

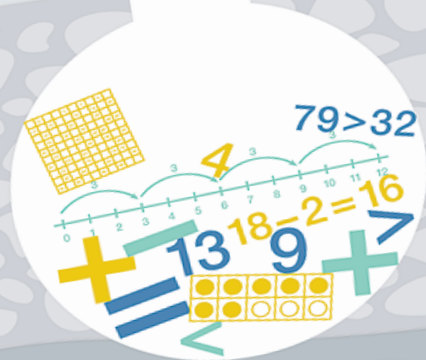
# MINE THE GAP

FOR MATHEMATICAL UNDERSTANDING

Common Holes and Misconceptions  
and What To Do About Them



John SanGiovanni



CM CORWIN  
MATHEMATICS

GRADES K-2

*Thank you*

FOR YOUR  
INTEREST IN  
CORWIN

Please enjoy this complimentary excerpt from Mine the Gap for Mathematical Understanding, Grades K-2, by John SanGiovanni.

[LEARN MORE](#) about this title!

CORWIN

# BIG IDEA 10

## Number Relationships Through Number Lines

### TASK 10A

Use the number on the number line to identify the missing numbers.



Tell how you found the numbers for one of the number lines.



#### MODIFYING THE TASK

We can modify the task by changing the three-digit numbers in this task to similar two-digit numbers.

### About the Task

Understanding number relationships is critical for developing number sense. We develop these relationships in many ways. One way is to consider number locations on number lines and how positions change as endpoints on number lines change. *In this task, students are presented with different numbers that are halfway between two unknowns.* Students establish the unknowns based on a relationship that they understand.



### PAUSE AND REFLECT

- How does this task compare to tasks I've used?
- What might my students do in this task?



Visit this book's companion website at [resources.corwin.com/minthegap/K-2](https://resources.corwin.com/minthegap/K-2) for complete, downloadable versions of all tasks.



## WHAT THEY DID

### Student 1

Student 1 makes jumps of one and counts on or counts back to find the endpoints. This is an acceptable strategy for finding the endpoints. It does imply that she has had limited exposure to number lines or work with number relationships. We should note that her count on strategy does not work in the first prompt and when she has to “wrap around” a century in the second prompt. This indicates counting difficulties. Her writing is blank, but it is unnecessary because her jumps communicate her approach.

### Student 2

Student 2 indicates a relationship between the known number and adjacent hundreds. She explains that the number is between the hundreds. She is correct that the numbers are between the noted hundreds. However, her endpoints show limited understanding of how number lines represent relationships between numbers.

## USING EVIDENCE

### *What Would We Want to Ask These Students? What Might We Do Next?*



#### MINING TIP

We can modify a traditional hundred chart to represent any group of a hundred (i.e., 501–599, 701–799, or 301–399).

### Student 1

Student 1 shows some foundational understanding of number lines. In time, she will need opportunities to work with open number lines. But, this should happen after other number concepts are further developed. She shows need for work counting on with larger numbers, especially in situations that count around a century. She will benefit from connecting work with number lines to *physical models and hundred charts*. She also needs opportunities to skip-count and talk about how numbers are related.

### Student 2

Student 2 needs opportunities to work with numbers and their proximity to other numbers. We can ask if a number is closer to one number or another. We need to develop ideas about benchmarks and give opportunities to notice the patterns within skip-counts. It may be that as she skip-counts, she is recalling the pattern through rote memory rather than an understanding of one more, 10 more, and so on. We may also consider first working with benchmark endpoints (0 and 100) or (100 and 200) and discussing where different numbers would be placed on the number line.

**TASK 10A:** Use the number on the number line to identify the missing numbers. Tell how you found the numbers for one of the number lines.

### Student Work 1

Use the number on the number line to identify the missing numbers.

Tell how you found the numbers for one of the number lines.

---



---



---



---



---



---

### Student Work 2

Use the number on the number line to identify the missing numbers.

Tell how you found the numbers for one of the number lines.

I found 100s because after the numbers than you get a new 1, 10, or 100 when you add or count so this is how I got 100s.

---



---



---



---



## MINING HAZARD

Student 4 changes the interval. We can hope that it is attributed to refined understanding. It is also possible that the midpoints prompted a different skip-count. 495 may prompt a skip-count/relationship of fives more so than a midpoint of 493, 497 or 320.

## WHAT THEY DID

### Student 3

Student 3 accurately completes the task. She finds 100 more and 100 less for each number on the number line. She explains her approach of counting forward and backward. She notes that doing it with hundreds makes it easy.

### Student 4

Student 4 finds accurate endpoints by changing the interval on each number line. She accurately explains how she did it. Her work encourages us that *she has a further refined understanding* of the relationship between numbers and representations of those numbers on a number line.

## USING EVIDENCE

### *What Would We Want to Ask These Students? What Might We Do Next?*

### Student 3

Student 3 seems to understand the relationship between numbers fairly well. We need to determine if this understanding only applies to 100 more and 100 less. We can ask what might happen if one endpoint was 5 more or 20 more. We might even ask if the location of the number will change if represented on a new number line that is 5 more or 20 more. For example, we could ask, “Would 320 still be in the middle if the endpoints are 315 and 325?” Her work may be attributed to limited understanding of number relationships or she may be taking a simple yet effective approach to completing the task.

### Student 4

Student 4’s work is encouraging. As noted in the “Mining Hazard,” her ideas may be indicative of refined thinking or the result of the actual numbers used within the prompt. To further investigate this, we can provide a modified task with varied midpoints. Good options may include numbers that aren’t multiples of 5 or 10. It would also be interesting to see how she responds to a midpoint that is a multiple of 100. Would she show endpoints that are adjacent hundreds?

**TASK 10A:** Use the number on the number line to identify the missing numbers. Tell how you found the numbers for one of the number lines.

### Student Work 3

Use the number on the number line to identify the missing numbers.

Tell how you found the numbers for one of the number lines.

I for each one I just took the numbers 100 backwards to make it easy. I also went forwards.

---



---



---



---

### Student Work 4

Use the number on the number line to identify the missing numbers.

Tell how you found the numbers for one of the number lines.

I put 330 and 310 because I did ten more and ten less than 320.

---



---



---



---

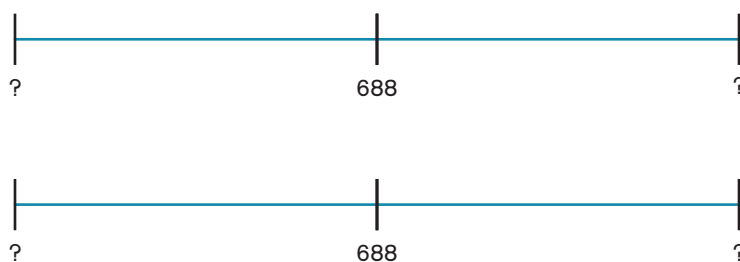
## OTHER TASKS

- What will count as evidence of understanding?
- What misconceptions might you find?
- What will you do or how will you respond?



Visit this book's companion website at [resources.corwin.com/minethegap/K-2](https://resources.corwin.com/minethegap/K-2) for complete, downloadable versions of all tasks.

**TASK 10B:** 688 is the middle for each number line but each number line has different endpoints. What numbers could the ? represent on each number line?



Tell how you found the numbers for one of the number lines.

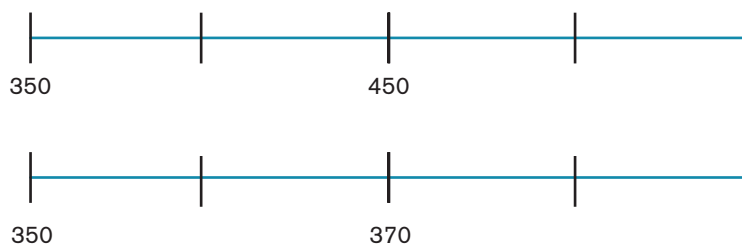


### MODIFYING THE TASK

The number provided as the midpoint can be changed to a single-digit, two-digit, or larger number.

*This task requires students to consider how different numbers relate to 688.* Unlike the first task, 688 is placed on both number lines and students are prompted to find different endpoints. Any reasonable endpoints should be accepted as evidence of understanding. Endpoints of 0 and 1,000 and 687 and 689 signify misunderstanding and/or limited understanding. We can develop students' understanding of varied relationships by building it into our daily number routines. We can pose activities that reinforce skip-counting, 10 more/less, 100 more/less, and eventually more complex relationships.

**TASK 10C:** Both number lines start with 350. The missing numbers are different on each number line.



Tell how you found the numbers for one of the number lines.

Task 10C provides a starting point and another location for students to determine the interval on the number line. Both number lines begin with 350, although one is partitioned by intervals of 50 and the other by intervals of 10. Students may



show skip-counts of different intervals because they cannot determine the missing amount. Others may count on by ones. Students are asked to explain how they found the intervals. Simply labeling the intervals with appropriate numbers should be considered a sound justification.

**TASK 10D:** Write the missing numbers on each number line.



Each number line in this task is partitioned in the same way. They show the same number of tick marks. Students will identify the tick marks with varied numbers as they may count by ones, twos, fives, tens, or more. We should look for students who use the same counting interval throughout. This doesn't signify student misunderstanding, although it may show limited understanding. We can prompt students who complete the task in this fashion to vary their intervals. This task is a good opportunity for pairs or groups of students to complete and then come together as a class to share ideas. This process allows students to observe various approaches to finding missing numbers on these number lines.