Elementary Math From The 2020 Presidential Election

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Abstract

This lesson is a "spin-off" to a high-school lesson that we recently shared in this journal (Izard & Cloft, 2023); however, the lesson shared here is intended for 4th grade. We wanted to continue the conversation about how to make mathematics more meaningful and relevant for our students by considering ways of bringing real-world events into our classrooms, and we specifically wanted to consider what this could look like in an elementary classroom.

Keywords: Elementary Math, Estimation, Rounding, Election, Civics

1 Introduction

If you have seen *Love Actually*, you might sing these words as you read them: "~~Christmas~~ Math is all around me, and so the feeling grows. It's written in the wind, it's everywhere I go. So if you really love ~~Christmas~~ math, come on and let it ~~snow~~ grow." As fellow math enthusiasts and educators, we hope you find our re-writes an upgrade!

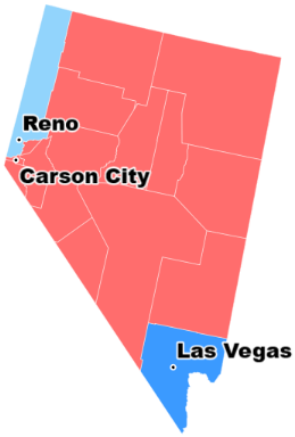
As silly as our jingle is, we see a connection: Math is all around us, it's everywhere! Even more importantly, math can be used to understand the world around us, specifically issues of social justice, politics, and other aspects of society (Izard, 2018; Gutstein & Peterson, 2006). While many of us often find ourselves in classrooms with students who struggle to see the value and relevance of the subject, we believe we can change this mentality by showing students how math can be used to make sense of important societal issues. We hope this approach helps create informed citizens who use mathematics to better understand the world.

In this article, we suggest a lesson that brings these ideas to light. As a means to continuing this conversation, we welcome feedback on the lesson and details of its implementation if others decide to try it with their students.

2 The Lesson

This past 2020 presidential election was fraught with mathematics, and we recognized there was an opportunity to bring aspects of the election into the work we do with elementary students. The election season was overwhelmed by simplistic maps that showed each state broken into blue and red areas with little context. We were interested in Nevada, because while the map results (see Figure 1) seem to indicate that Donald Trump won the state, Joe Biden was the winner, making for an interesting mathematical activity. For more information about the results from Nevada, see this link. We would like to note that we observed other states (e.g., Minnesota and Wisconsin) that looked like this too, but we decided to focus on Nevada because the numbers were smaller and more manageable to work with. This map of Nevada was also part of the high school lesson that we created (Izard & Cloft, 2023), and it serves as the main focus of this elementary lesson too.

Figure 1: Map of the 2020 Nevada Presidential Election results. Red represents Republican-held districts, while blue indicates Democratic Party victories (CNN, 2020).



This lesson is broken into 3 sections: a launch, exploration, and discussion that brings it all together. In the sections below, we describe how this lesson could be implemented in a 4th-grade classroom.

3 Launch

First, we suggest beginning this lesson by letting students know that they will be asked to discuss and analyze the 2020 presidential election. Then, show them the map results from the state of Nevada (see Figure 1). Explain that the map shows counties within the state; the red counties had more votes for Donald Trump while the blue counties had more votes for Joe Biden. The winner of the state was the candidate with the most total votes in the entire state.

Next, ask students "What do you notice or wonder about this map." Provide 2 minutes to think independently, then another 2-3 minutes for students to talk with a neighbor. You may hear statements like, "It looks like Donald Trump won," "I wonder how close it was," "There is more red on the map," and "I wonder how many people live in each county."

After spending some time discussing these observations as a whole class, say something like, "Which of these questions can we find answers to using math? What information would we need?," encouraging students to want to know the number of votes in each county in order to determine which candidate won the state.

4 Exploration

The launch can lead into the exploration in which students work in small groups on the handout in the Appendix. The handout provides students with the number of votes in each county for Biden and Trump, and students are asked to round in order to estimate the total number of votes for one of the candidates (you can assign groups to either Biden or Trump). This is working toward a 4th grade Common Core Mathematics Standard (4.NBT.A.3: Use place value understanding to round multi-digit whole numbers to any place). We purposefully keep these instructions broad, not telling students which place value to round to. This is because we want students to use different strategies, like rounding to the nearest ten, hundred, or even thousand, depending on what they prefer for each county. This will create a more interesting discussion in the "Bringing it all together" part of the lesson, because students will have different answers and can share their reasoning for rounding to certain place values.

Once students have an estimate of the total number of votes, they are asked to check their estimate with a calculator (or, if you prefer, you can simply provide them with the total). Then, they should determine how many votes their estimate was off by and explain why they think their estimate fell above or below the actual number of votes. If students finish the task early, you could ask them to apply a different rounding strategy to find a more accurate estimate, anticipate mistakes that others could make, or estimate and round the number of votes for the other candidate.

5 Bringing it All Together

Likely, different rounding strategies were used, so once everyone is ready, select certain groups, with varying strategies, to present their work. Have students look for connections across the strategies—maybe some groups rounded certain numbers up while others rounded down, some may have rounded to the nearest tens, hundreds, or thousands, etc. Encourage conversation about why we round in certain ways and what we should keep in mind when rounding and estimating. For example, if we want a more precise answer, then we might round to a smaller place value. Alternatively, if we are looking for a quick answer, then we might round to a larger place value that makes adding easier. Further, the specific number you are looking to round may impact the place value that you round it to. For instance, if a particular number is close to the nearest thousand, then you might round that number to the nearest thousand instead of the nearest ten or hundred. This could be the case for Clark country which had 430,930 votes for Donald Trump (someone might round this number to 431,000, the nearest thousand, because it is so close to that number).

After this discussion, now that students see the total number of votes within the state for each candidate, ask them to individually complete the following sentences:

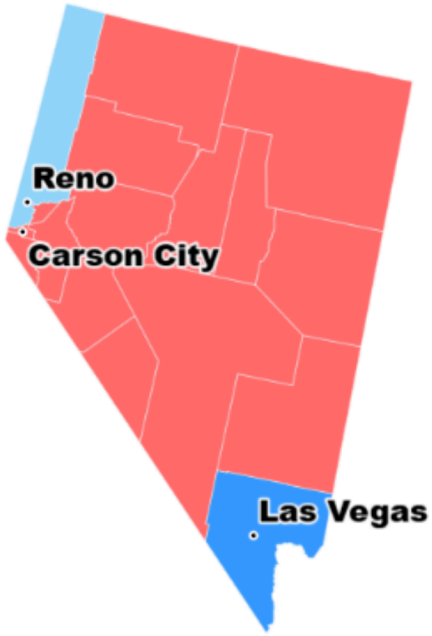
1. The winner of the state of Nevada was _____ because ...
2. I still wonder ...

After students individually complete those sentences, have them turn and talk to a neighbor about what they wrote. This can lead into a discussion in which students notice that Joe Biden had more votes than Donald Trump. They might be surprised because this does not match what they expected from the image of the map. More discussion can help them unpack this. Try asking the question, "How is it possible that Joe Biden won when the map makes it seem like Donald Trump won?" The key here is for students to realize that the blue areas on the map had bigger numbers (and were more populated) than the red areas on the map (which had fewer people that were more spread out).

Finally, and perhaps more importantly, discuss the 2020 election. This might be uncomfortable given the polarizing nature of the election; however, the purpose of this conversation is not to discuss political views, but rather to discuss how mathematics helps us understand important events in society. You could discuss that sometimes when we watch election results come in, we can be confused–like with Nevada–about how a state had more votes for one candidate when an image or picture makes it look like something else happened. You could even bring the maps of Minnesota and Wisconsin into the discussion to provide other examples of this, and acknowledge that when we use mathematics to make sense of these images–like in this lesson–we can get a more full understanding of the situation. Further, if students are curious about how winning one state can lead to winning the presidency, you could incorporate a brief civics lesson about the Electoral College (and this is a good resource for informing this discussion). As mentioned, we understand these kinds of conversations can be difficult and challenging, which we will address in the next section.

You can end the lesson with an exit ticket (see Figure 2) that allows students to reflect on what they learned.

Figure 2: Exit ticket.



County	# of votes for Biden	# of votes for Trump
Washoe	128,128	116,760
Humboldt	1,689	5,877
Elko	4,557	16,741
Pershing	547	1,731
Lander	496	2,198
Eureka	105	895
White Pine	859	3,403
Storey	902	1,908
Lyon	8,473	20,914
Douglas	11,571	21,630
Churchill	3,051	9,372
Mineral	829	1,423
Nye	7,288	17,528
Lincoln	330	2,067
Esmeralda	74	400
Carson City	12,735	16,113
Clark	521,852	430,930
Total	703,486	669,890

1. *What did you learn from the math we did today?*
2. *In what ways do you now see the map differently? Use the numbers to support your thinking.*

6 Final Thoughts

While we believe that math can be used to understand important issues in society, and we want students to see and experience math tasks that exemplify this idea, we want to acknowledge that this can be challenging for teachers. Even teachers who want to bring these tasks into their classroom may experience discomfort when attempting these types of lessons, especially given the currently climate in which "35 states have introduced 137 bills limiting what teachers can teach with regard to race, American history, politics, sexual orientation and gender identity" (Gross, 2022). As such, below we share some ideas for becoming more comfortable teaching these types of lessons.

1. At the beginning of the year, establish norms for discussing difficult topics. In our high school lesson (Izard & Cloft, 2023), we share suggestions from the University of Michigan Center for Research on Learning and Teaching (n.d.) for establishing expectations when discussing controversial and emotionally-charged issues within the classroom. Teachers are encouraged to create ground rules for students that include listening actively and respectfully, criticizing ideas rather than individuals, avoiding blame and inflammatory language, allowing everyone to speak, and avoiding assumptions. Working with students to create these ground rules at the beginning of the year, and coming back to them throughout the year, will support these types of lessons. Specifically, in the launch of this lesson, it could be helpful to remind students of these expectations.

2. The University of Michigan Center for Research on Learning and Teaching also suggests that you identify a clear purpose of the lesson when discussing difficult or high-stakes topics. They say "starting a discussion with clearly articulated objectives can help shape the nature of the discussion and link it to other course goals." At the beginning and end of this lesson, you could discuss why you are doing this lesson (i.e. it allows us to practice rounding and see how mathematics can be used to understand important societal events).
3. As the teacher, we suggest you maintain a neutral, apolitical stance when teaching these types of lessons. Keeping your personal views to yourself will allow students the space to come to their own conclusions based on the facts, activities, and discussions.
4. At the beginning of the year, talk with parents about the types of lessons you will bring into the classroom and your reasons for bringing these lessons in. Let them know that you will always stay neutral and not tell students what to think; instead, you will let them share and come to their own conclusions. If a parent ever reaches out with a concern about a particular lesson, be prepared to share details of that lesson. Being transparent and showing parents the kinds of activities and tasks that you are completing with students might calm their nerves. With that said, these conversations with parents can sometimes be challenging, and it could help to have the support of an administrator.
5. Bring books and stories into your classroom that provide different perspectives and allow for discussion about ideas that students might not agree with. This way, students can practice these types of conversations within the context of stories or characters.
6. Reach out to colleagues for support. For example, collaborating with a history teacher could be helpful, as they might have insight into how to navigate these types of lessons with students.

We do not have all the answers here, but these are some ideas for becoming more comfortable teaching about important societal issues. Ultimately, we hope that the more we all do this work, the more comfortable we will become. We also hope that a shared dialogue about these ideas will provide further support for each other; therefore, please reach out with questions, comments, ideas, and feedback!

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APPENDIX

Student Handout/Worksheet

Name: _____

County	**# of votes per county for Biden**	**# of votes per county for Trump**	**Use rounding to estimate the total # of votes for Biden or Trump. You may decide which place value you would like to round to for each county.**
Washoe	128,128	116,760	
Humboldt	1,689	5,877	
Elko	4,557	16,741	
Pershing	547	1,731	
Lander	496	2,198	
Eureka	105	895	
White Pine	859	3,403	
Storey	902	1,908	
Lyon	8,473	20,914	
Douglas	11,571	21,630	
Churchill	3,051	9,372	
Mineral	829	1,423	
Nye	7,288	17,528	
Lincoln	330	2,067	
Esmeralda	74	400	
Carson City	12,735	16,113	
Clark	521,852	430,930	
Total			

Now that you have an estimate for the total number of votes, use a calculator to check your answer. Then, answer the questions on the back.

a) What is the exact number of votes that your candidate received?

b) How many votes was your estimate off by? You may use a calculator for this question.

c) Was your estimate above or below the actual number of votes? Why do you think it fell above or below? Be specific.

You can stop here. We will complete the next section together as a class.

	Votes for Biden	Votes for Trump
Total		

Complete the following sentences:

1. The winner of the state of Nevada was _____ because…
2. I still wonder…