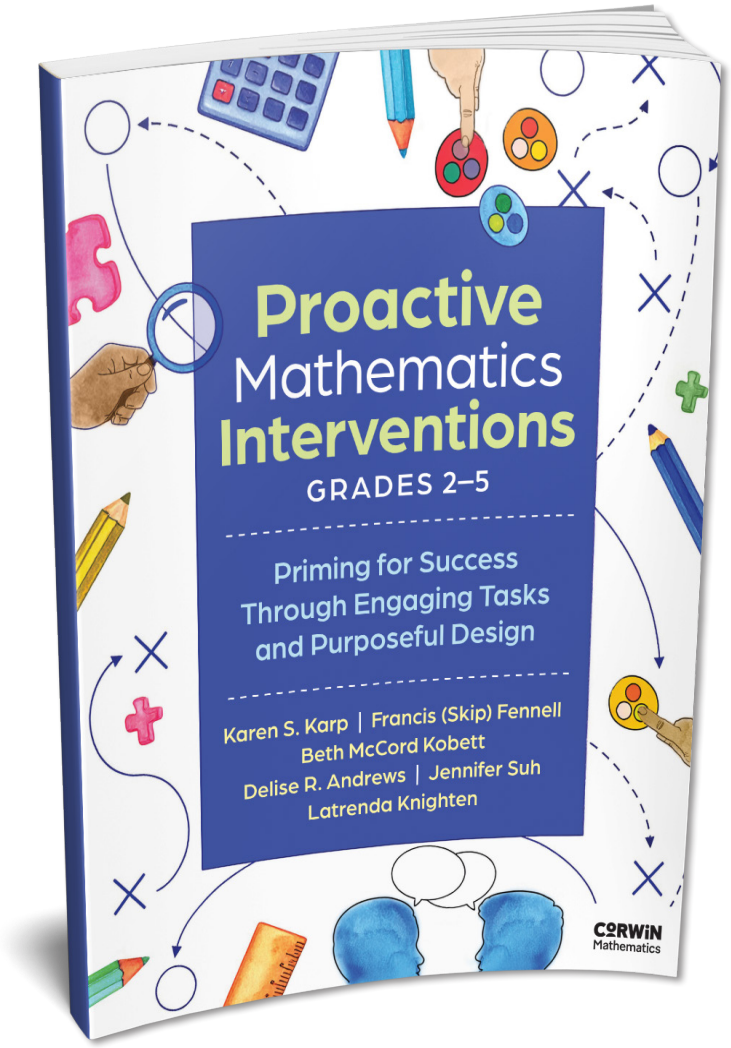

Thankyou

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CORWIN

Please enjoy this complimentary excerpt from Proactive Mathematics Interventions, Grades 2-5.

LEARN MORE about this title!

CORWIN

What's the Difference?

TASK 5

General Objective:

Students will develop understanding of regrouping in subtraction problems.

This activity might be used with:

Students who can (prerequisite knowledge):	**Students who are Primed to** (getting ready to learn):
• describe the relationship between adjacent place values • use models to solve subtractions within 10 • build a number using place value blocks	• subtract with two-, three-, or four-digit numbers • regroup (grouping and ungrouping) in subtraction

Materials:

- Jumbo-sized place value trading chart made on disposable plastic tablecloth or butcher paper (see PRINTABLE directions).
- Place value blocks. If possible, make two colors of place value blocks available for Variation 2.
- PRINTABLE: Place Value Mat
- PRINTABLE: Directions for Making a Jumbo Place Value Chart
- PRINTABLE: Place Value Cards
- PRINTABLE: Take From Mats (suggest laminating so students can use dry-erase markers)
- PRINTABLE: Compare Mat (suggest laminating so students can use dry-erase markers)

Recommended Children's Literature:

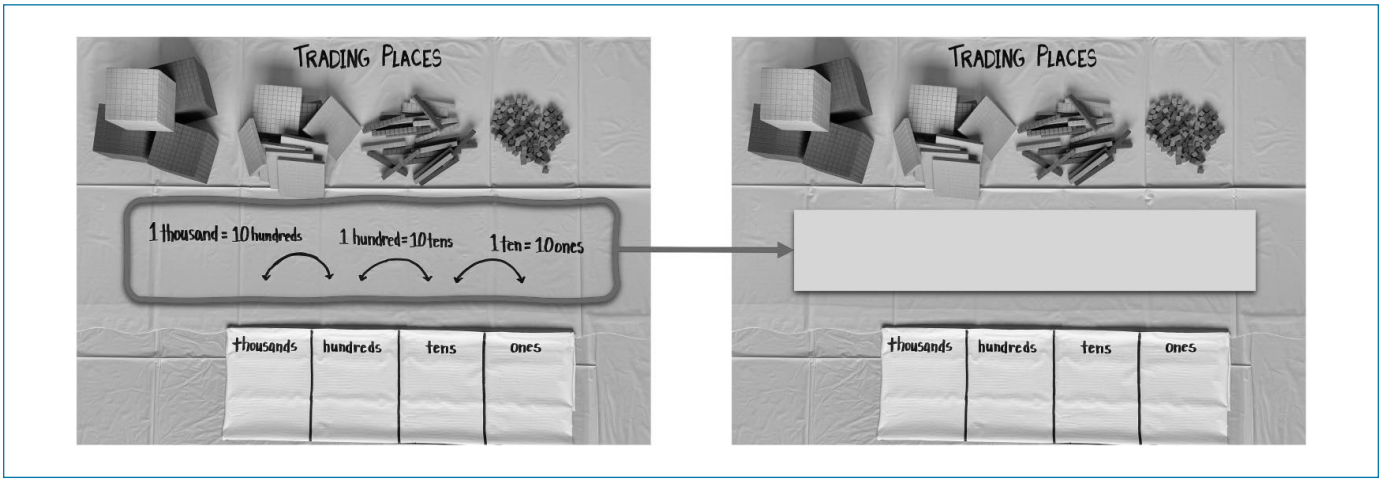
- *17 Kings and 42 Elephants* – Mahy, 1987
- *Shark Swimathon* – Murphy, 2000
- *Panda Math: Learning About Subtraction from Hua Mei and Mei Sheng* – Nagda, 2009
- *Great Math Tattle Battle* – Bowen, 2006
- *What's the Difference? An Endangered Animal Subtraction Story* – Slade, 2010

Task Overview:

In this activity, students will generate physical models of whole number minuends (for take from/separate problems) and both minuends and subtrahends (for comparison problems) on a jumbo-sized place value chart. They will equate those models to abstract numerical notations, including standard and expanded notation. They will practice taking from and comparing to find a difference and learn how to ungroup when needed to subtract.

Begin each variation with the place value equivalencies left off or covered on the place value trading chart.

Figure 5.5.1 Jumbo Place Value Chart with place value equivalencies covered



Invite students to explore the base ten manipulatives and ask them to tell you what relationships they notice. As students share (and show) each place value equivalency (e.g., 1 ten = 10 ones), reveal or write the equivalence on the place value trading chart. Next, show students the place value cards and elicit from them which cards correspond to which place value blocks. Once these correlations have been made, students are ready to begin the variation.

**Note: Each variation of this task can be adapted to include anywhere from two to four place values. For students being Primed to learn about subtracting two-digit numbers, limit variations to the ones and tens place values. Variations can include the hundreds and/or thousands places for students who are being Primed to learn subtraction with greater numbers.*

Select (or create) a variation that focuses on the prior knowledge you are working to shore up for your student group.

Variation 1

Learning Target: Students will solve "take from" subtraction problems involving regrouping.

Variation Directions:

Begin this variation by organizing students into pairs. Each pair will need a Take From Mat. Partners will take turns as follows:

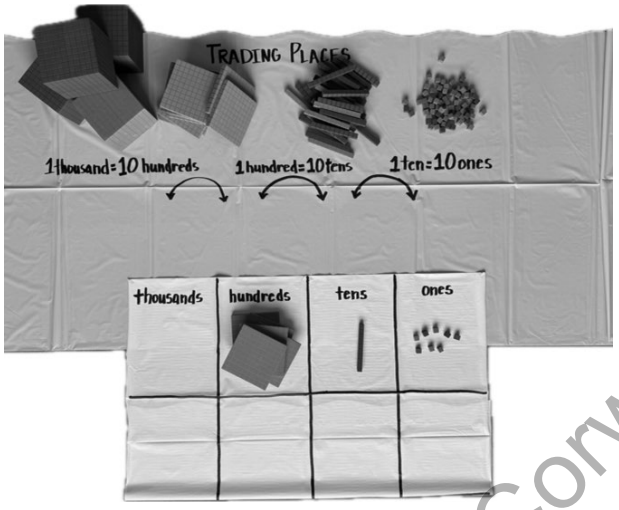
1. Partner A builds a number on the place value chart using place value blocks.
2. Partner B represents a ***lesser*** number using place value cards. This is the amount that will be ***taken from*** Partner A's amount.
3. The pair writes a subtraction expression and the expanded notation of each number on their Take From Mat.
4. Next, the partners expand Partner B's place value cards and place them in the second row of the place value chart under the corresponding place values. Together, the pair look to decide if they have enough of the place value blocks in each place to subtract. If they don't, they need to regroup without changing the value of the minuend (the starting value).
5. Partners record any regrouping they do on their Take From Mat.

6. When the pair is sure they have enough in each place value to subtract, they ***take away*** Partner B's amount in each place value by moving the subtracted amount to the second row of the place value chart. ***Students can choose to begin with the greatest place or the ones place, but direct them to work in order by place value (either least to greatest or greatest to least). They should use Partner B's place value cards to keep track of the parts they have subtracted (see example).*
7. When they have subtracted in all place values, partners record the difference (the amount left in the top row of the place value chart) on their Take From Mat.

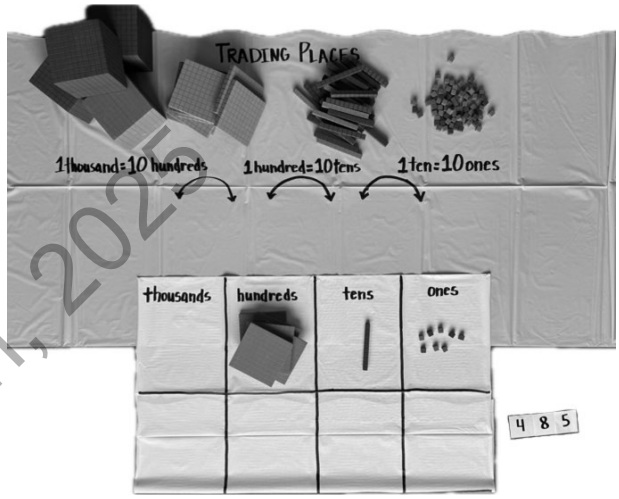
   Switch roles and repeat.

Figure 5.5.2 What's the Difference? Variation 1 example

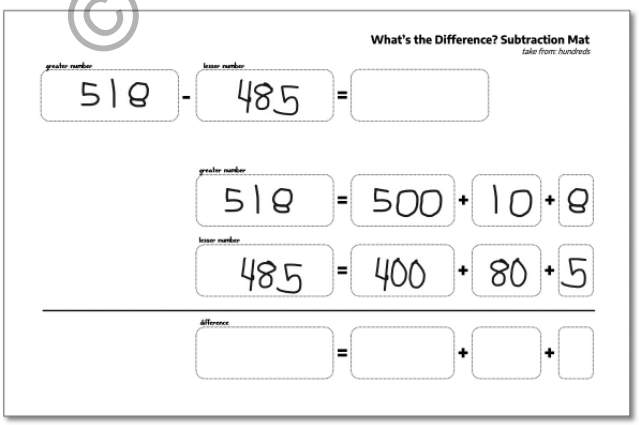
Partner A builds the number 518 in the top row of the place value chart.



Partner B represents the number 485 with place value cards next to the second row of the chart.



The pair writes a subtraction expression and the expanded form of each number on their Take From Mat.



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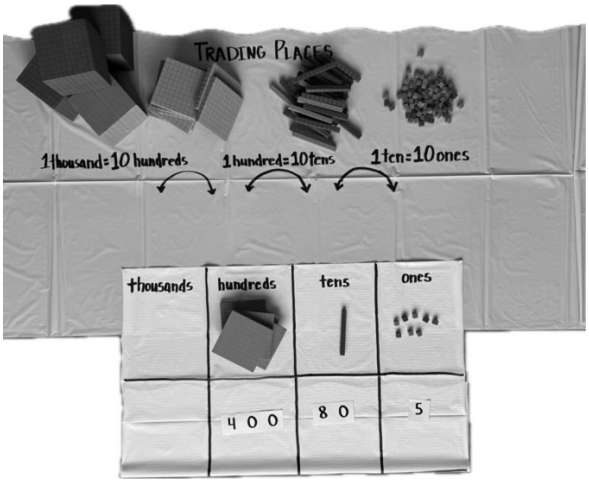
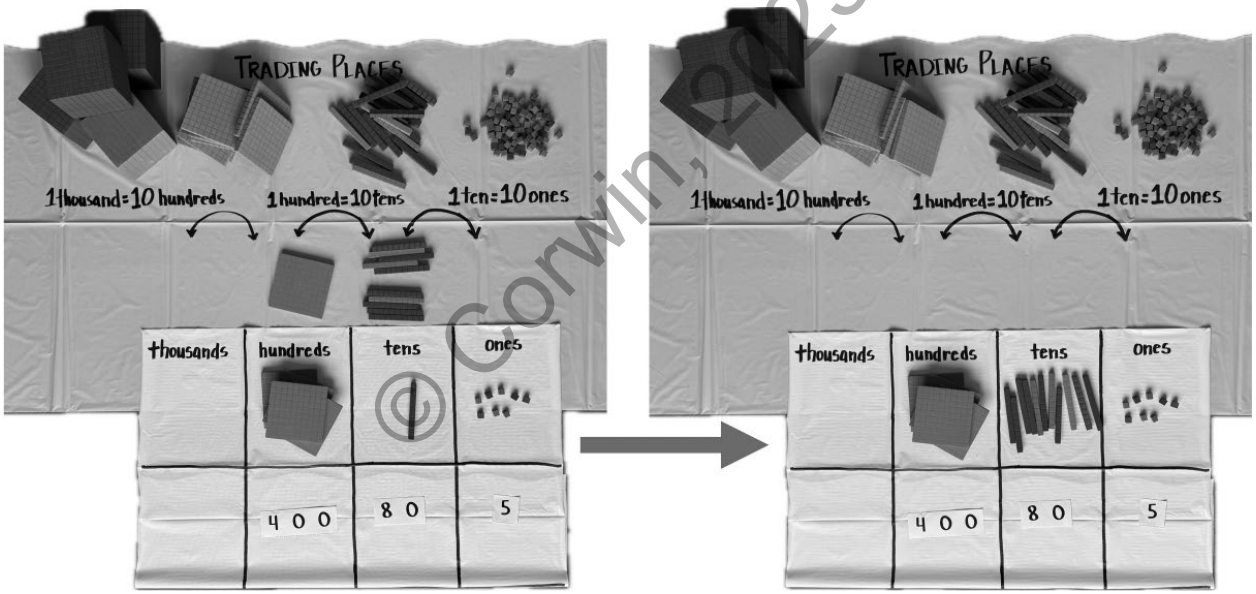
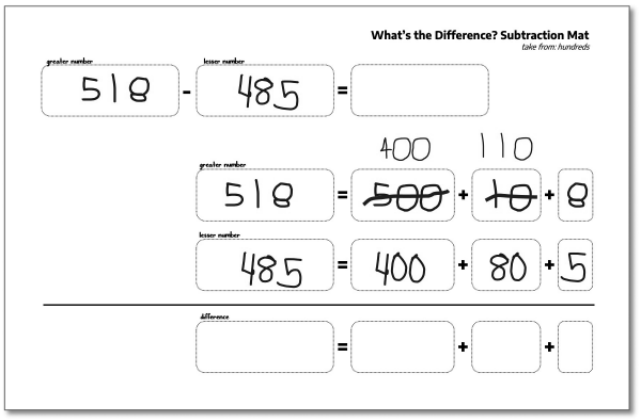
The pair expands Partner B's place value cards and places them in the bottom section of the place value chart under the corresponding place values.



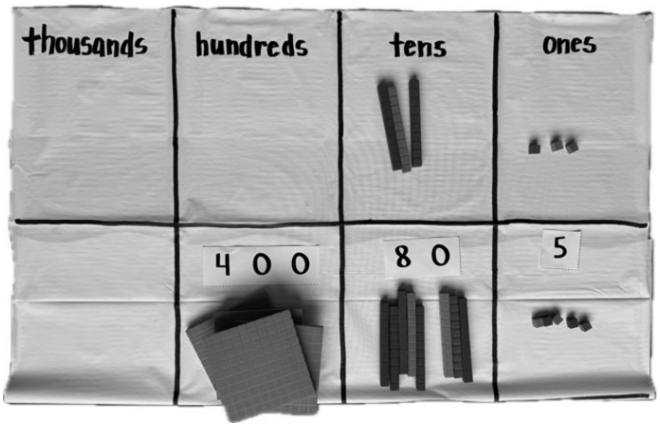
They decide they have enough hundreds and ones to subtract, but there are not enough tens to take away 8 tens. The pair decide to ungroup 1 hundred to get 10 more tens.



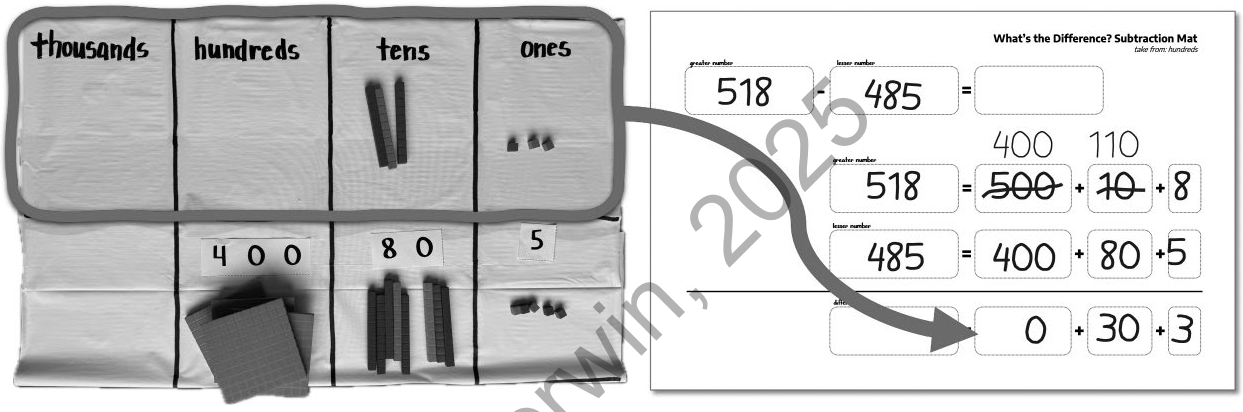
They record this trade on their Take From Mat.



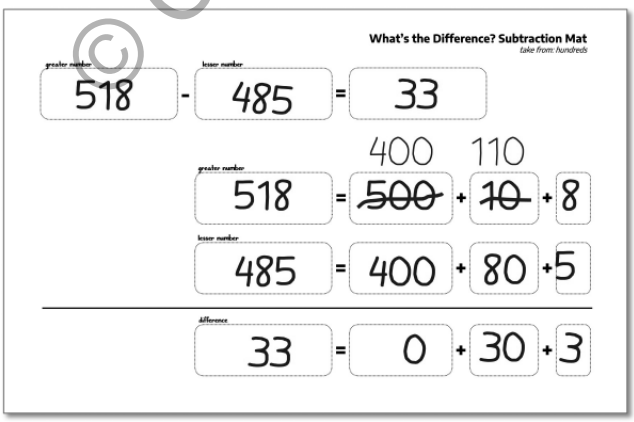
Now they can subtract! They take away 4 hundreds, 8 tens, and 5 ones by moving that amount down to the second row of the place value chart.



They record the final differences for each place value on their Take From Mat (the amount left in the top section).



They write the difference 33 on their Take From Mat.



Engage in Math Discourse (Make the Mathematics Visible):

As students work, encourage them to notice important relationships and push on early and partial understandings.

Observation:

- Watch for students who add place value blocks onto their place value mats instead of regrouping. Ask them, "Are we adding? Did you mean to add 10 (tens/ones)?

- How might you get 10 (tens/ones) without **adding** 10 (tens/ones) and changing the total amount? Can you think of another way to represent your original number where you would have more tens than you have now?"

Interview:

- When you started to take Partner B's amount away from the place value mat, which part did you subtract first? Did you subtract the (hundreds) first? or the ones? Why?

Observation:

- Be on the lookout for students who are choosing numbers that do not require regrouping. **Highlight a strength:** Ask what pattern they are noticing that is helping them to be sure they won't have to do any regrouping. These ideas will be great to lift up for group discussion. Then, challenge the group to show you what they mean by making a problem that breaks their "rule" and requires regrouping.

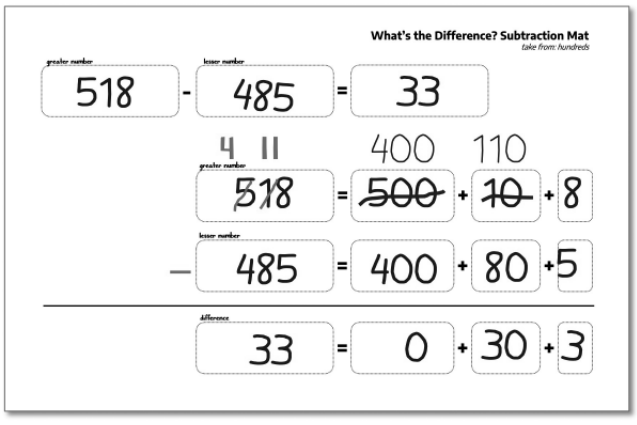
Interview: After the activity, bring the intervention group together for a discussion. Suggested prompts:

- Did you notice any patterns? Could you predict when you might need to regroup in a place value? How did you know?
- How did you get more (tens) without adding something more to your number?

- Using one or more of the student-generated Take From Mats, ask students to describe the regrouping that happened. Annotate the regrouping notation using standard notation as the students describe each move, making connections to their expanded-form annotations. For example, you might start a conversation like this . . .

Figure 5.5.3 Sample group conversation

Student(s):	They didn't have enough tens to take 8 tens away, so they ungrouped 1 hundred to get 10 more tens.
Teacher:	Let's look at this group's regrouping. When these students ungrouped 1 hundred, how many hundreds did that leave them?
Students:	4!
Teacher:	They only had 1 ten before. Now how many did they have?
Students:	11!



Teacher:	They ungrouped 1 hundred to get 10 more tens. So now they have 4 hundreds. I'll show that here by changing the 5 in the hundreds place to a 4. Where do you see that in their expanded form?
Students:	They changed 500 to 400!
Teacher:	Right, and now they have 11 tens. Let's change that too. I'll change the 1 in the tens place to an 11. Can you see that in their expanded form?

Bridging Prompt (Prompt for Classroom Teacher to Use During New Lesson Content):

- Show the class a minuend built with place value blocks and a subtrahend represented with place value cards.
- Ask students who participated in the intervention group to explain: When you are subtracting, how do you know you will need to regroup in a place value?

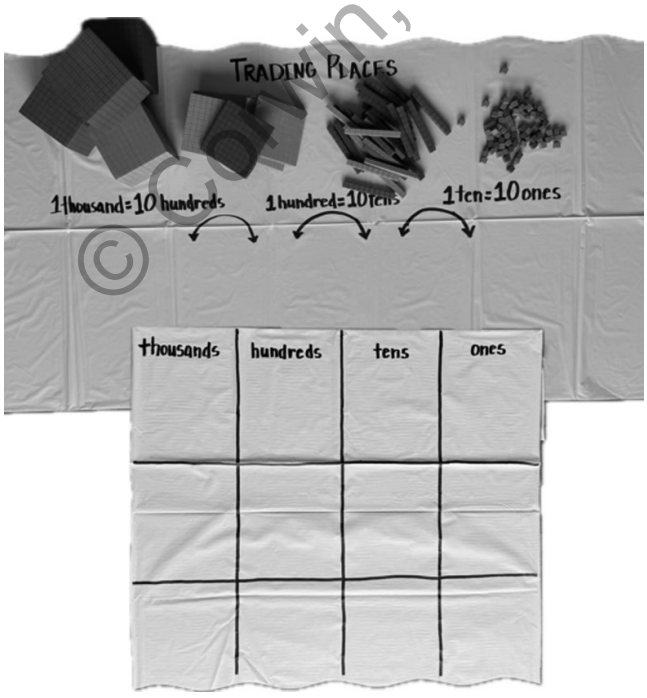
Variation 2

Learning Target: Students will solve "comparison" subtraction problems involving regrouping.

Variation Directions:

For this variation, unfold your third row or add a third row to the place value chart.

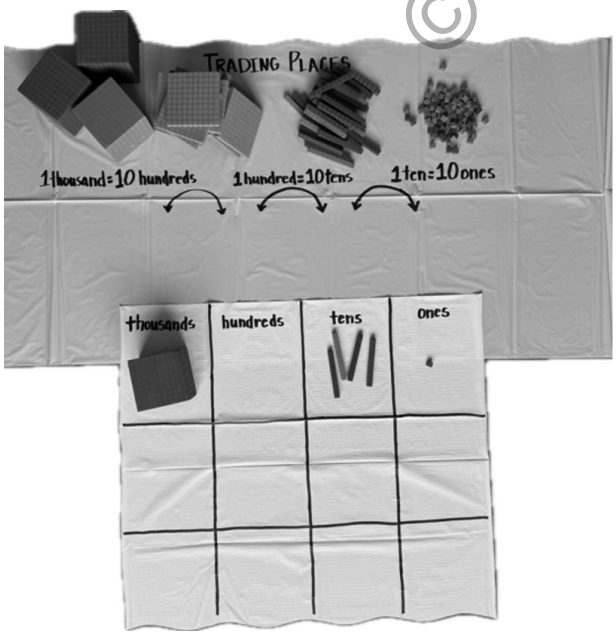
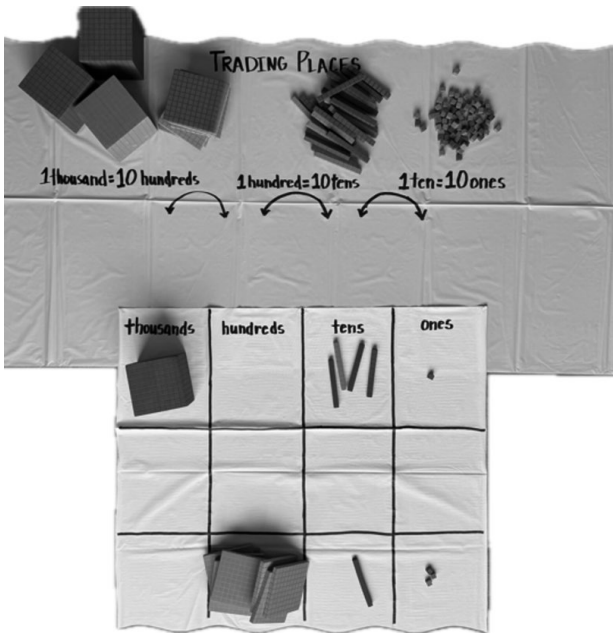
Figure 5.5.4 Place value chart with third row



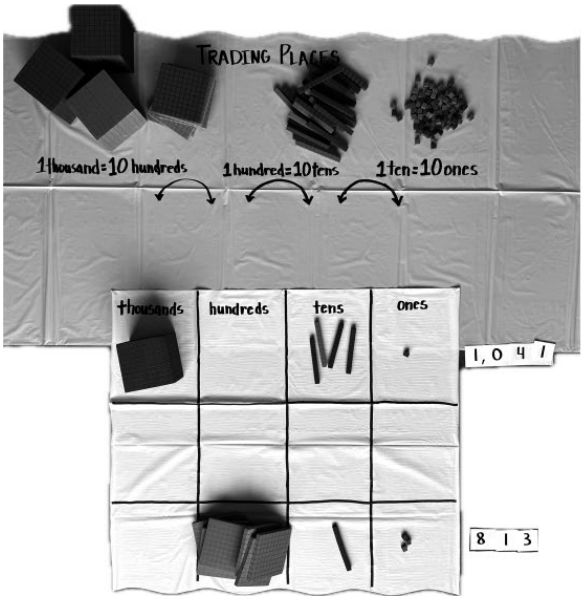
Begin the variation by organizing students into pairs. If possible, provide each pair with two colors of place value blocks. Each pair will need a Compare Mat. Partners will take turns as follows:

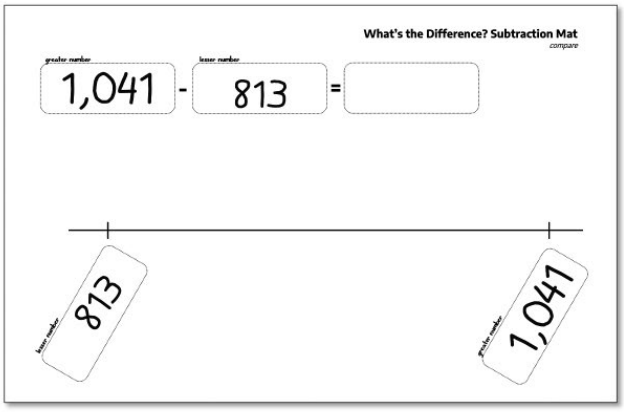
1. Partner A uses one color of place value blocks to build a number in the top row of the place value chart using place value blocks.
2. Partner B uses *the same color* of place value blocks to build a ***lesser*** number in the bottom row of the place value chart using place value blocks.
3. Each partner represents their number using place value cards.
4. They record the two numbers on the Compare Mat.
5. The pair works together to find the ***difference*** between the two numbers. To do this, they will use a different color of place value blocks to ***add up*** from the lesser number to the greater number (e.g., "think addition" to find the difference). The pair will build the ***difference*** amount in the middle row of the place value chart.
6. As the pair adds up, they will record their moves as lengths on the number line on the Compare Mat.
7. When the adding is complete, students will regroup the ***difference*** amount as needed so the difference is represented with the fewest place value blocks possible.
8. The partners will then ***compare*** the numbers. They determine ***how much more*** Partner A's number is compared to Partner B's number and ***how much less*** Partner B's number is compared to Partner A's number.
9. Finally, partners will record the difference on their Compare Mat.

Figure 5.5.5 What's the Difference? Variation 2 example

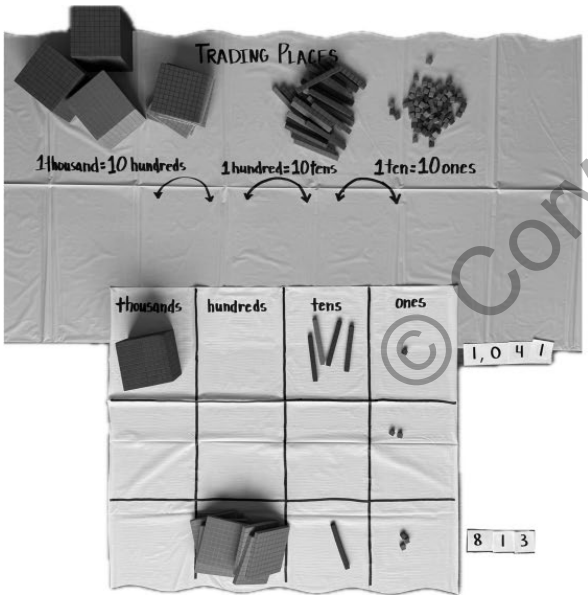
Partner A builds the number 1,041 in the top row of the place value chart.	Partner B builds the number 813 in the bottom row of the place value chart.
	

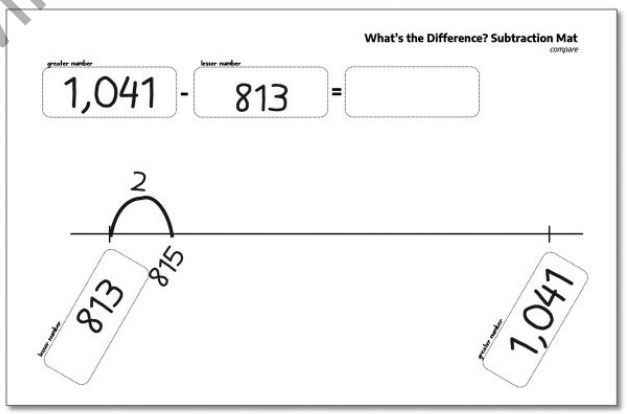
The pair build one another's numbers using place value cards, and they write a subtraction expression and write the numbers in the blanks at each end of the number line on the Compare Mat.





The pair begins adding up from 813 to 1,041 by adding 2 ones to 813. This gets them to 815. They place 2 ones in the middle row of the place value chart and record this on the number line on their Compare Mat.





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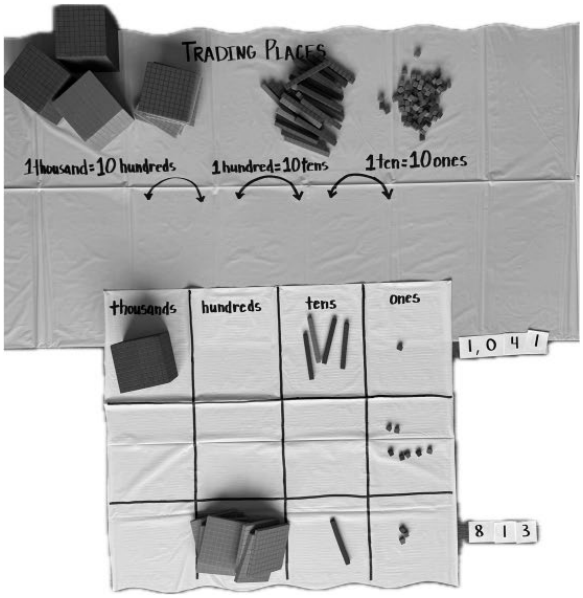
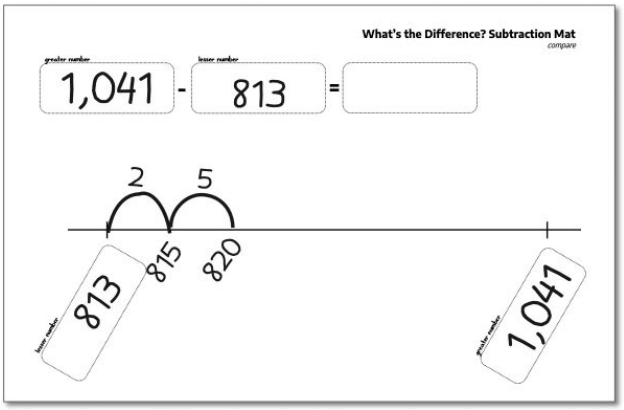
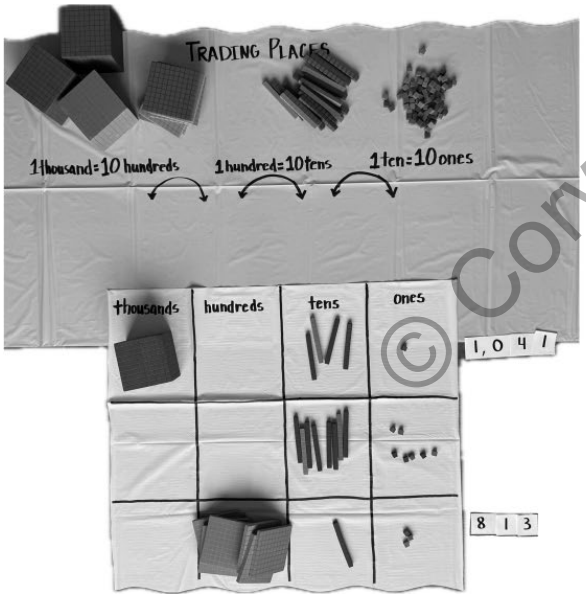
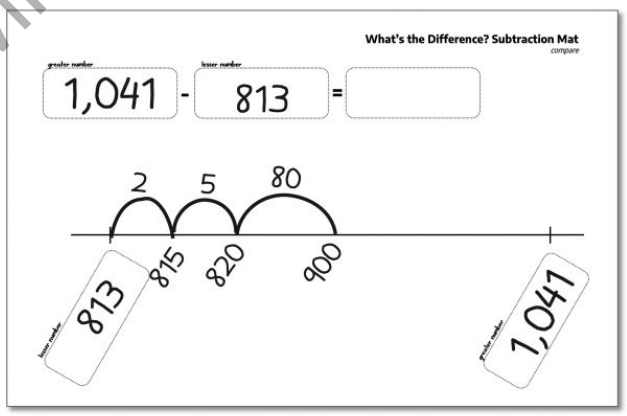
Next, they add 5 ones to 815 to get to 820.



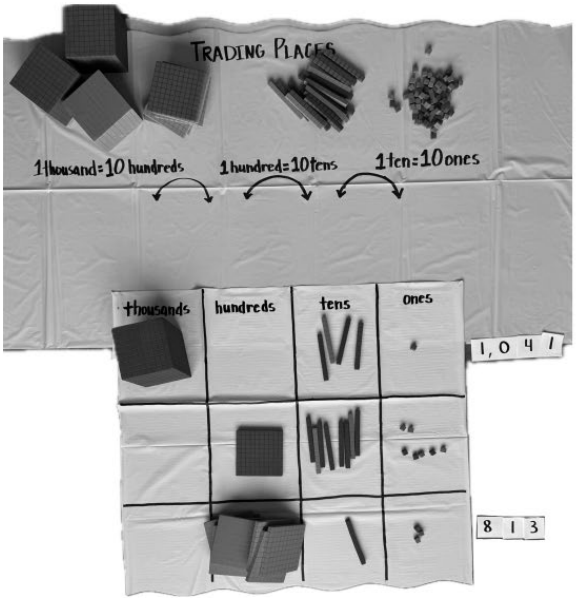


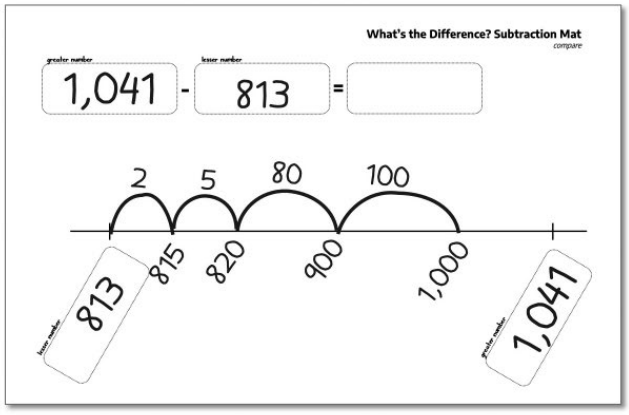
Then, they decide to add 8 tens. Now they have 900.



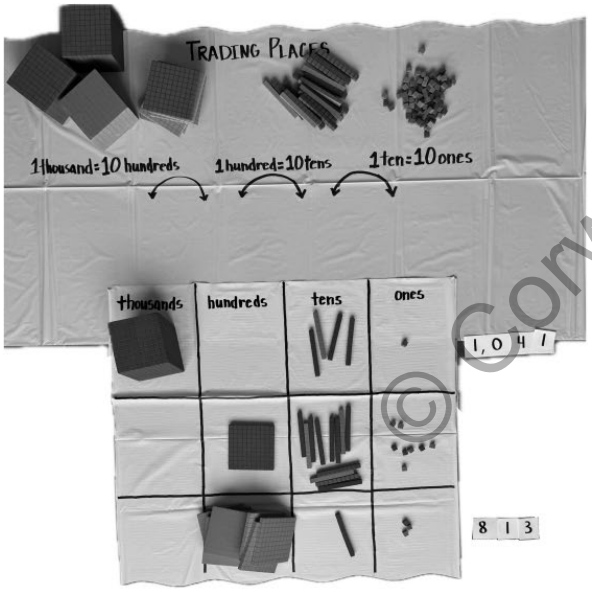


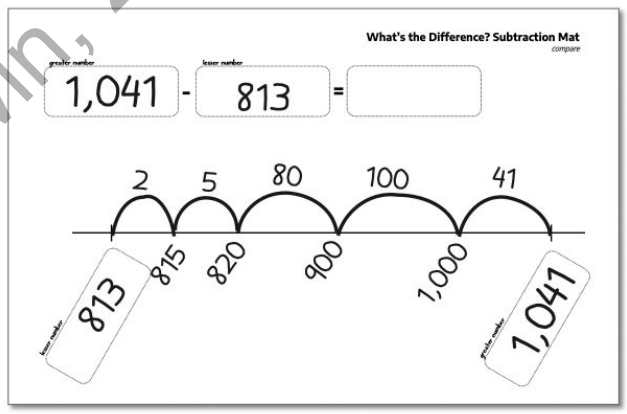
After some trial and error, the pair decides to add 1 hundred.





At this point, the pair notices that they can add 41 (4 tens and 1 one) to get to Partner A's number.





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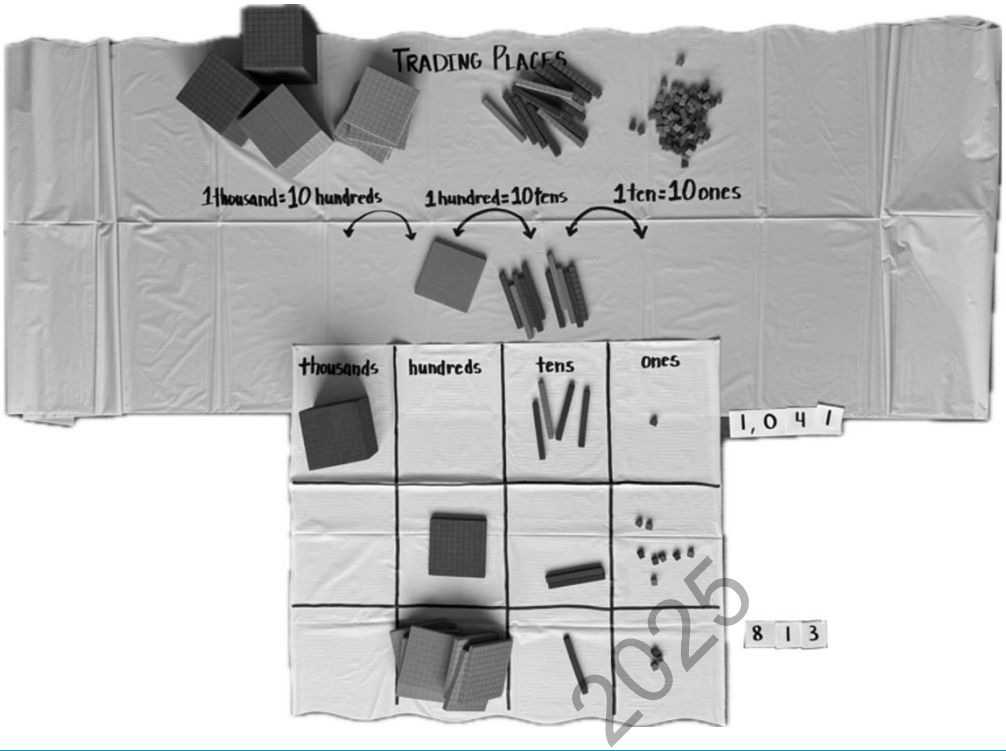
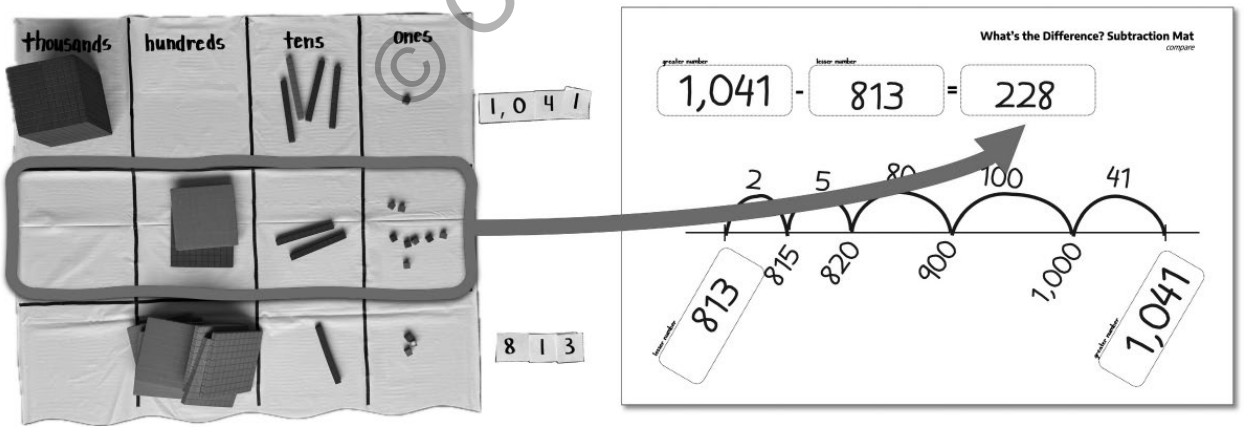
They look at their difference amount and see that they can group 10 tens to make another hundred.



After regrouping, they ***compare*** their numbers.

- Partner A says, "1,041 is 228 *more than* 813."
- Partner B says, "813 is 228 *less than* 1,041."

They write the difference 228 on their subtracting mat.



Engage in Math Discourse (Make the Mathematics Visible):

Observation: As students work, encourage them to notice important relationships and push on early and partial understandings.

- Watch for students who add place value blocks onto their place value mats instead of regrouping. Ask them, "Are we adding? Did you mean to add 10 (tens)?
- How might you get 10 (tens) without **adding** 10 (tens) to our number?
- Can you think of another way to represent your original number where you would have some additional tens?"
- Be on the lookout for students who are making a great number of very small lengths on the number line (possibly counting up by ones). **Highlight a strength:** Ask what kinds of numbers they are trying to "get to" on the number line. Celebrate when they talk about wanting to get to useful benchmarks (fives, tens, hundreds, etc.). These ideas will be great to lift up for group discussion. Then, challenge the group to try for a greater benchmark. For example, if students are only counting by ones to the next "five" on the number line, ask them how they might use tens instead or even hundreds.
- When you started to add up from Partner B's amount, how did you decide what to add first? Did you add (hundreds) first? or ones? Why?
- Find the sum of the lengths you made on your number line. What do you notice?

Interview: After the activity, bring the intervention group together for a discussion. Suggested prompts:

- Did you notice any patterns? What kinds of numbers were you trying to reach on the number line? How did those numbers help you? (elicit that benchmark numbers are helpful)
- What did you notice about the sum of all the lengths you made on the number line? How does that compare to the difference?

Bridging Prompt (Prompt for Classroom Teacher to Use During New Lesson Content):

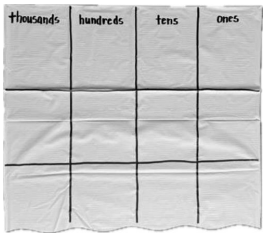
- Show students a subtraction problem represented on the subtraction mat number line.
- Ask students who participated in the intervention group to explain: How could we use "think addition" to find a difference if we don't want to subtract?

Place Value Mat

Thousands	Hundreds	Tens	Ones

Directions for Making a Jumbo Place Value Chart

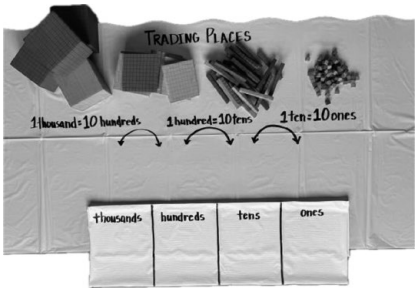
This chart consists of two separate pieces of disposable plastic tablecloths or butcher paper. On the first piece, use a bold marker to make a place value chart with three rows. Make sure the spaces are large enough to fit physical base ten manipulatives.



Use the second piece to create the "trading mat" that will lay beneath the place value chart. On this piece, use a bold marker to make arched arrows and equations to indicate the place value trades that can be made above corresponding place value pairs:

1 thousand = 10 hundreds 1 hundred = 10 tens 1 ten = 10 ones

The space above the place value relationship equations should be filled with a "bank" of base ten manipulatives.



Leave space between the place value relationship equations and the place value chart for trading. The second and/or third rows of the place value chart can be folded under as needed based on the task.

Place Value Cards

1

1,	0	0	0
1,	0	0	0
1	1	0	0
1	1	0	0
1	0	1	0

Place Value Cards

2,000

2,000

2200

2200

2200

2020

Place Value Cards

3,	0	0	0
3,	0	0	0
3	3	0	0
3	3	0	0
3	0	3	0

Place Value Cards

4

4,	0	0	0
4,	0	0	0
4	4	0	0
4	4	0	0
4	0	4	0

Place Value Cards

5,	0	0	0
5,	0	0	0
5	5	0	0
5	5	0	0
5	0	5	0

Place Value Cards

6,	0	0	0
6,	0	0	0
6	6	0	0
6	6	0	0
6	0	6	0

Place Value Cards

1,	0	0	0
1,	0	0	0
1	1	0	0
1	1	0	0
1	0	1	0

Place Value Cards

8

8,000

8,000

8800

8800

8800

8080

Place Value Cards

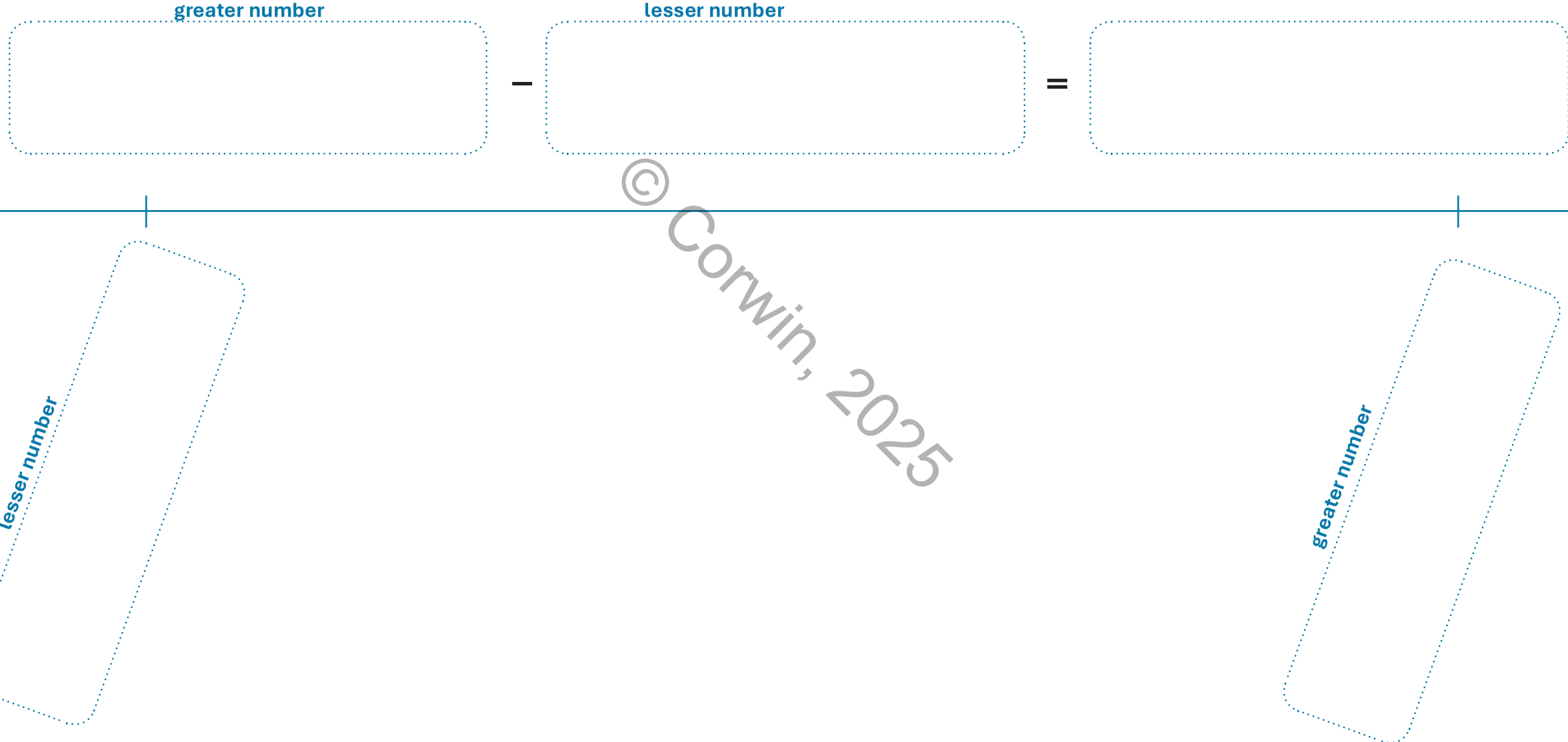
9,	0	0	0
9,	0	0	0
9	9	0	0
9	9	0	0
9	0	9	0

What's the Difference? Subtraction Mat

compare

greater number

lesser number



What's the Difference? Subtraction Mat

take from: thousands

greater number | lesser number

[ ] − [ ] = [ ]

greater number

[ ] = [ ] + [ ] + [ ] + [ ]

lesser number

[ ] = [ ] + [ ] + [ ] + [ ]

---

difference

[ ] = [ ] + [ ] + [ ] + [ ]

What's the Difference? Subtraction Mat

take from: hundreds

greater number − **lesser number** =

greater number = + +

lesser number = + +

---

difference = + +

What's the Difference? Subtraction Mat

take from: tens

greater number − lesser number =

greater number = + +

lesser number = + +

difference = + +