Rational Thinking: Voting, Fairness, and the 2016 Presidential Election

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This curriculum unit is recommended for:
7th Grade Math

Keywords: real-world application, literacy, metacognitive "think alouds," academic conversations, close reading, rational numbers, integers, critical thinking

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: The students will explore concepts such as gerrymandering, fairness in elections, and social factors that contribute to any election, including the 2016 presidential election. Students will learn about using all operations with rational numbers in order to build confidence in fractions and decimals to best prepare them for 7th-grade rigor. Throughout the curriculum, students will read, write, listen, and interpret current events. At the end of the unit, students will be prepared to be Campaign Managers for either Hillary Clinton or Donald Trump's campaign. They will sue the strategies they have already learned to complete a series of tasks to create a plan for their candidate to win the 2016 presidential election.

I plan to teach this unit during the coming year to 70 students in 7th grade math.

Introduction

Why is the current North Carolina gerrymandering case so important? Could Hillary Clinton have been our president? What is considered fair representation? Students will engage in a series of activities about the individuals who represent them at the local, state, and federal level. Students will learn about voting and fairness through mathematical operations. This unit will primarily incorporate Number Sense standards, but will also relate to social studies standards.

Students at the middle school level are incredibly aware about sociopolitical issues, but do not yet have many of the tools to make their beliefs concrete. Often, they regurgitate tidbits from the news or directly reflect their families' perspectives. I do not intend to directly challenge their beliefs, but my goal as an educator is to bring further awareness into issues that are relevant to my students' lives and expose them to opinions they may have never considered. My students are beginning to learn about government, power, and authority in their social studies classes and are experiencing the effects of local, state, and federal government decisions daily. As they increase awareness of the systems surrounding them, I would like to expose them to facts and research to inform their opinions and future civic decisions - improving their *rational* thinking.

This curriculum will serve 7th grade math student as they begin the school year. Number Sense is traditionally one of, if not the first units taught. In order for students to be proficient in the concept, they need a strong understanding of rational numbers, specifically, fractions and decimals. Elementary curriculum covers how to add, subtract, multiply, and divide fractions and decimals; middle school curriculum is responsible for including negative numbers, order of operations, and real-world applications. As a middle school teacher, it is frustrating and disheartening to see students' success hindered by elementary errors. As such, I have researched and planned for new methods of applying existing content knowledge to Number Sense gaps.

Rationale

Number Sense is a consistently low standard for students at Martin Luther King Jr. Middle School, in the district, and in the nation. According to the NWEA MAP assessment, Number Sense is categorized under the overarching concept of "The Real and Complex Number System." Although the Real and Complex Number system is a heavily-tested strand of content, it is often a weakness that follows students from elementary school all the way through high school. Because Number Sense is a concept in which students generally underperform, it is critical to address foundational misconceptions of fractions and decimals. According to PEAK Learning Systems, once a student learns a concept, they need to practice it at least 28 times over the course of 3 weeks before they truly learn it. Relooping and remediating is vital to truly understanding, especially if the student did not get a strong grasp on the material in a previous year.

It is also important for students to develop a deeper understanding of the structures of government around them. The Nations Report Card exposed that only 18% of 8th grade history NAEP test-takers were proficient in U.S. History.[i] Research indicates that those students are generally only proficient at identifying shaded regions on a map. The majority of U.S. students

are not proficient at explaining events, finding cause-effect relationships, describing reasons why events happened, or properly comprehending primary sources.

Students also need to be considerate of the world around them. North Carolina is in the midst of redistricting as a result of gerrymandering. Within theses districts, there has been a steep decline in the number of "swing seats" in Congress. In 1997, there were 164 swing seats in Congress, whereas there are currently only 94 swing seats. The remaining 363 seats are strongly divided amongst the Democratic or Republican parties.[ii] Not only do students need to be aware of the historical contexts of the past, but they also need to be cognizant that they are in the process of creating history themselves.

School and District Information

This curriculum will serve 7th grade students at Martin Luther King Jr. Middle School in Charlotte, North Carolina. The intended students are primarily students of color and low-income. The students are primarily African-American (60.1%), Hispanic (33.2%), white (3.1%), Asian (2%), and other (1.6%). MLK Jr. Middle is a Title I school where over 92% of students are economically disadvantaged. In 2017, the North Carolina End of Grade test dictated that only 23% of 7th-grade students were proficient or college and career ready. In 2016, 24% of the 7th-grade students at MLK were proficient or college and career ready in math.

After Donald Trump's election in November, many students, particularly Hispanic students, expressed concern for the safety and profiling of their families. Some students admitted they or someone they knew was undocumented. In February of 2017, local media in Charlotte began sharing Immigration and Customs Enforcement policies, and some individuals in Charlotte were deported. Many students were afraid, and on Thursday, February 17, 2017, the "Day Without Immigrants" about 40% of the student body was absent, standing in solidarity with immigrants in the Charlotte Community and against the Trump administration and ICE policies. The following day, even more students did not attend school as the student body organized a walkout as an example of civil disobedience. They raised flags from all of the different countries their families were from and shared their thoughts and feelings with one another outside the school building. Prior to this event, I struggled to converse with my students on documentation and immigration issues -- there never seemed to be time in class for an activity, and it is a very sensitive and fragile topic that many students did not want to share out of fear.

Martin Luther King Jr. Middle School supports an academic enrichment block, which groups math students who are on the brink of proficient scores or have been trending toward proficiency over several years together. This curriculum is designed with that specific enrichment time (45 minute blocks), but could easily be implemented in a block or as a series of projects to supplement relooping strategies. It could also be implemented at the end of the year as a review activity prior to state testing, as Number Sense concepts are usually taught in the fall and therefore require special attention in the spring.

In 2015, Charlotte Mecklenburg Schools announced literacy as its "North Star." The expectation in all contents is that there is clear evidence of literacy in every classroom. Although many current mathematical problems use literacy purely for compliance, literacy in math can actually help engage students in the activity and should force students into delving deeper into

mathematical concepts. This means that students are expected to read through complex word problems, not just complete “naked math.”

Curriculum Unit Goals

The goals of this unit are to understand that fairness in voting begins with the way representative lines are drawn, and power lies within those who draw them. Then, students will learn how different states carry different weights in the electoral college, which differentiates itself from a popular vote system. Finally, students will be able to compare two historical apportionment methods to see how strategic planning can influence outcomes. All of these factors influence outcomes, but have nothing to do with political ideology.

Students will be able to create and interpret various methods of data, mostly from tables and charts, and be able to fluently speak to what the data means. They will be able to interpret the data in a way where they can give a strong conclusion and recommendation, similar to the role of the ground intelligence wing of a political campaign.

Connections to Other Subjects

This unit has relevance to the students’ 7th grade social studies class, where they compare sources of power and governmental authority, and primes them for 8th grade United States history. It also directly connects with future high school civics and economic lessons, which rely on understanding government and interpreting charts. Furthermore, future math classes rely on students being comfortable and competent with rational numbers.

Content Research

Integers: Integers are positive and negative whole numbers and zero. Examples of integers include 100, -100, 0, 4, -75, etc. Integer operation rules are introduced through this content. Whenever students are adding or subtracting integers, they must evaluate the integers’ signs. If they are of the same sign, they should add the values together and keep the sign. For example, 5+6=11and -5+(-6)=-11. If the integers have different signs, they should subtract and keep the sign of the bigger number. For example, -5+6=1but 5+(-6)=-1.

Rational Numbers: All integers are rational numbers, as are all numbers who can be divided with a nonzero denominator. Students will be able to understand that all integer rule operations apply to rational numbers as well. Students are also responsible for ordering the rational numbers from least to greatest and from greatest to least.

Absolute value: Absolute value informs a rational number’s distance from zero on a number line. Adding integers with the same absolute value and different signs will equal zero. Because absolute value is a measurement of distance, it is always positive. Therefore, -3 is equal to 3, which is equal to 3.

Fractions: Teachers must assist students in understanding that a fraction represents division between the numerator and denominator. Teachers should facilitate the understanding that the fraction also represents a ratio between two quantities. By 7th grade, most students have practiced adding, subtracting, multiplying, and dividing fractions with common and uncommon denominators, but if students begin the year struggling with fractions, they struggle through rigorous 7th-grade word problems.

When adding or subtracting fractions, the denominator must be the same. If the denominator is not the same, students must find an equivalent fraction with a common denominator to what they are adding or subtracting and proceed. They must also follow integer rules for adding and subtracting with negative numbers.

When multiplying fractions, the numerators should be multiplied by one another to form the product's numerator. The denominators should be multiplied by one another to form the product's denominator. If necessary, the fraction should be reduced to lowest terms (by finding the greatest common factor).

When dividing two fractions, students must multiply the first fraction by the reciprocal of the second fraction. Students must be able to recognize this within a complex fraction, such as 7834could also be written as7834 which could then be written as7843.

Students should also understand if a fraction is negative or positive based on their division rules. If just the numerator, denominator, or entire fraction has a single negative sign, then their quotient will be negative. If there is a negative sign in both the numerator and denominator, then the quotient will be positive.

Decimals: Students will be responsible for adding, subtracting, multiplying, and dividing positive and negative decimals. Some of these decimals may terminate, some may not. Students will need to know how to transcribe a terminating decimal, such as 0.3 as compared to a non-terminating or repeating decimal, such as 0.3. Students must also be able to order decimals from greatest to least or least to greatest. In order to do so, students should compare the next digit. In the situation of comparing 0.3to 0.3, students would need to recognize that they are actually comparing the value 0.30 to 0.33. Because the values are the same in the ones place and the tenths place, they have compared the hundredths place. 3 is greater than 0, so 0.3is greater than 0.3.

Translating Verbal Equations to Mathematical Expressions: Students must be able to translate real-life scenarios into mathematical expressions, then utilize their knowledge of integer rules and all operations for rational numbers to find a final solution. Students should recognize that words like deposit, ascend, or climb translate mathematically to addition. Words like withdraw, descend, or fall translate to subtraction. "Each," "per," or "every" are words that could translate to multiplication or division depending on the context of which they are used.

Finding Averages: Students will also need to find the average or arithmetic mean of a set of positive and negative numbers in a real-world context. In order to do so, the students must add each of the numbers in the data set, then divide that number by the quantity of numbers they added.

Apportionment: This concept indicates that the number of representatives in the government should be proportional to the number of people being represented. We will find that apportionment is not necessarily straightforward; if there is a remainder in the number of representatives allocated to a specific area, there are different opinions on how to allocate those representatives.

Hamiltonian apportionment: Give every state at least one representative, vote, or seat. If any seats are not filled, the state with the highest remainder will get that additional seat. Use the fractional remainder to determine which states will get an additional seat.

Jeffersonian Apportionment: Find the Standard Divisor by dividing the total population by the number of available seats. Then, divide each state's population by the Standard Divisor to find the Standard Quota. The whole number integer is the number of guaranteed seats allocated. If that total number of seats does not equal the necessary number, then guess-and-check with a different, smaller divisor until one works.

Electoral vote and the electoral college: Voters are separated by their states. Each state has a set number of electoral votes, which contribute to the electoral college.

Popular vote: In a race, the candidate who receives the highest number of votes wins. This has no bearing on the neighborhood, district, or state the voters are from.

General Teaching Strategies

I will use these activities in an inquiry-based method of teaching. I will often provide the data for students and ask them to show it in a line graph (in order to practice graphing as well) or table. I may also provide them with a table or graph with missing points and require that they use knowledge about rates or my clues to fill out their tables or graphs. Then, I will have a series of word problems for the students to explore their data.

Intentional grouping will be absolutely imperative for the success of this unit. Teachers should access existing data such as previous End of Grade test scores, MAP assessment data, or Lexile levels prior to pairing or grouping students. I envision these lessons in groups of 2-3 with high flyers spread across the different pairs or groups. It may also be helpful to pair up a student with a high Lexile level with a student with lower MAP data and vice versa.

Holding high expectations for students to complete a close reading of the texts, annotate the activities, and providing accommodations for English Language Learners are also crucial for the teacher. Ideally, the teacher should model a silent, independent reading of the scenario, then annotate the important information, including the question or task at hand. The teacher should also model using a graphic organizer of some sort in order to clarify that certain words have a mathematical connotation (such as per, which can mean multiply or divide). A graphic organizer will be a great strategy for English Language Learners as well.

The teacher must also model academic conversations regularly. The students will be expected to collaborate, and may agree with, disagree with, or not understand what their partner is saying. Exemplar practices would include modeling sentence starters (such as, "I predict

that…" or, "What would happen if we…") can encourage active dialogue that will prove necessary for a successful group.

The teacher is also responsible for creating his or her own exemplar of the activity. The teacher should ask, "What should every single student, including my lowest student, have on their paper by the end of their work session? What should my star student have on their paper? What should a student in the middle of the road have?" While students are working on their investigations, the teacher should have a set of key things to look for on student paper and keep track of where students are excelling or struggling.

After students have had sufficient time to investigate the activities on their own, potentially struggling and potentially with incorrect answers, the teacher should spend a brief amount of time assisting the students whole-group in editing their own papers to become perfect. While the teacher explains how to work through each problem, he or she should invite students to share their own strategy for solving each problem and address any misconception. Using a document camera would be helpful to show authentic student work in real time.

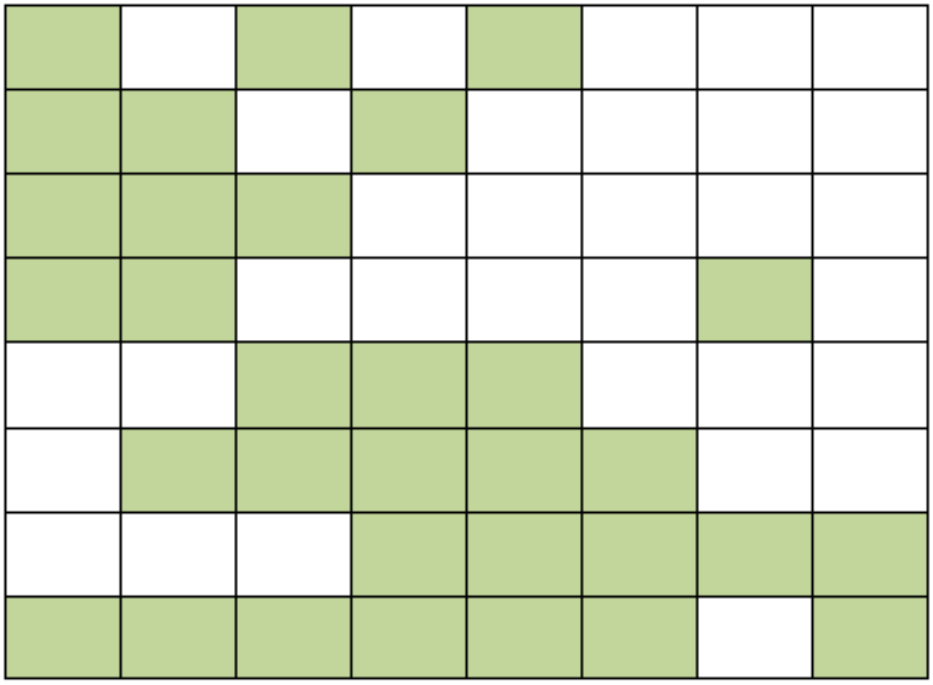
Classroom Lessons and Activity #1 - Drawing the Lines

The first activity will be on general fairness in voting. Teachers should use Appendix 2 supplement this lesson. Each student should have at least two tables.

Launch

The teacher should explain that the students are looking at an 8x8 grid with 64 total squares, 32 of each color (white and green). The teacher will model an example of dividing the squares into 8 equal sections. The teacher should model looking at each section and deciding which color "wins," or has more representation. Strategic questioning should allow students to engage creatively in the activity -- "How many green squares are there?" (32) "How many white squares are there?" (32) "How many boxes do you need to draw?" (8) "How many small squares should be in each box?" (8) "Is the example the only way to draw squares?" (No, you could draw them diagonally in order to be adjacent to the other squares).

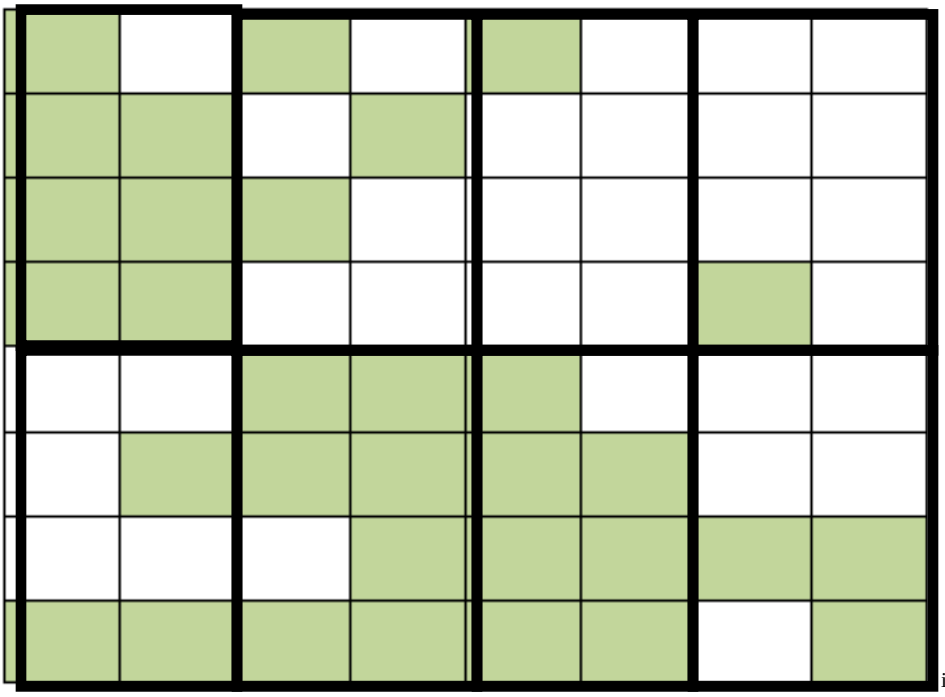
Drawing 1

 [iii]

Explore

Each student should have a copy of the activity in the Appendix. Students should first individually draw their sections then compare their sections with a partner's. After a minute, student should leave their activities on their desks and look at the strategies of other students around the classroom, taking notes of the different ways to group. After students have had a minute to walk around and look, the teacher can ask some whole-group questions. "How many different ways could we make white win?" "How many different ways could we make green win?" "What were similar strategies?" "What parts of the board did green always win?" "What parts of the board did white always win?" As a class, have students answer questions about their own drawing. An example is below in Drawing 2.

Drawing 2

 [iv]

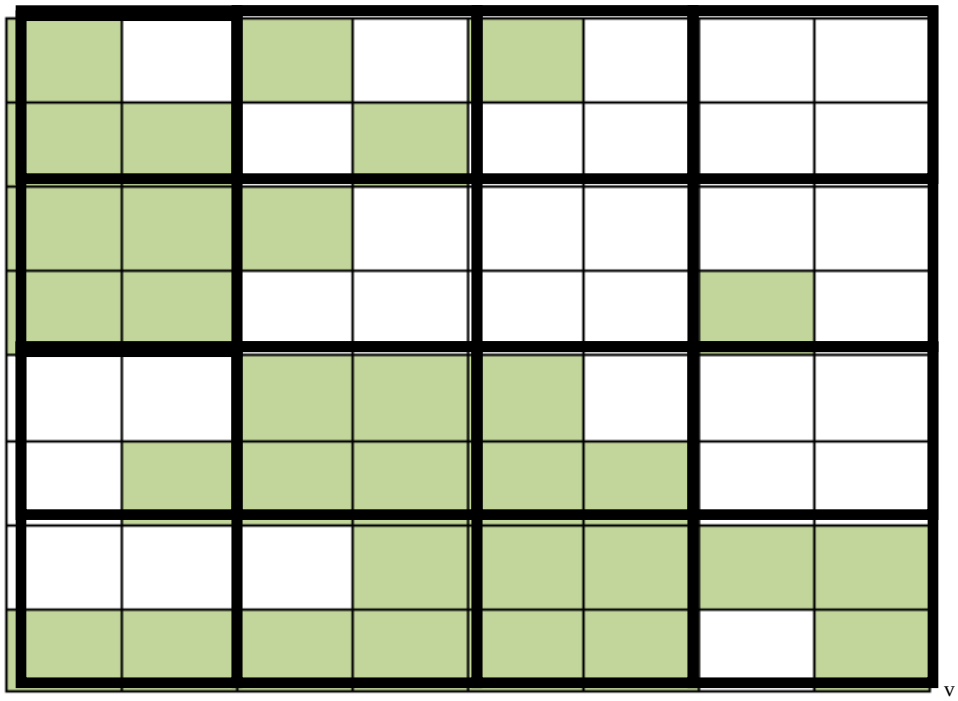
Using Drawing 2 ask an example, determine the total number of voters (64), the number of white squares, or families (32) and the number of green squares, or families (32). Write out the fractions for each of the eight neighborhoods in terms of favoring green ($\frac{7}{8},\frac{3}{8},\frac{1}{8},\frac{1}{8},\frac{3}{8},\frac{7}{8},\frac{7}{8},\frac{3}{8}$) then favoring white $\frac{1}{8},\frac{5}{8},\frac{7}{8},\frac{7}{8},\frac{5}{8},\frac{1}{8},\frac{1}{8},\frac{5}{8}$). Determine the overall number of neighborhoods that voted for green compared to white ($\frac{3}{8}$ green, $\frac{5}{8}$ white). The teacher should take time to break down the situation that the board really intends to represent: an election between two parties, candidates, or groups. The boxes in green represent a group of people that want green to win. The white boxes represent a group of people that want white to win. Ask the students, "How did we change who won -- green or white?" The students should respond that we changed where we drew our lines.

Quickly preface that the process of drawing lines is a contentious discussion in the United States, and that there is not clear responsibility as to who should draw the lines and exactly how they would draw them. Have students watch the video at *youtube.com/watch?v=mnVFu58SHfA* in order to learn a bit more about how the lines are drawn in the state. Teachers can extend this to include information about the current North Carolina Supreme Court case as well.

Multiplying Fractions: The teacher should bring the entire class back to the original example, where we learned that ⅝ of the neighborhoods voted for white. The class will debate if that means ⅝ of the families voted for white, too. The class should decide that ⅝ * 64 families = 40 families that voted for white then compare that to the 32 white squares and realize that these are not equivalent.

Dividing Fractions: After filling out the first two boxes on the activity in Appendix 2, discuss predictions if you split each of the existing neighborhoods in half, creating 16 different neighborhoods. Theoretically, if students divided the previous ⅝ of neighborhoods who voted for white by 2, they would see $\frac{5}{8} \div 2 = \frac{5}{8} \cdot \frac{1}{2} = \frac{5}{16}$ will be guaranteed to be white. If students divided the previous ⅜ of neighborhoods who voted for white by 2, they would see $\frac{3}{8} \div 2 = \frac{3}{8} \cdot \frac{1}{2} = \frac{3}{16}$ will be guaranteed to be white. But then the students will have to consider: $\frac{5}{16} + \frac{3}{16} = \frac{8}{16}$. What will happen to the remaining 8 neighborhoods? Who will they vote for?

Drawing 3



When splitting the neighborhoods up further, green wins $\frac{7}{16}$ neighborhoods. White wins $\frac{7}{16}$ neighborhoods. There is a tie in $\frac{2}{16}$ neighborhoods. The teacher should inquire to students what might happen if there is a tie -- that this does not count positively for either green or white. Explain to students that they will create rules to determine what happens with remainders or tied states in Activity 3.

Summary

Students will have surmised that, even in a completely “fair” election, the power lies whenever the voting districts are drawn. Determining how to create voting districts is one of the most important, and often, misunderstood part of the voting process. They will also have had practice multiplying and dividing fractions, and should have an exemplar for how to do both operations with fractions. This will be evaluated for understanding in their final assessment.

Classroom Lesson and Activity #2 - Converting the Electoral College from Fraction to Decimals

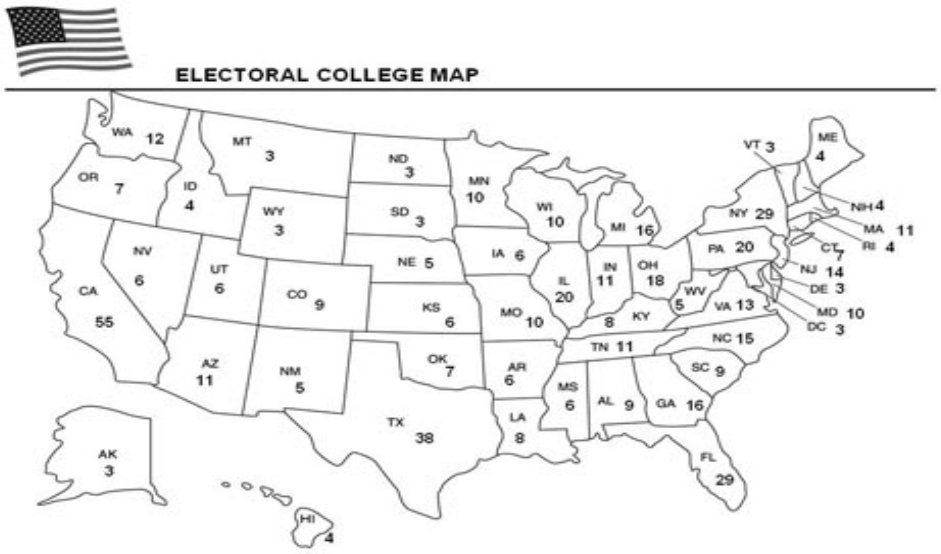
Students can clearly determine which states have the most power by ordering their number of electoral votes from least to greatest. This activity will see exactly how the states compare to one another with the 50 states.

Launch:

Have students fill out a quick quiz about what they know about the United States -- how long it has had independence, how many presidents we have had, what is the voting age, how many states we have, how many electoral votes there are, etc. Use the activity in Appendix 3 to assist with the Launch.

Explore:

The students have figured out that the number of voters certainly impacts the outcome in an election, but the specific state or neighborhood they are in matters as well. Provide students with a map of the electoral college and encourage them to make a chart, as listed below. Assign each student or group of students in the class 5 states to research. Have students compare their answers to create a complete list by the end of the class.



vi

In order to determine the importance of each state, we will convert this fraction to a decimal with a denominator of 538 total votes. Ask students to divide until the hundred thousandth place. If necessary, take a moment to ensure that students all know that the hundred thousandth place is the fifth place to the right of the decimal point. Explain that we will have to compare these decimals later, and therefore will need to know their approximate value beyond the tenths place.

When setting up this division problem, the numerator, or number of electoral votes that students observe on the map, is the divisor. The total number of 9 is the dividend. In the situation of Alabama, students will need to see how many times 538 can be multiplied by and be equal or less than 9 (0). It may be helpful to ask students to write out the approximate factors, as is shown on the left.

1 x 538 = 538
2 x 538 = about 1000
3 x 538 = about 1500
4 x 538 = about 2000
5 x 538 = about 2500
6 x 538 = about 3000
7 x 538 = about 3500
8 x 538 = about 4000
9 x 538 = about 4500
10 x 538 = 5380

```
      0.01672
538 | 9.00000
    -   538
        3620
       -3228
         3920
        -3766
          1540
         -1076
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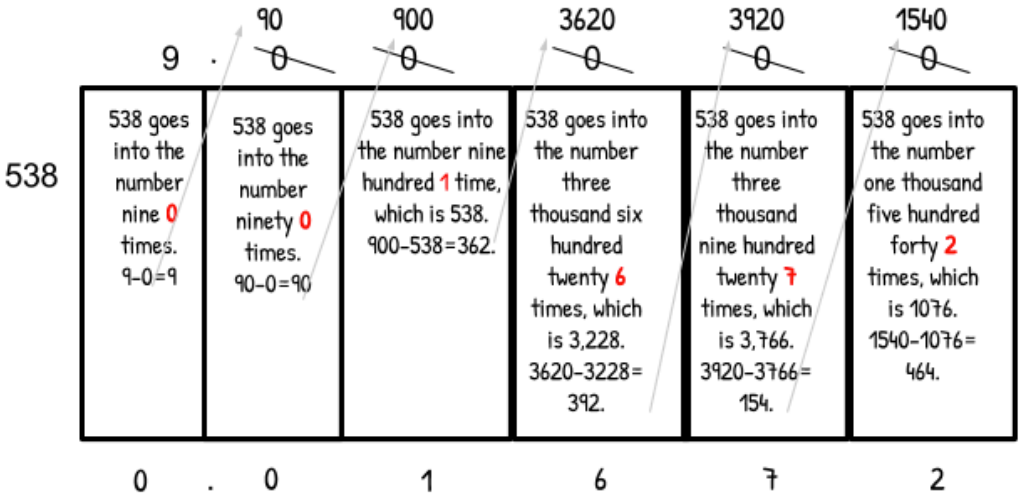
Students may also benefit from using the box, or area, method of division. It is still helpful to list out the approximate factors, as shown above. Using this method, students must

expand 9 to have a hundred thousandths place, 9.00000, as listed below.



State	$\frac{\text{Fraction electoral votes}}{\text{538 total votes}}$	Decimal	Percent
Alabama	$\frac{9}{538}$	0.01672	1.67%
Alaska	$\frac{3}{538}$	0.00557	0.50%
Arizona	$\frac{11}{538}$	0.02044	2.04%
Arkansas	$\frac{6}{538}$	0.01115	1.11%
California	$\frac{55}{538}$	0.10223	10.22%

After recording each of the decimals in the chart in Appendix 3, students should convert these decimals to percent values. They will do so by multiplying their decimal by 100, or by moving the existing decimal place two places to its right, as shown in the exemplar above. Advise the students to use their own judgment with the hundred thousandth decimal point. Strategically question students about what that last decimal point could indicate. Some students will consider rounding up or staying at the existing decimal point. Do not go too in depth with rounding or these remainders- this will come up in the next apportionment activity.

Ask the students to order the five states that they were responsible for from least to greatest. Have the groups discuss which numbers they looked for, and how those values compared to each states' percent, decimal, and fraction values.

Summary:

By the end of this activity, students should feel comfortable converting between fractions, decimals, and percent values. They should also feel comfortable ordering the decimals. They will use their results from this activity to understand the importance of certain swing states' weights and the importance of fractional remainders in the next investigation.

Classroom Lesson and Activity #3 – Apportionment

Launch:

Assign students to work in groups of 2. Elect one student to represent Thomas Jefferson. Elect one student to represent Alexander Hamilton. Explain that Jefferson and Hamilton were archrivals.[vii] Allow students to listen to the clean version of the song "Cabinet Battle #1" from the popular production, *Hamilton* at *https://www.youtube.com/watch?v=1z95rwbNAy0*. This will ensure students are aware that these Founding Fathers had very different opinions.

Explore:

Hamilton believed that if there is a seat that needs apportionment, give the seat to the place with the highest fractional remain. In the example below, the whole integers 14+2+4=20 seats, but there are 21 seats available. Therefore, Hamiltonians will need to compare the remainders: .24, .41, and .35. Because the largest fraction, .41 is from State B, State B will receive that additional seat. Now, 14+3+4=21, so all seats are filled.

State	Population	Quota	Hamilton apportionment
A	7,270,000	14.24	14
B	1,230,000	2.41	3
C	2,220,000	4.35	4
Total	10,720,000	21.00	21

[viii]

In a realistic depiction of 1792, Hamilton gave each state a Standard Quota by $\frac{state\ population}{total\ population}$. Hamilton then gave each state their guaranteed number of seats, which is the whole number integer. This number may or may not have totaled the number of necessary seats. Below is a complete chart for teachers. Do not give the chart below to students. Provide students with the chart in Appendix 4. Have them figure out the total population. Ask each pair of students to find the standard quota without a calculator. Pause after the third column (the

Standard Quota) is entirely filled out to make sure that all students are on track to be successful. Ask students to then fill out the last 3 columns in their partner groups with little teacher support. It is very important for students to be able to compare the Remainders column. Students should be actively how many extra seats they need to allocate (9) and discussing who will get those seats.

State	Population	Standard Quota	Guaranteed Seats	Remainders (Top 9 are bolded)	Modified Quota
Virginia	630560	20.92612668	20	**.92612668**	21
Massachusetts	475327	15.7744751	15	**.7744751**	16
Pennsylvania	432879	14.36577137	14	.36577137	14
North Carolina	353523	11.73221753	11	**.73221753**	12
New York	331589	11.00430319	11	. 00430319	11
Maryland	278514	9.242925728	9	.242925728	9
Connecticut	236841	7.859941592	7	**.859941592**	8
South Carolina	206236	6.844266466	6	**.844266466**	7
New Jersey	179570	5.959313259	5	**.959313259**	6
New Hampshire	141822	4.706586429	4	**.706586429**	5
Vermont	85533	2.838547313	2	**.838547313**	3
Georgia	70835	2.350771035	2	.350771035	2
Kentucky	68705	2.28008363	2	.28008363	2
Rhode Island	68446	2.271488307	2	. 271488307	2
Delaware	55540	1.843182371	1	**.843182371**	2
Total	**3615920**	120	111		120

Jefferson disagreed with Hamilton's method. He argued that Hamilton's method was a "difficult and inobvious doctrine of fractions."[ix] Instead, he has a specific series of steps. It is not entirely as important that students memorize what these steps are as it is it that they eventually recognize there will be a different in outcome between Hamilton and Jefferson's outcomes.

First, Jefferson requires the calculation of the "Standard Divisor," which is calculated as $\frac{total\ population}{number\ of\ seats}$. In 1792, the total population was 3,615,920. There were 120 House seats. Have the students calculate the Standard Divisor (30,132.67).

Next, students must calculate each state's Standard Quota, which is calculated as $\frac{State\ Population}{Standard\ Divisor}$. The teacher should pause to ensure that students have filled out this column correctly before allowing students to fill out the next columns.

After the Standard Quota column is complete, students will need to discuss what the Lower Quota (Guaranteed Seats) column should be. Students should see on their own that the total is only 111, which is 9 fewer than the necessary 120 seats.

At this point, the teacher and students should be on the same page: 9 more seats need to be apportioned. Jefferson claimed that there needed to be a different divisor. The teacher should make it clear that each student should use 28,500 as a divisor.

Give students a few minutes to complete the Modified Divisor column with this information. Then, have the students discuss the Modified Lower Quota column. Students should realize that they apportion all of their seats this way.

State	Population	Standard Quota	Lower Quota (Guaranteed Seats)	Modified Divisor **(28,500)**	Modified Lower Quota
Virginia	630560	20.92612668	20	22.12491228	22
Massachusetts	475327	15.7744751	15	16.67814035	16
Pennsylvania	432879	14.36577137	14	15.18873684	15
North Carolina	353523	11.73221753	11	12.40431579	12
New York	331589	11.00430319	11	11.63470175	11
Maryland	278514	9.242925728	9	9.772421053	9
Connecticut	236841	7.859941592	7	8.310210526	8
South Carolina	206236	6.844266466	6	7.236350877	7
New Jersey	179570	5.959313259	5	6.300701754	6
New Hampshire	141822	4.706586429	4	4.976210526	4
Vermont	85533	2.838547313	2	3.001157895	3
Georgia	70835	2.350771035	2	2.485438596	2
Kentucky	68705	2.28008363	2	2.410701754	2
Rhode Island	68446	2.271488307	2	2.401614035	2
Delaware	55540	1.843182371	1	1.94877193	1
Total	**3615920**	120	111		120
Number of House Seats	**120**				
Standard Divisor	**30132.66667**				

Summary:

By the end of this lesson, students should have completed several long division problems and analyzed their remainders. The teacher should review the differences in the plans, but also take a moment to compare the differences in outcomes. Ask the students if they think it is a coincidence that Virginia, Jefferson's home state, gets an additional seat under his apportionment method.

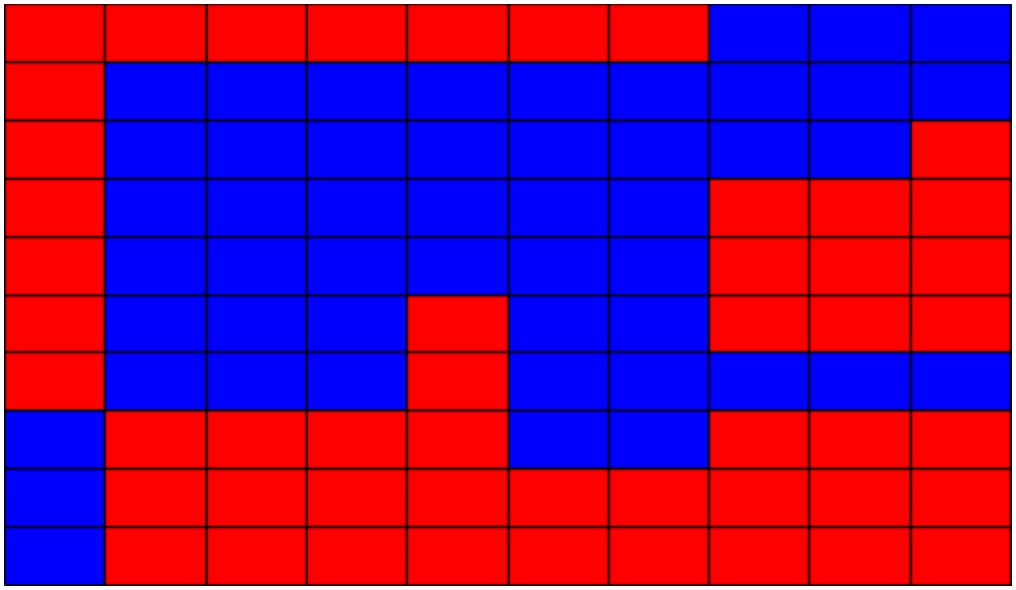
Assessments

Students will create an election portfolio with tasks to ensure that either Hillary Clinton or Donald Trump win the 2016 presidential election. Students will not know whose campaign they are working for prior to receiving their assessment. The teacher will provide each student with this series of checklists, clarify what each task means, and then tell each student for which campaign they are managing.

Task 1:

Blue represents voters in Charlotte, North Carolina who favor Hillary Clinton. Red represents the voters who favor Donald Trump. Each box represents the exact same number of voters. There are 1,000,000 people in Charlotte.

1. Can your candidate win? Explain using a complete sentence.
2. The voting districts have not been set yet. Write a complete sentence to explain a strategy of drawing voting lines that would best help your candidate. You may supplement your explanation by annotating the picture below.



Task 2:

x

State	$\frac{Fraction\ of\ votes}{538\ electoral\ votes}$	Decimal	Percent
New Hampshire			
Minnesota			
Wisconsin			
Michigan		0.02973978	
Florida		0.05390335	
Pennsylvania			3.7174%

1. The states above were “Swing States” – states that were won by a candidate by a very small margin -- in 2016. Order the states with the most electoral votes from greatest to least. Show your thinking by using the chart above.
2. The election is only 1 week away. Pick three states you will campaign in. Explain your reasoning.

Task 3

You are a campaign manager trying to limit your opposition's weight. Using your notes about Hamilton and Jefferson's apportionment methods to complete the chart and answer the question below.

	Hillary Clinton's States			Donald Trump's States		
	California	New York	Illinois	Texas	Ohio	North Carolina
State Population	37,253,956	19,378,102	12,830,632	25,145,561	11,536,504	9,535,483
US Population	250055734	250055734	250055734	250055734	250055734	250055734
Total Electoral Votes	538	538	538	538	538	538
Approximate # of Seats under Hamilton's method						
Current Number of Seats in the Electoral College	55	29	20	38	18	15

1. Complete the table above.

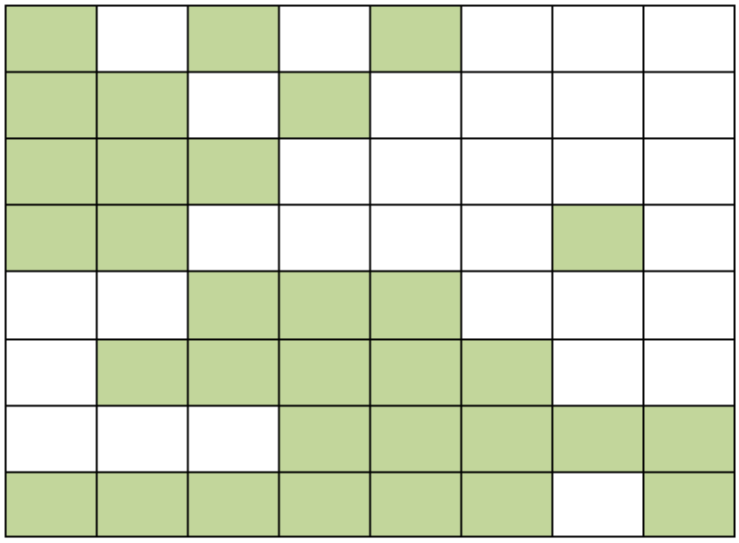
2. Consider your candidate, and which states they are likely to win already. Does the current system benefit your candidate? Would Hamilton's method benefit him/her more? Explain.

Appendix 1- Teaching Standards

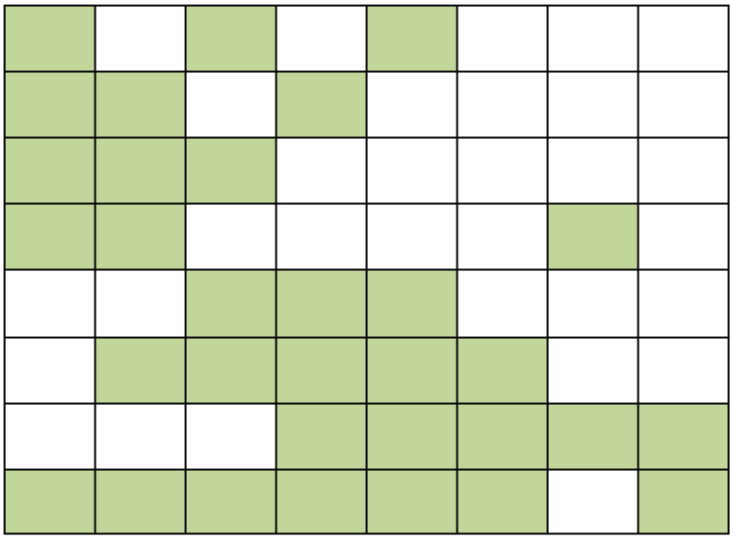
Standard	Description
Math 7.NS.1	Add and subtract rational numbers.
Math 7.NS.2	Multiply and divide rational numbers.
Math 7.NS.3	Solve real-world problems involving rational numbers and order of operations.
Social Studies 7.C&G1.4	Compare sources of power and authority.

Appendix 2

Directions: Divide the squares below in 8 different ways. There should be 8 squares in each group. The squares must be touching. Can you group the squares so the green squares win?



Now, separate the squares into 16 different groups of 4 squares. Can you make green win?



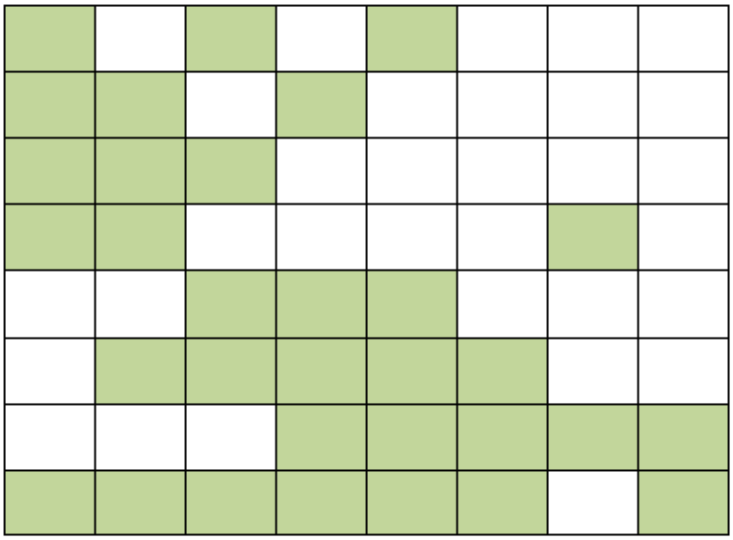
Exploration:

1) What is gerrymandering?
2) How did we just use gerrymandering?
3) If each square represents one family who all votes the same way, how many families are there?
4) If each box you drew represents one neighborhood, how many neighborhoods are there?

	Prediction	Actual Outcome	Was your prediction the same as the actual outcome?
Drawing 1 - Number of neighborhoods who voted for green			
Drawing 1 -Number of neighborhoods who voted for white			
Drawing 2- Number of neighborhoods who voted for green			
Drawing 2- Number of neighborhoods who voted for white			
Drawing 2- Number of ties			

Draw your own lines, then answer the following:

1) Could you draw any neighborhoods that all voted for the same color?
2) How many neighborhoods voted for green?
3) How many neighborhoods voted for white?



Appendix 3

Launch:
1) What year did the United States become independent?
2) How many years has the United States been its own independent country?
3) What is the legal voting age in the United States?
4) How many states are in the United States?
5) How many territories are in the United States?
6) How many people have been president of the United States?
7) How many electoral votes are there in United States elections?
8) Which state has the most electoral votes? How many electoral votes does it have?
9) How many senators are in the United States?
10) How many people are in the United States House of Representatives?

Exploration:
Fill in the chart below. Discuss your findings with your partner.

State	$\frac{\text{Fraction electoral votes}}{\text{538 total votes}}$	Decimal	Percent

Appendix 4

Hamilton's Method

State	Population	Standard Quota	Guaranteed Seats	Remainders (Top 9 are bolded)	Modified Quota
Virginia	630560				
Massachusetts	475327				
Pennsylvania	432879				
North Carolina	353523				
New York	331589				
Maryland	278514				
Connecticut	236841				
South Carolina	206236				
New Jersey	179570				
New Hampshire	141822				
Vermont	85533				
Georgia	70835				
Kentucky	68705				
Rhode Island	68446				
Delaware	55540				
Total					120

Jefferson's Method

State	Population	Standard Quota	Lower Quota (Guaranteed Seats)	Modified Divisor **(28,500)**	Modified Lower Quota
Virginia	630560				
Massachusetts	475327				
Pennsylvania	432879				
North Carolina	353523				
New York	331589				
Maryland	278514				
Connecticut	236841				
South Carolina	206236				
New Jersey	179570				
New Hampshire	141822				
Vermont	85533				
Georgia	70835				
Kentucky	68705				
Rhode Island	68446				
Delaware	55540				
Total					120
Number of House Seats	**120**				
Standard Divisor					

[i] Nations Report Card (2014)
[ii] Wasserman, D., Flinn, A. (2017)
[iii] Bennett, J., Briggs, W. (1998)
[iv] Bennett, J., Briggs, W. (1998)
[v] Bennett, J., Briggs, W. (1998)
[vi] Education World (2012)
[vii] Young, H. Peyton (2004)
[viii] Young, H. Peyton (2004)
[ix] Young, H. Peyton (2004)
[x] Education World (2012)

Bibliography

Bennett, J., and Briggs, W. *Using and Understanding Mathematics: A Quantitative Reasoning Approach.* Boston, MA. Pearson Publishing. 1998. This source provided a starting point into the initial fairness activity. I modified it in order to fit into the rational thinking exercises.

Campbell, J., Norpoth, H., Abramowitz, A., Lewis-Beck, M., Tien, C., Campbell, J., Cuzán, A. (2017). A Recap of the 2016 Election Forecasts. *PS: Political Science & Politics,*. This article gives direct numbers regarding the election in its recap. I am on the lookout for the election numbers, and this article has a nice summary.

Ceaser, James W., Andrew Busch, and John J. Pitney. 2017. *Defying the odds: the 2016 elections and American politics*. While this analysis is quite concise, I can use the excerpt describing the congressional data as a basis for my students to understand the overall electoral college and voting theory.

Dowd, Maureen. 2016. *The year of voting dangerously*. This book describes some of the thought processes of voters for either candidate. I will use some of the research Dowd has completed in my surveys and labsheets.

Education World. 2012. *Electoral College Map Template.* This map is a fantastic visual and will be rendered in different activities.

Gill, Jeff. 2006. *Essential mathematics for political and social research*. Cambridge: Cambridge University Press. Although this text is not particularly current, it provides several reminders for myself in regards to the mathematics I will use. I will be aggregating a lot of local and national data to instruct my students and will use this text to ensure its accuracy.

Ginsberg, Alice E. 2012. *Embracing risk in urban education: curiosity, creativity, and courage in the era of "no excuses" and relay race reform*. Lanham, Md: Rowman & Littlefield Education. This book produces an impressive case study about a high school designated to Peace and Social Justice. It highlights several curriculum strategies and student-driven sections. I will definitely be considering the examples in this book on a smaller scale for my own curriculum.

Korostelina, K. V. 2017. *Trump effect*. This book identifies some of the shortcomings of not engaging in political discourse with voters of different ideologies, an issue many of my students are already facing. Although they are diverse in gender and religion, most of them were shocked when Trump was voted into office. Excerpts of this book will encourage them to go beyond the hypotheticals and engage in the data - the exact purpose of this curriculum unit.

Meko, T., Lu, D., Gamio, L. 2016. *How Trump Won the presidency with razor-thin margins in swing states.* The Washington Post. This article highlighted 2016 presidential election data that was helpful for creating the end assessment.

Moore, John Norton. 2016. *The presidential debates: issues and questions for the 2016 elections and beyond*. This book is a launching point for me. I plan to extract certain issues these authors found critical to the 2016 election, and use them to cross-reference the lab sheet. This might look like determining key issues within foreign policy, isolating a single survey question about foreign policy, and cross-referencing it with who voted in the 2016 election and for which candidate.

Morris, Dick, and Eileen McGann. 2016. *Armageddon: how Trump can beat Hillary*. This book details all of Hillary Clinton's vulnerabilities. Although her opponent had his own political risks, this book describes projections for Hillary's loss. I can use some of the theories in the labsheet or potentially ideas for surveys.

Morrissey, Ed. 2016. *Going red: the two million voters who will elect the next president--and how conservatives can win them*. This book narrowed down a lot of my research. I will directly cite statistics from this book and utilize some of the thought processes Morrissey uses in a student-facing labsheet.

Nations Report Card. 2014. *2014 Achievement Levels*. https://www.nationsreportcard.gov/hgc_2014/#history/achievement.

Parham-Payne, Wanda. 2017. *The intersection of race and gender in national politics*. This 2017 book explores and analyzes disenfranchised populations through US history. This will provoke questions I will directly ask my students and extends my own questions.

Samuels, Robert. 2016. *Psychoanalyzing the Left and Right after Donald Trump: Conservatism, Liberalism, and Neoliberal Populisms*. Cham: Springer International Publishing. http://public.eblib.com/choice/publicfullrecord.aspx?p=4714269. This book argues some very unique points, including the role of narcissism in the role of the election. On an eventual classroom activity, this might look like a survey scale of voters' perceptions of themselves using a Likert scale, then comparing that data with if they voted and for whom they voted.

Schools, North Carolina Public. 2012. *North Carolina Standard Course of Study in 7th Grade Mathematics.* http://www.ncpublicschools.org/docs/curriculum/mathematics/scos/7.pdf

Schools, North Carolina Public. 2013. *North Carolina Standard Course of Study in 7th Grade Social Studies.* http://www.ncpublicschools.org/docs/curriculum/socialstudies/scos/unpacking/7th.pdf

US Census Bureau. 2010. *2010 Population Finder*. This source provided information for state population, which assisted in the apportionment project.

Wasserman, D. and Ally Flinn. 2017. *Introducing the 2017 Cook Political Report Partisan Voter Index.* http://cookpolitical.com/introducing-2017-cook-political-report-partisan-voter-index

Young, H. Peyton. 2004. *Fairness in Apportionment.* US Census Bureau Symposium. This article gave engaging explanations as to the differences between Hamilton and Jefferson's apportionment methods.