher presents material to students using videos or movies
11. Focused Note Taking – AVID strategy to use notes continually to better understand material
12. Graphic Organizers – tool to help visualize information and the relationship between concepts and ideas
13. Think-Pair-Share – small group strategy to help students develop individual ideas and then discuss and share with other group members

Quarter 1: 9 weeks

Topic: Unequal Wealth Distribution in the United States

I will start the first unit discussing the unequal distribution of wealth in the United States. We will begin by talking about how wealth is distributed in America and how the students feel about this unequal distribution. We will use our morning meeting times to discuss the pros and cons of this distribution. How did this come to be? What can be done to fix the issue? We will watch news clippings, movies, and videos about the unequal distribution and have debates in class

about the system. We will discuss what groups are the most largely affected and why. I will also have the students discuss the difficult exit from poverty and what our city can do to help people move out of poverty.

During math class, we will begin learning multiplication, division, decimals, and graphs. We will then take this information from math and tie it into the wealth distribution. Students will solve problems involving distribution of wealth using the skills learned in math class. The next and final step is a problem-based project. Students will be given an amount of money that they will have to distribute to a fictional society. They will be in charge of distributing the wealth how they feel will best meet the needs of their society. They will need to produce equations using their math skills as well as graphs to show their thinking. They will need to produce writing to explain their ideas and the reasons why they chose how to distribute the money. Once the project is completed, the students will need to present their project to the class.

Week 1: [Appendix 2](#) [Appendix 3](#)

Rich Vs. Poor

- Objective: Students will be able to discuss the concept of rich vs. poor from the movie *Willy Wonka and the Chocolate Factory* using accountable talk and academic vocabulary.
- Activate Prior Knowledge: What does it mean to be rich? What does it mean to be poor? Who is rich? Why? Who is poor? Why? What is wealth? Is money the only way to be rich?
- Acquire New Knowledge: Vocabulary, *Willy Wonka and the Chocolate Factory*
- Application: Students will take the knowledge they learned from the movie and apply to classroom discussions and graphic organizers. While watching the movie students will complete 3 column notes. Once they have finished the movie and the 3 column notes they will use the information to conduct a jigsaw activity where they become experts on a particular character from the movie.
- Assessment: Presentation of their character and how it relates to rich vs. poor

Week 2 & 3: [Appendix 4](#) [Appendix 5](#) [Appendix 6](#)

Unequal Wealth Distribution

- Objective: Students will be able to analyze and read graphs and charts to explain the wealth distribution in the United States of America.
- Activate Prior Knowledge: Was the wealth equally distributed in Willy Wonka and the Chocolate Factory? Where are some other places you have noticed unequal wealth? Do you find it fair? Unfair? Have students create a pie chart in a group with their ideas of how the wealth is distributed in the US. Discuss charts during morning meeting.
- Acquire New Knowledge: Present charts and graphs to students and explain how the wealth is actually distributed across the US. Read articles about the wealth distribution. Watch videos about wealth distribution
- Application: Compare and contrast their pie chart with the actual data

- Complete wealth distribution percentage chart
- Assessment: Complete a Socratic Seminar based on data from wealth distribution percentage chart. Write a reflection about what they learned.

Week 4 – 8: [Appendix 7](#)

Problem Based Learning Project

- Students will complete a project to work on during math workshop over the course of the next 4 weeks.

Week 9: [Appendix 8](#)

Final Assessment

- Students will present their projects to the class.

Quarter 2: 9 weeks

Topic: Border Patrol

The next unit will focus on illegal immigration and border patrol. Students will explore during morning meetings the issue of illegal immigration and the different views on border patrol. We will discuss the pros and cons of immigration and look at the stereotypes that are given to immigrants. We will talk about how to counter the stereotypes and create new and positive ones. We will focus on immigrants of all different backgrounds and how they are positively affecting our country. We will also talk about the US money spent to protect the boarder and why this is important. During math this quarter, we are focusing on decimals and fractions. We will be learning how to add, subtract, multiply and divide decimals and fractions. We will also be looking at area and perimeter equations. I will be teaching students to use these skills by using problems about immigration, border security, recipes immigrants bring to America and many more. During their workshop time students will focus on the problem-based project of how to better spend border security money, the pros and cons of a wall and provide better ideas about how to protect the boarder. They will create graphics displaying how much money is spent each year on border patrol and how much is predicted to be spent in the next few years. They will create projects that will provide positive images of immigrants as well as a plan to help people legally immigrate to the United States.

Week 1-3 [Appendix 9](#) [Appendix 11](#)

Dear America: The Story of an Undocumented Citizen

- Objective: Students will explore the idea of what it means to be an undocumented citizen and develop conversations around the pros and cons of immigration.

- Activate Prior Knowledge: What is an immigrant? What do you know about immigration? Can anyone live in America?
- Acquire New Knowledge: Read Dear America and have questions to follow daily reading. On Fridays after a week worth of reading have students complete a journal activity based on reading.
- Application: Create a Venn diagram of the Pros and Cons of immigration. Conduct a Socratic Seminar on immigration.
- Assessment: Students will either research another culture or their own culture and discuss the contributions that culture and immigrants from that culture brought to America. They will present these findings with a food, activity, game, etc. to the class.

Week 4-6 [Appendix 10](#)

Illegal Immigration

- Objective: Students will investigate border patrol and illegal immigration to create and understanding of the reasons and cost of both.
- Activate Prior Knowledge: We just finished a book on a person who was undocumented in America. What does that mean? Without giving any names, do you know anyone who is undocumented? What would you do if you had a friend who was undocumented? Have you ever heard of Border Patrol? Who are they and what do they do?
- Acquire New Knowledge: Job of border patrol (why are they important?) Cost of border patrol daily and yearly. Negative discussions of border patrol.
- Application: Graphic organizer explaining the pros and cons of border patrol.
- Assessment: Problem Based Learning Project

Week 7-8

Problem Based Learning Project

- Students will complete a project to work on during math workshop over the course of the next 2 weeks.
- <http://teacher.scholastic.com/activities/immigration/index.htm>

Week 9

Assessment

- Students will present their project to the class

Quarter 3: 9 weeks

Topic: Students' choice

After three project-based projects on social justice issues that directly affect students of color I want the students to develop a topic of their choice. I want my students to pick something that is directly affecting them and their families. Some examples of topics that could be used are: incarceration rates in America, police brutality, re-segregated schools, gentrification, etc. They will be in charge of picking, researching and developing a project tying both social justice and math. I will help students develop their projects with individual meetings and making sure, they are on the right track.

During each of these projects, I will scaffold the learning. I will help them develop their research skills. AVID instruction will also help them take notes during research and keep their information organized. I will meet with students individually each week to discuss their progress towards their project. We will work during class daily learning how to present information effectively to their peers by coming in front of the class to solve problems and answer questions. I will build their confidence in their work and public speaking before they present their topics to the class. I will also work with students during class meetings to discuss sensitive topics with respect but also teach them how to have an effective back and forth discussion with opinions they differ from their own.

Appendix 1: Teaching Standards

North Carolina State Standards for Literature

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

RI.5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area

RI.5.5 Compare and contrast the overall structure of events, ideas, concepts, or information in two or more texts

RI.5.6 Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question or to solve a problem efficiently.

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably

North Carolina State Standards for Mathematics

NC.5.OA.3 Generate two numerical patterns using two given rules.

NC.5.NBT.5 Demonstrate fluency with the multiplication of two whole numbers up to a three-digit number by a two-digit number using the standard algorithm.

NC.5.NBT.6 Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two-digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm.

NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers.

NC.5.NF.1 Add and subtract fractions, including mixed numbers, with unlike denominators using related fractions: halves, fourths and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths.

NC.5.NF.3 Use fractions to model and solve division problems.

NC.5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers.

NC.5.MD.2 Represent and interpret data.

NC.5.G.1 Graph points in the first quadrant of a coordinate plane, and identify and interpret the x and y coordinates to solve problems.

Appendix 2

Unequal Wealth Distribution – 3 Column Notes

Appendix 3

Unequal Wealth Distribution – Jigsaw Character



CHARACTER ANALYSIS FRAME

Name: _____ Book/Story Title: _____ Author: _____

PERSONALITY TRAITS		CHARACTER'S ROLE	
MAJOR ACCOMPLISHMENTS	Using the book's descriptions, draw a picture of the character.		CHARACTER'S ACTIONS
PROBLEMS/CHALLENGES	_____ (Character's Name)		
OTHER CHARACTERS' THOUGHTS, WORDS, AND ACTIONS TOWARDS THE CHARACTER		CHARACTER'S THOUGHTS & FEELINGS	

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Appendix 4

Unequal Wealth Distribution – Percentage Chart

% of population	% of wealth	# of people	Total Wealth	Average Wealth per person
1 %	32.7%			
Next 9%	37.1%			
Next 40 %	27.4%			
Bottom 50%	2.8%			

- **US Population – 300,000,000**
- **US Wealth – 42,389,200,000,000**

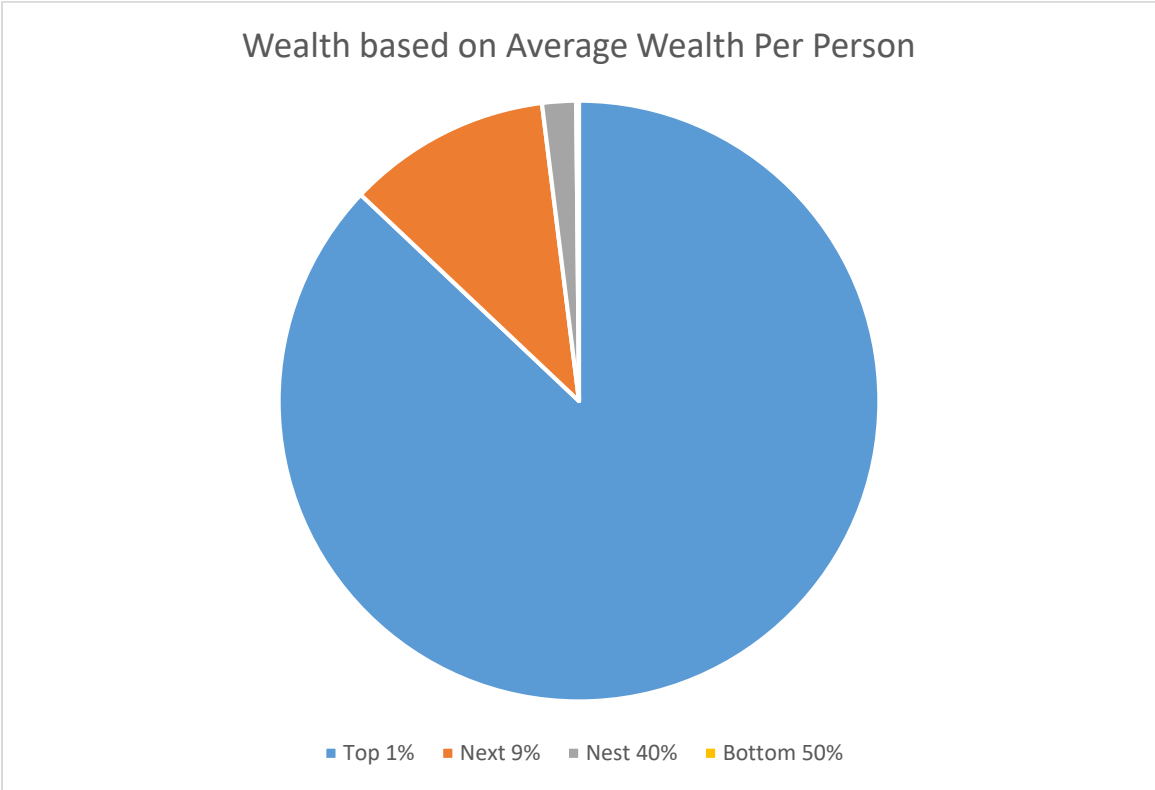
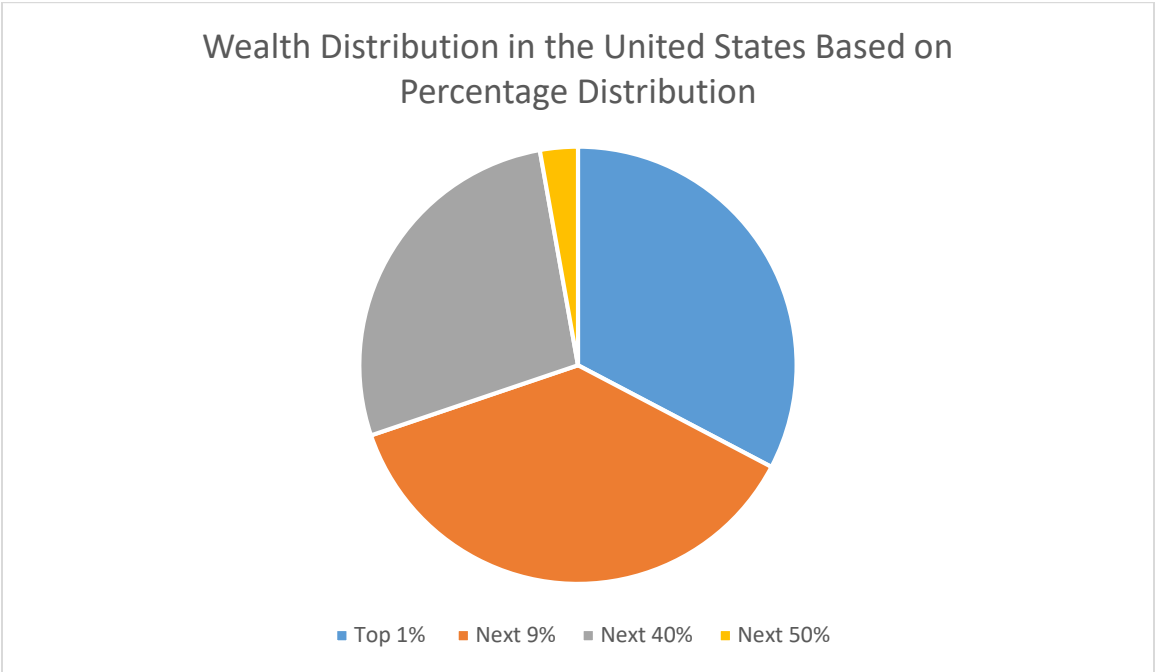
Teacher Key:

% of population	% of wealth	# of people	Total Wealth	Average Wealth per person
1 %	32.7%	3,000,000	\$13,861,268,400,000	\$4,620,422
Next 9%	37.1%	27,000,000	\$15,726,393,200,000	\$582,459
Next 40 %	27.4%	120,000,000	\$11,614,640,800,000	\$96,788
Bottom 50%	2.8%	150,000,000	\$1,186,897,600,000	\$7,912

- **US Population – 300,000,000**
- **US Wealth – 42,389,200,000,000**

Appendix 5

Unequal Wealth Distribution – Pie Chart



Appendix 6

Unequal Wealth Distribution – Socratic Seminar Questions

1. Is this wealth distribution fair? Why? Why not?
2. Why is the wealth split this way?
3. Some people think, “if you earn it then it is yours” Do you agree with this statement? Why? Why not?
4. Do you think the distribution should be more equal? Why? Why not?

Your name:

Your Partner’s name:

Directions: Place an X in a box each time you witness your partner doing one of the following actions.

Contributes an idea to the discussion

--	--	--	--	--	--	--	--	--	--

Asks a question that gets others talking

--	--	--	--	--	--	--	--	--	--

Refers to something that another student said in the discussion

--	--	--	--	--	--	--	--	--	--

Focuses on the student who is speaking

--	--	--	--	--	--	--	--	--	--

Distracts from the discussion

--	--	--	--	--	--	--	--	--	--

Appendix 7

Unequal Wealth Distribution - Problem Based Learning Project

You are the new leader of a small country in the Caribbean Islands. You have a country budget of \$2,000,000 to give your citizens to start a new life. Your country currently inhabits 1,000 citizens. How will you distribute the money?

Step 1: Create a table using the same percentages as current America

% of population	% of wealth	# of people	Total Wealth	Average Wealth per person
1 %	32.7%			
Next 9%	37.1%			
Next 40 %	27.4%			
Bottom 50%	2.8%			

Step 2: Create a table using percentages you find more equal

% of population	% of wealth	# of people	Total Wealth	Average Wealth per person

Step 3: Reflection – Research your answers. You must back it up with evidence.

1. Why did you choose your percentages?
2. How does this make life more equitable?
3. What privileges (if any) are provided to citizens in each bracket of America?
4. How does this wealth distribution keep people financially poor?
5. What challenges does unequal wealth cause? Who is the most affected?

Step 4: Create a pie graph for table 1 and table 2.

Step 5: Create a presentation of you project

- You can use Google Slides, PowerPoint, Create a video recording, posters, etc.

Appendix 8

Unequal Wealth Distribution – Rubric



Unequal Wealth Distribution				
	Proficient <i>25 Points</i>	Emerging <i>21 Points</i>	Beginning <i>17 Points</i>	Not Demonstrated <i>13 Points</i>
Unequal Wealth Distribution Tables	Both tables are fully filled out with at least 20 correct answers	Tables are filled out with 17-19 correct answers	Tables are filled out with 13-16 correct answers	Tables are not completely filled out or less than 12 correct answers
Unequal Wealth Distribution Reflection	Reflection is written in full and complete sentences. Reflection is written from use of research (3 or more sources) Sources are cited	Reflection is written in full and complete sentences. Reflection is not fully researched (less than 3 resources) Sources are cited	Reflection is partially written in full and complete sentences. Reflection is not fully researched (less than 3 resources) Sources are not properly cited	Reflection is not written in full and complete sentences. Reflection is not researched (less than 2 sources) Sources are not cited
Unequal Wealth Distribution Pie Charts	Two pie graphs are created using the data from table 1 and table 2. Each graph is properly represented. Your graphs include a key for the reader and are in color.	Two pie graphs are created using the data from table 1 and table 2. The graphs are not properly represented (the pieces are incorrect sizes).	Two pie graphs are created using the data from table 1 and table 2. The graphs are not properly represented. There is no key. The graphs are not in color.	Two pie graphs are created using data not found in the tables. They are poorly represented. There is no key. The graphs are not in color.
Unequal Wealth Distribution Presentation	During your presentation you speak loud and clear. You use your visual as a guide (do not read just from visual). You include your table and pie charts in visual. You explain your reflection. You are able to answer questions about your research	During your presentation you do not speak loud and clear. You read directly from your visual. You include your tables and pie charts in visual. You explain your reflection. You are able to answer questions about your research	During your presentation you do not speak loud and clear. You read directly from the visual. Your visual is not attention grabbing and does not include your tables and charts. You are not prepared to explain your reflection or answer questions.	Your presentation is not complete and you are not prepared to present.

This rubric was created with [Quick Rubric](#) and can be found at

Appendix 9

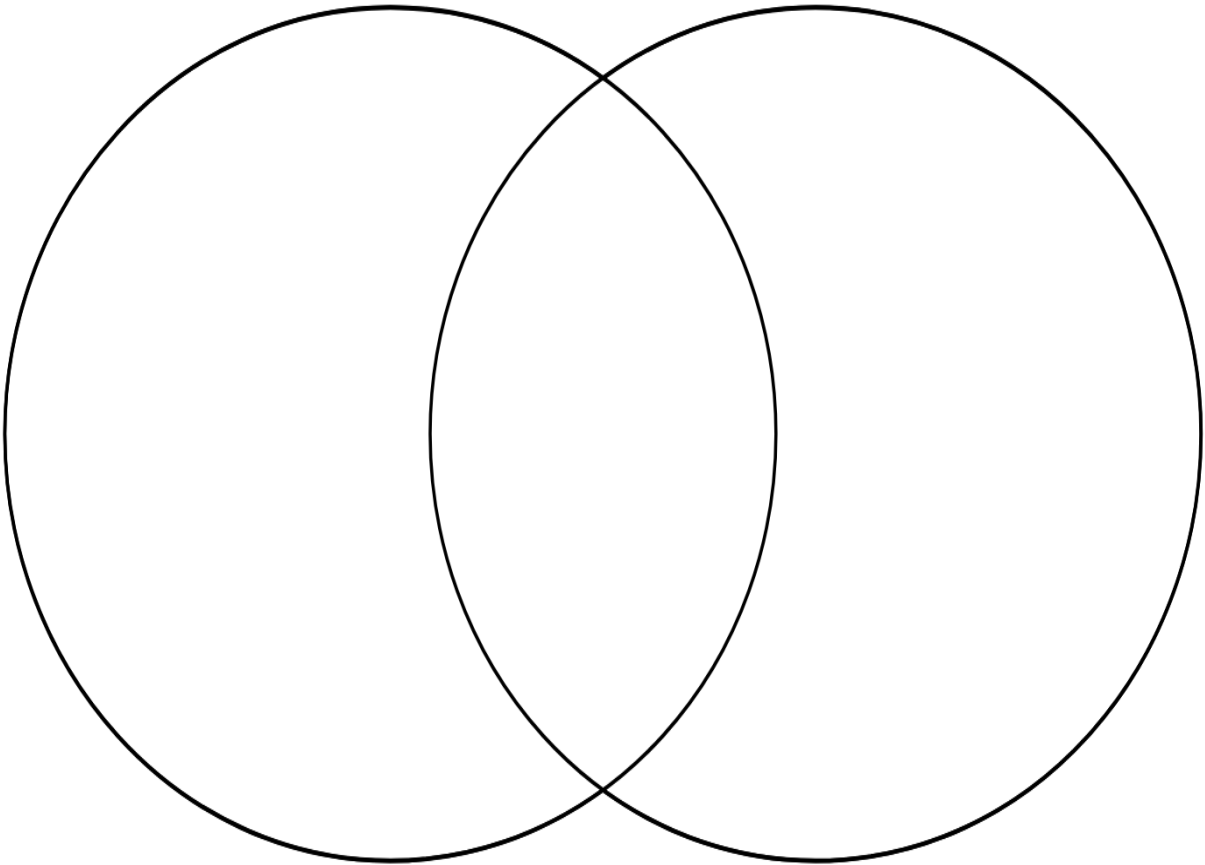
Border Patrol – Venn Diagram


Name _____ Date _____

Title:

Directions:

Type Word Bank Here Type Word Bank Here Type Word Bank Here



www.storyboardthat.com 

Create your own at Storyboard That

Appendix 10

Border Patrol – Pros and Cons Graphic organizer

Name: _____

For (Pros) and Against (Cons) Chart

Use to help support a position for or against an idea

Pro

Con

Appendix 11

Border Patrol – Culture Projects Ideas

Cultures Around the World Project

Objective: Students will learn about and compare human and physical characteristics of places.

Directions:

- Choose one of the following countries:
 - China
 - Russia
 - Japan
 - India
 - Egypt
 - Australia
 - Canada
 - Indonesia
 - Greece
 - Brazil
 - Argentina
 - Mexico
 - Tanzania
 - United Kingdom
 - France
 - Spain
 - Costa Rica
 - Greenland
 - Saudi Arabia
 - South Africa
 - Madagascar
 - Sweden
 - Chile
 - Jamaica
- Create one of the following projects:
 - Make a brochure
 - Create a poster
 - Write an essay
 - Create a power point
- Include all of the following information about the chosen country in your project:
 - Location
 - Climate
 - Clothing
 - Religion
 - Food
 - Holidays / Celebrations
 - Language
 - Type of Government
- Present your project to the class on the assigned due date. Due date _____

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Name: _____

Language:

How do you say...

Hello _____

Goodbye _____

Other interesting words _____

Country:

Capital:

Interesting Facts:

1. _____

2. _____

3. _____

Flag:

Holidays:

Foods:

Clothing:

My Culture and Traditions!

USE THIS WORKSHEET TO TELL MORE ABOUT YOUR CULTURE AND THE TRADITIONS OF YOUR FAMILY!

LANGUAGES MY FAMILY AND I SPEAK!

MY FAVORITE TRADITION!

MY FAVORITE FOOD TO EAT!

CLOTHES WORN IN MY CULTURE!

HOLIDAYS CELEBRATED IN MY CULTURE!

OTHER INTERESTING FACTS!

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Teacher Resources

McIntosh, Peggy. “White Privilege: Unpacking the Invisible Knapsack”

<https://www.racialequitytools.org/resourcefiles/mcintosh.pdf>

Classic/ground-breaking essay defining white privilege. Includes lots of everyday, concrete examples.

“Wealth Inequality.” Inequality.org. Accessed October 22, 2019.

<https://inequality.org/facts/wealth-inequality/>.

Great page with lots of information in inequality. Includes graphs, tables, articles, and more.

<https://www.youtube.com/watch?v=QPKKQnijnsM>

Video explaining wealth inequality in America.

“Coming to America: Immigration Builds a Nation.” Coming to America: Immigration Builds a Nation | Education World. Accessed October 22, 2019.

https://www.educationworld.com/a_lesson/lesson204.shtml.

Math lesson plans with an immigration focus.

Fraze, Gretchen. “4 Myths about How Immigrants Affect the U.S. Economy.” PBS. Public Broadcasting Service, November 2, 2018. <https://www.pbs.org/newshour/economy/making-sense/4-myths-about-how-immigrants-affect-the-u-s-economy>.

Helps debunk myths about negative impacts of immigration

“Take a Poll, Debate the Issue: Immigration.” PBS. Public Broadcasting Service. Accessed October 22, 2019. <https://www.pbs.org/newshour/extra/lessons-plans/take-a-poll-debate-the-issue-immigration/>.

Provides additional lesson plans and resources to use in the classroom

“Immigration: Stories of Yesterday and Today and Ellis Island.” Scholastic.com. Accessed October 22, 2019. <http://teacher.scholastic.com/activities/immigration/index.htm>.

Provides PBL for Border Patrol topic

Kent, Ana Hernández, and Lowell R. Ricketts. “Wealth Inequality in America: Key Facts & Figures: St. Louis Fed.” Wealth Inequality in America: Key Facts & Figures | St. Louis Fed. Federal Reserve Bank of St. Louis, October 13, 2019. <https://www.stlouisfed.org/open-vault/2019/august/wealth-inequality-in-america-facts-figures>.

Great source of fact and figures on wealth inequality

Student Resources

“Income and Wealth Inequality: Crash Course Economics #17.”

<https://www.youtube.com/watch?v=0xMCWr0O3Hs> Accessed November 18, 2019.

Defines and distinguishes income and wealth inequality, especially at a global level.

Chapin, Angelina. “In Their Own Words, Migrant Children Describe Conditions At Border Patrol Facilities.” HuffPost. HuffPost, June 28, 2019. https://www.huffpost.com/entry/migrant-children-describe-detention_n_5d1646ffe4b03d61163af666.

First-hand accounts of children’s experiences with border patrol

“What We Do.” What We Do | U.S. Customs and Border Protection. Accessed October 22, 2019.

<https://www.cbp.gov/careers/usbp-what-we-do>.

Detailed description of daily job tasks for border patrol agents

“The Benefits of Immigration: Addressing Key Myths.” Mercatus Center, September 15, 2019.

<https://www.mercatus.org/publications/trade-and-immigration/benefits-immigration-addressing-key-myths>.

Gives students benefits of immigration and debunks common myths

“Border Patrol Overview.” Border Patrol Overview | U.S. Customs and Border Protection.

Accessed October 22, 2019. <https://www.cbp.gov/border-security/along-us-borders/overview>.

Benefits of border patrol

McFadyen, Jennifer. “Building Barriers on the US-Mexico Border.” ThoughtCo. ThoughtCo,

April 2, 2019. <https://www.thoughtco.com/mexico-border-fence-pros-and-cons-1951541>.

Pros and cons of a border fence along the US/Mexico border

Notes

- ⁱ “Reedy Creek Elementary School Home.” Reedy Creek Elementary School. Accessed October 22, 2019. <https://reedycreekelementaryschool.wearecms.com/>.
- ⁱⁱ “AVID / Closing the Achievement Gap in Education.” AVID / Closing the Achievement Gap in Education. Accessed October 22, 2019. <https://www.avid.org/>.
- ⁱⁱⁱ “Problem-Based Learning: Center for Teaching Innovation.” Problem-Based Learning | Center for Teaching Innovation. Accessed October 22, 2019. <https://teaching.cornell.edu/teaching-resources/engaging-students/problem-based-learning>.
- ^{iv} “Discover the Story of English More than 600,000 Words, over a Thousand Years.” Home : Oxford English Dictionary. Accessed November 14, 2019. <https://www.oed.com/>.
- ^v McIntosh, Peggy. “White Privilege: Unpacking the Invisible Knapsack (1989) 1.” In *On Privilege, Fraudulence, and Teaching As Learning*, April 2019, 29–34. <https://doi.org/10.4324/9781351133791-4>.
- ^{vi} Richard W. Riley, quoted in Naia Wilson-Akubude, Zeena Zakharia, Patricia Krueger-Henney, and Adrian Mims. “Black Male Success in Mathematics: The Development of a Positive Mathematics Identity in Urban Schools.” *ProQuest Dissertations Publishing*, 2016. <http://search.proquest.com/docview/1803936445/>.
- ^{vii} Ibid.
- ^{viii} Ibid.
- ^{ix} Riegle-Crumb, Catherine, and Melissa Humphries. “Exploring Bias in Math Teachers’ Perceptions of Students’ Ability by Gender and Race/Ethnicity.” *Gender & Society* 26, no. 2 (February 2012): 290–322. <https://doi.org/10.1177/0891243211434614>.
- ^x Ibid.
- ^{xi} Mueller, Mary F., and Carolyn A. Maher. “Promoting Equity through Reasoning.” *Teaching Children Mathematics* 16, no. 9 (May 1, 2010): 540–47. <http://search.proquest.com/docview/742856350/>.
- ^{xii} Battey, Dan, and Megan Franke. “Integrating Professional Development on Mathematics and Equity.” *Education and Urban Society* 47, no. 4 (2013): 433–62. <https://doi.org/10.1177/0013124513497788>.
- ^{xiii} Ibid.
- ^{xvi} DiAngelo, Robin. *White Fragility: Why It’s so Hard for White People to Talk about Racism*.

London: Penguin Books, 2019.

- ^{xv} Battey and Franke. “Integrating Professional Development on Mathematics and Equity.”
- ^{xvi} Skovsmose, Ole. *An Invitation to Critical Mathematics Education*. Dordrecht: Springer, 2012.
- ^{xvii} Ibid.
- ^{xviii} Ibid.
- ^{xix} Brewster, Holly, and Megan Laverty. “The Teacher as Mathematician: Problem Solving for Today’s Social Context.” *ProQuest Dissertations Publishing*, 2014.
<http://search.proquest.com/docview/1548332413/>.
- ^{xx} Aslan Tutak, Fatma, Elizabeth Bondy, and Thomasenia L. Adams. “Critical Pedagogy for Critical Mathematics Education.” *International Journal of Mathematical Education in Science and Technology* 42, no. 1 (January 15, 2011): 65–74.
<http://www.tandfonline.com/doi/abs/10.1080/0020739X.2010.510221>.
- ^{xxi} Mcnamee, Rick, David Keiser, Jeremy Price, and Corey Webel. “Teaching Social Justice Mathematics in a Privileged Setting.” *ProQuest Dissertations Publishing*, 2013.
<http://search.proquest.com/docview/1362253327/>.

Bibliography

- Aslan Tutak, Fatma, Elizabeth Bondy, and Thomasenia L. Adams. "Critical Pedagogy for Critical Mathematics Education." *International Journal of Mathematical Education in Science and Technology* 42, no. 1 (January 15, 2011): 65–74.
<http://www.tandfonline.com/doi/abs/10.1080/0020739X.2010.510221>.
- "AVID / Closing the Achievement Gap in Education." AVID / Closing the Achievement Gap in Education. Accessed October 22, 2019. <https://www.avid.org/>.
- Battey, Dan, and Megan Franke. "Integrating Professional Development on Mathematics and Equity." *Education and Urban Society* 47, no. 4 (2013): 433–62.
<https://doi.org/10.1177/0013124513497788>.
- "Border Patrol Overview." Border Patrol Overview | U.S. Customs and Border Protection. Accessed October 22, 2019. <https://www.cbp.gov/border-security/along-us-borders/overview>.
- Brewster, Holly, and Megan Laverty. "The Teacher as Mathematician: Problem Solving for Today's Social Context." *ProQuest Dissertations Publishing*, 2014.
<http://search.proquest.com/docview/1548332413/>.
- Chapin, Angelina. "In Their Own Words, Migrant Children Describe Conditions At Border Patrol Facilities." HuffPost. HuffPost, June 28, 2019.
https://www.huffpost.com/entry/migrant-children-describe-detention_n_5d1646ffe4b03d61163af666.
- "Coming to America: Immigration Builds a Nation." Coming to America: Immigration Builds a Nation | Education World. Accessed October 22, 2019.
https://www.educationworld.com/a_lesson/lesson204.shtml.
- DiAngelo, Robin. *White Fragility: Why It's so Hard for White People to Talk about Racism*. London: Penguin Books, 2019.
- "Discover the Story of English More than 600,000 Words, over a Thousand Years." Home : Oxford English Dictionary. Accessed October 22, 2019. <https://www.oed.com/>.
- Frazee, Gretchen. "4 Myths about How Immigrants Affect the U.S. Economy." PBS. Public Broadcasting Service, November 2, 2018.
<https://www.pbs.org/newshour/economy/making-sense/4-myths-about-how-immigrants-affect-the-u-s-economy>.
- "Immigration: Stories of Yesterday and Today and Ellis Island." Scholastic.com. Accessed October 22, 2019. <http://teacher.scholastic.com/activities/immigration/index.htm>.
- McIntosh, Peggy. "White Privilege: Unpacking the Invisible Knapsack (1989) 1." On Privilege,

Fraudulence, and Teaching As Learning, April 2019, 29–34.
<https://doi.org/10.4324/9781351133791-4>.

Kent, Ana Hernández, and Lowell R. Ricketts. “Wealth Inequality in America: Key Facts & Figures: St. Louis Fed.” *Wealth Inequality in America: Key Facts & Figures* | St. Louis Fed. Federal Reserve Bank of St. Louis, October 13, 2019.
<https://www.stlouisfed.org/open-vault/2019/august/wealth-inequality-in-america-facts-figures>.

McFadyen, Jennifer. “Building Barriers on the US-Mexico Border.” ThoughtCo. ThoughtCo, April 2, 2019. <https://www.thoughtco.com/mexico-border-fence-pros-and-cons-1951541>.

Mcnamee, Rick, David Keiser, Jeremy Price, and Corey Webel. “Teaching Social Justice Mathematics in a Privileged Setting.” *ProQuest Dissertations Publishing*, 2013.
<http://search.proquest.com/docview/1362253327/>.

Mueller, Mary F., and Carolyn A. Maher. “Promoting Equity through Reasoning.” *Teaching Children Mathematics* 16, no. 9 (May 1, 2010): 540–47.
<http://search.proquest.com/docview/742856350/>.

“Problem-Based Learning: Center for Teaching Innovation.” *Problem-Based Learning* | Center for Teaching Innovation. Accessed October 22, 2019.
<https://teaching.cornell.edu/teaching-resources/engaging-students/problem-based-learning>.

“Problem-Based Learning: Benefits and Risks - Faculty Focus: Higher Ed Teaching & Learning.” *Faculty Focus* | Higher Ed Teaching & Learning, November 12, 2009.
<https://www.facultyfocus.com/articles/effective-teaching-strategies/problem-based-learning-benefits-and-risks/>.

“Reedy Creek Elementary School Home.” Reedy Creek Elementary School. Accessed October 22, 2019. <https://reedycreekelementaryschool.wearecms.com/>.

Riegle-Crumb, Catherine, and Melissa Humphries. “Exploring Bias in Math Teachers’ Perceptions of Students’ Ability by Gender and Race/Ethnicity.” *Gender & Society* 26, no. 2 (February 2012): 290–322. <https://doi.org/10.1177/0891243211434614>.

Skovsmose, Ole. *An Invitation to Critical Mathematics Education*. Dordrecht: Springer, 2012.

“Take a Poll, Debate the Issue: Immigration.” PBS. Public Broadcasting Service. Accessed October 22, 2019. <https://www.pbs.org/newshour/extra/lessons-plans/take-a-poll-debate-the-issue-immigration/>.

“The Benefits of Immigration: Addressing Key Myths.” Mercatus Center, September 15, 2019.
<https://www.mercatus.org/publications/trade-and-immigration/benefits-immigration-addressing-key-myths>.

“Wealth Inequality.” Inequality.org. Accessed October 22, 2019.
<https://inequality.org/facts/wealth-inequality/>.

“What We Do.” What We Do | U.S. Customs and Border Protection. Accessed October 22, 2019.
<https://www.cbp.gov/careers/usbp-what-we-do>.

Wilson-Akubude, Naia, Zeena Zakharia, Patricia Krueger-Henney, and Adrian Mims. “Black Male Success in Mathematics: The Development of a Positive Mathematics Identity in Urban Schools.” *ProQuest Dissertations Publishing*, 2016.
<http://search.proquest.com/docview/1803936445/>.