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Let's Talk Math

This sample includes the following:

Teacher's Guide Cover (1 page)
Teacher's Guide Table of Contents (1 page)
How to Use This Resource Pages (4 pages)
Sample Lessons, Task Cards, and Student Pages

- Think Using Quantities (4 pages)
- Construct and Critique Arguments (4 pages)
- Mathematize the Situation (4 pages)
- Use Tools Strategically (4 pages)
- Analyze the Structure (4 pages)
- Generalize Your Thinking (4 pages)

LEVEL 2

Let's Talk Math

TEACHER'S GUIDE

Support Videos Inside!

TCM Teacher Created Materials

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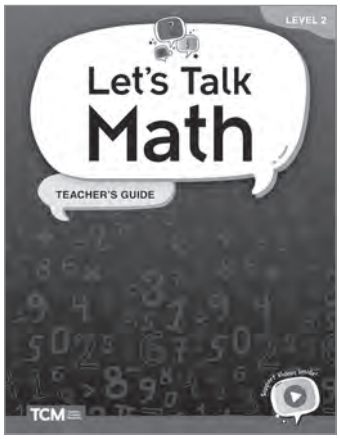
How to Use This Resource

Components

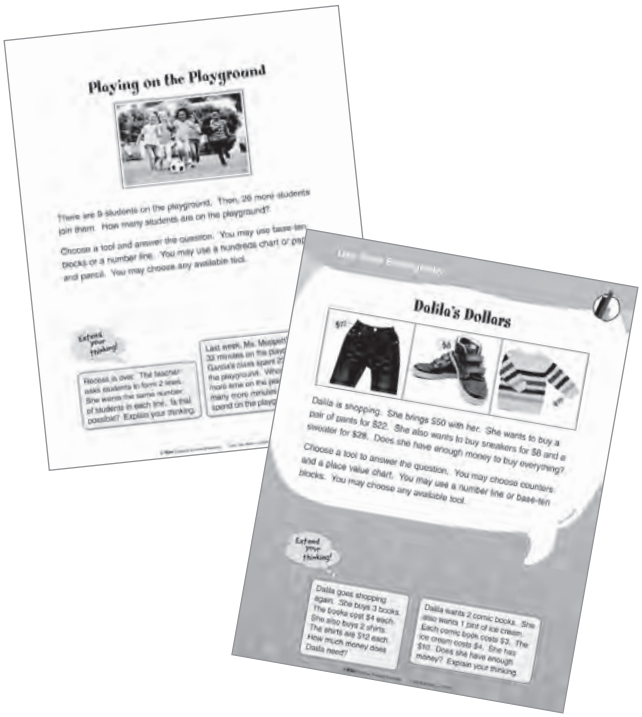
Teacher's Guide



The *Let's Talk Math* Teacher's Guide is an informative, detailed guide that facilitates implementation of this supplemental resource. Every lesson includes a common student misconception for the particular task as well as differentiated support for both scaffolding and extension. Outlined in each lesson are tiered vocabulary lists for language support that might prevent access to the mathematics.

Task Cards

There are 60 full-color, double-sided cards for small-group lessons and workstations. Each card clearly lists one task on each side and two extension opportunities per task. The cards are color-coded based on the mathematical practices/processes and include icons to indicate the mathematical domains.

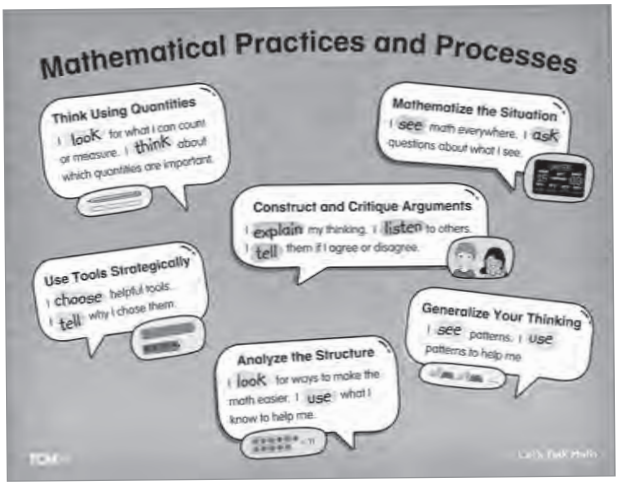


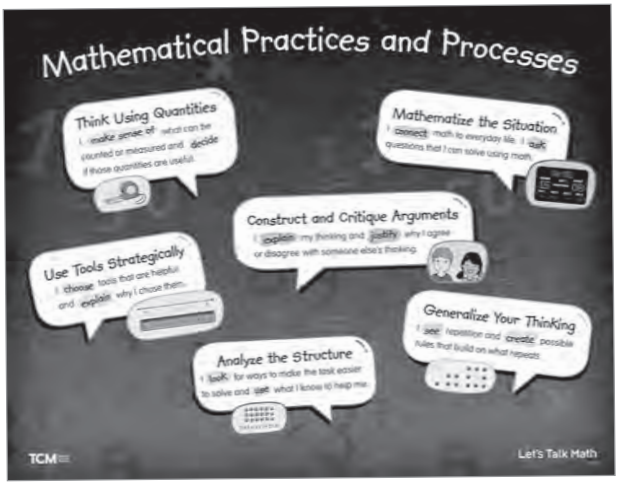
Let's Solve: Student Task Book

The 120 student tasks are provided in an easy-to-use book with perforated pages for easy distribution to students or for use as students' personal math journals. Each student page includes an opportunity for students to reflect and write.

Poster

A two-sided, full-color poster lists the Standards for Mathematical Practices/Processes in student-friendly language. One side is for grades K–1, and the other side is for grades 2–5.





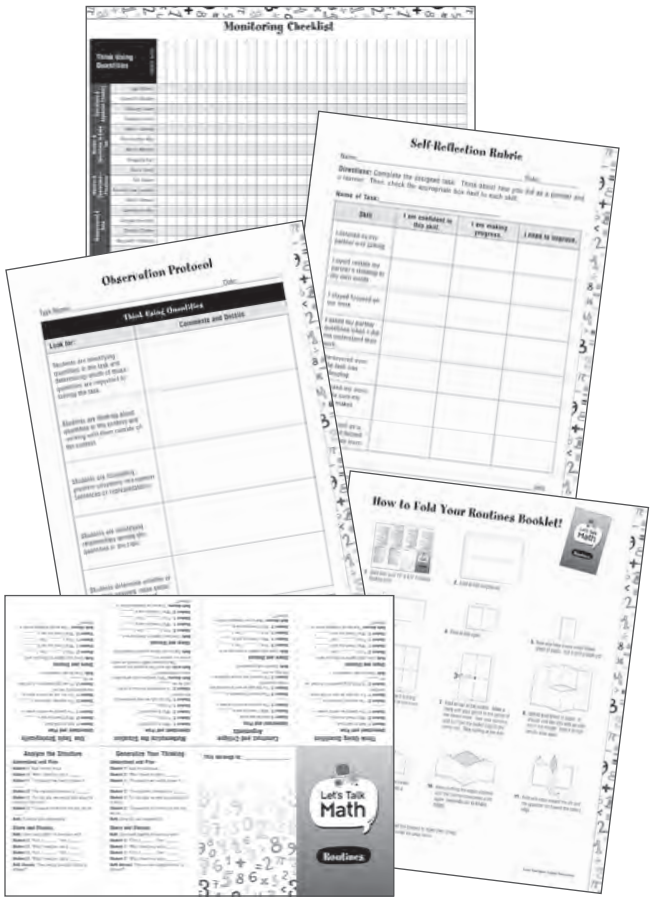
How to Use This Resource *(cont.)*

Components *(cont.)*

Digital Resources

Let's Talk Math features a wealth of digital resources. These digital resources offer greater flexibility and accessibility than the print resources alone.

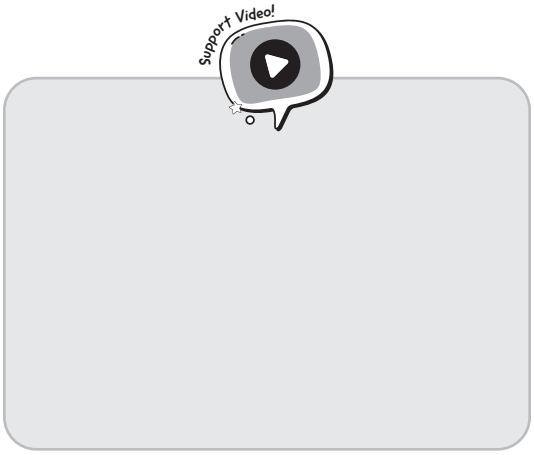
- Digital versions of **Task Cards, Student Task Book** pages, and the **poster** can be used on interactive whiteboards, for virtual sessions, in LMS platforms, and more!
- Assessment tools such as **Observation Protocols**, **Monitoring Checklists**, and **Student Reflection** and **Feedback** templates help teachers and students track progress.
- **Classroom exemplars** bring *Let's Talk Math* to life and inform instruction and assessment.
- **Anchor charts** can be displayed as reminders of the routines for the mathematical practices/processes.
- **Tier 3 vocabulary word cards** can be printed and used to prepare students for math tasks.



Support Videos

Don't miss the *Let's Talk Math* support videos for teachers and students.

- The **teacher videos** feature authors Kit Norris and Dr. Hilary Kreisberg discussing the routines, and include examples from classrooms and tips for implementation.
- Animated **student videos** explain the mathematical processes/practices and make concepts accessible with engaging examples.
  - Think Using Quantities
  - Construct and Critique Arguments
  - Mathematize the Situation
  - Use Tools Strategically
  - Analyze the Structure
  - Generalize Your Thinking

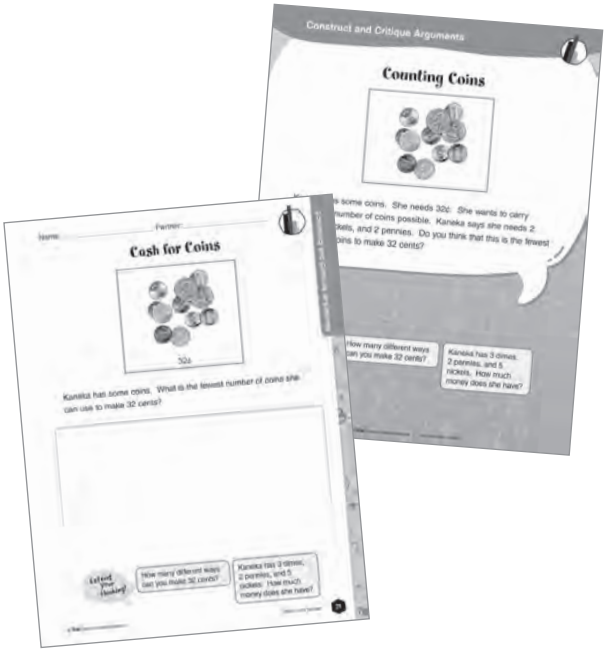


How to Use This Resource *(cont.)*

Tasks

This kit contains 120 tasks. There are 20 tasks for each of the six identified mathematical practices/processes (see Figure 5). The 20 tasks for each practice/process include tasks per content domain (see Figure 6). The tasks are provided in three formats to give teachers flexibility in deciding how to use them with students.

- Full-color student reproducibles in the *Let's Solve: Student Task Book*. Each student activity sheet has the task and extension activities on one side and the Reflect and Write routine on the other. These student-facing pages can be used in small groups for students to record their thinking and reflections. Students can alternatively complete the pages during workstation work with partners and submit them for evaluation and review by the teacher. (The *Let's Solve: Student Task Book* can be purchased as student consumables. Contact Teacher Created Materials at 800-858-7339 for more information or to order.)
- Full-color cards (one set per kit) for use in small-group lessons or by students in math workstations. The tasks are organized by color to help with both management and student connections (see Figure 5).
- Full-color PDFs in the Digital Resources (see page 168 for more information) for whole-class projection to share with students for work in class or at home.



Practice/Process	Color
Think Using Quantities	blue
Construct and Critique Arguments	orange
Mathematize the Situation	red
Use Tools Strategically	green
Analyze the Structure	purple
Generalize Your Thinking	yellow

Figure 5—Task Card Colors

The student tasks (and teacher notes) also include visual icons to identify the mathematical domains of the tasks. These icons are included in all three versions of the cards as well as on the teacher notes pages for ease of teacher and student use and management. See Figure 6 for the icons used throughout the resource.

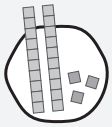
Mathematical Domain	Icon
Operations and Algebraic Thinking	
Number and Operations in Base Ten	
Measurement and Data	
Geometry	

Figure 6—Domain Icons

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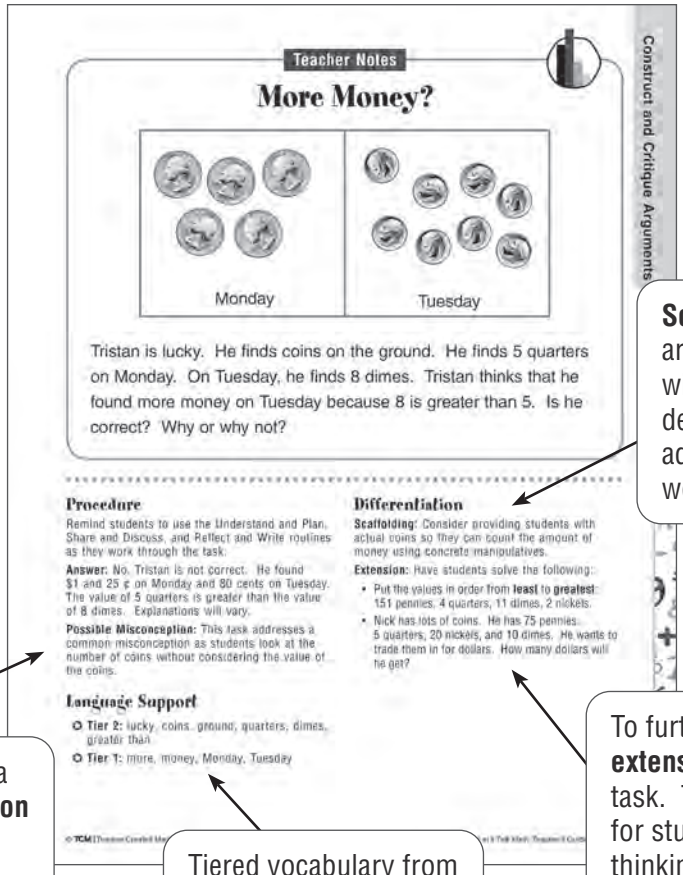
Analyze the Structure 118

Generalize Your Thinking. 138



Teacher Notes

More Money?

Construct and Critique Arguments

Monday

Tuesday

Tristan is lucky. He finds coins on the ground. He finds 5 quarters on Monday. On Tuesday, he finds 8 dimes. Tristan thinks that he found more money on Tuesday because 8 is greater than 5. Is he correct? Why or why not?

Procedure

Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.

Answer: No. Tristan is not correct. He found $1 and 25 ¢ on Monday and 80 cents on Tuesday. The value of 5 quarters is greater than the value of 8 dimes. Explanations will vary.

Possible Misconception: This task addresses a common misconception as students look at the number of coins without considering the value of the coins.

Language Support

- **Tier 2:** lucky, coins, ground, quarters, dimes, greater than
- **Tier 1:** more, money, Monday, Tuesday

Differentiation

Scaffolding: Consider providing students with actual coins so they can count the amount of money using concrete manipulatives.

Extension: Have students solve the following:

- Put the values in order from **least** to **greatest**: 151 pennies, 4 quarters, 11 dimes, 2 nickels.
- Nick has lots of coins. He has 75 pennies, 5 quarters, 20 nickels, and 10 dimes. He wants to trade them in for dollars. How many dollars will he get?

Scaffolding suggestions are provided to use with students who have demonstrated a need for additional support as they work on the task.

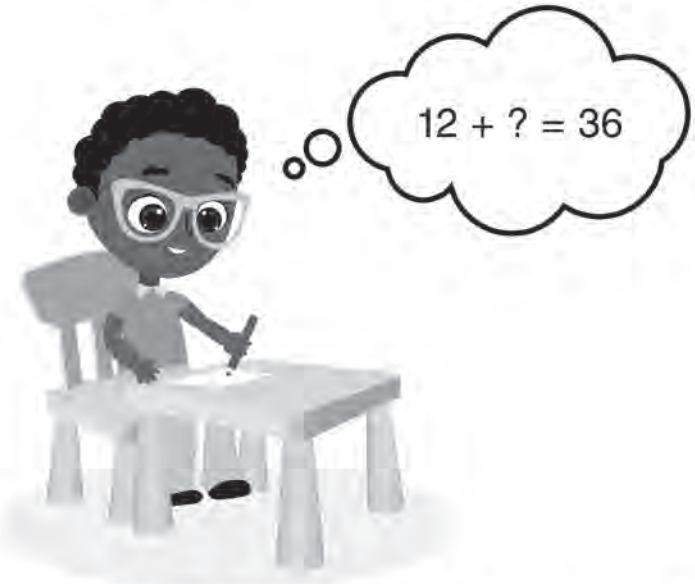
Each lesson includes a **possible misconception** students might have when working on the task. Knowing about these ahead of time will help you prepare to support students.

Tiered vocabulary from the task is highlighted along with other key **language supports**.

To further challenge students, two **extensions** are provided for each task. These provide opportunities for students to apply their critical thinking to related scenarios. When computable answers are possible, they are provided in parentheses.

Teacher Notes

Your Story



Look at the equation. Write a story to match the number sentence. Make sure your story has a question at the end that can be solved by this number sentence.

Procedure

Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.

Answer: An example answer is: There were 12 marbles in a bowl. When I wasn't looking, Brad put some more marbles into the bowl. Now, there are 36. How many marbles did Brad put in the bowl?

Possible Misconception: Students may write problems that look for a sum rather than a missing addend.

Language Support

- **Tier 3:** equation, story, problem, number sentence
- **Tier 2:** question, write, solved

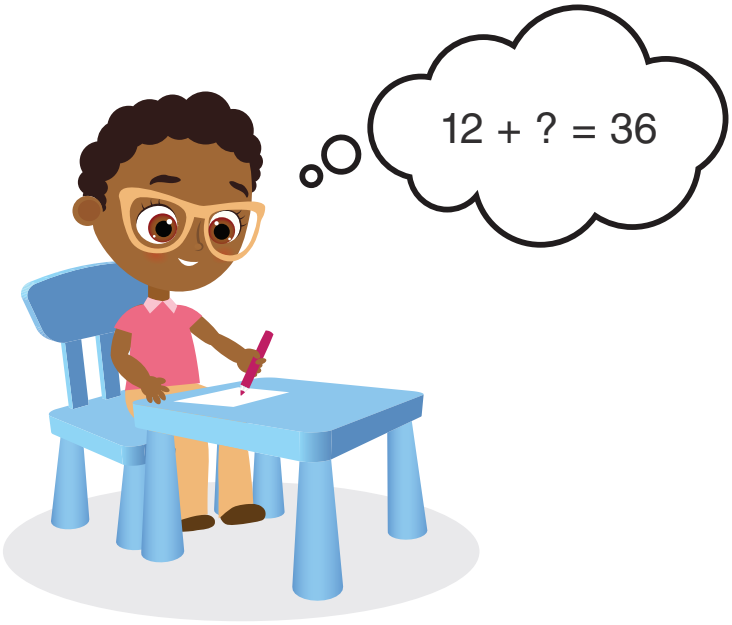
Differentiation

Scaffolding: Ask students to describe what each part of the equation represents. Do we have 12 of something to start and then some more join and now we have 36? Or, do we have 36 total objects and 12 are one type and the missing part is another type? Consider using smaller values as well, such as 8 + ? = 14.

Extension: Have students solve the following:

- What happens if the question mark comes first in the equation? How does your story change? Does the answer remain the same? Explain your thinking.
- Write a story problem for 14 – ? = 6.

Your Story



Look at the equation. Write a story to match the number sentence. Make sure your story has a question at the end that can be solved by this number sentence.

Extend your thinking!

What happens if the question mark comes first in the equation? How does your story change? Does the answer remain the same? Explain your thinking.

Write a story problem for 14 – ? = 6.

Name: _____ Partner: _____

Your Story

Look at the equation. Write a story to match the number sentence. Make sure your story has a question at the end that can be solved by this number sentence.

Extend your thinking!

What happens if the question mark comes first in the equation? How does your story change? Does the answer remain the same? Explain your thinking.

Write a story problem for 14 – ? = 6.

Name: _____ Date:_____

Think Using Quantities

Reflect and Write

Student 1: "Which quantities were important in this task?"

Student 2: Respond.

Student 2: "What did we notice about the important quantities?"

Student 1: Respond.

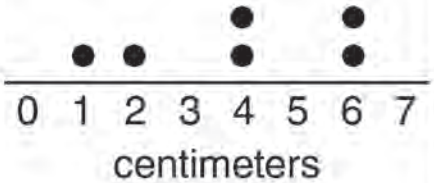
Both reflect: "How did we use quantities to help us solve the task?"

Both write: We used the quantities to help us solve by _____

Teacher Notes

Organizing Objects

Object	Length
pencil	6 cm
index card	6 cm
small paper clip	2 cm
large paper clip	4 cm
staple	1 cm
pen cap	2 cm
eraser	4 cm



Jordana has several items on her desk. Look at the chart to see the items and their lengths. She wants to organize them by their lengths. She makes a line plot. Does her line plot show her data correctly? Why or why not?

Procedure

Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.

Answer: No, Jordana's line plot doesn't show her data correctly. The line plot does not have enough dots on 2 cm. It should have 2 dots on 2 cm.

Possible Misconception: Students may not think they can represent the different objects with the same symbol on a line plot.

Language Support

- **Tier 3:** lengths, data, line plot
- **Tier 2:** several, items, organize, chart
- **Tier 1:** desk, first

Differentiation

Scaffolding: Review the features of the line plot, and connect it to the list of objects and their measurements.

Extension: Have students solve the following:

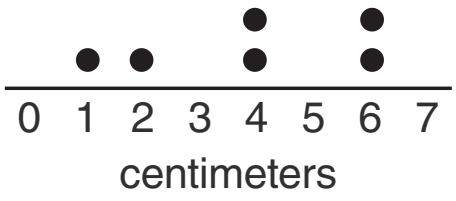
- Create your own line plot using this information:

Name	Glasses of Water Each Day
Ava, Lily, Zoe	4
Eli, Ryan	2
Zane, Luna	3
Jack	6

- Write a question based on the line plot you created. Ask a partner to answer the question.

Organizing Objects

Object	Length
pencil	6 cm
index card	6 cm
small paper clip	2 cm
large paper clip	4 cm
staple	1 cm
pen cap	2 cm
eraser	4 cm



Jordana has several items on her desk. Look at the chart to see the items and their lengths. She wants to organize them by their lengths. She makes a line plot. Does her line plot show her data correctly? Why or why not?

Extend your thinking!

Create your own line plot using this information.

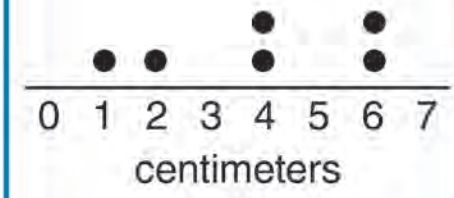
Name	Glasses of Water Each Day
Ava, Lily, Zoe	4
Eli, Ryan	2
Zane, Luna	3
Jack	6

Write a question based on the line plot you created. Ask a partner to answer the question.

Name: _____ Partner: _____

Organizing Objects

Object	Length
pencil	6 cm
index card	6 cm
small paper clip	2 cm
large paper clip	4 cm
staple	1 cm
pen cap	2 cm
eraser	4 cm



Jordana has several items on her desk. Look at the chart to see the items and their lengths. She wants to organize them by their lengths. She makes a line plot. Does her line plot show her data correctly? Why or why not?

Extend your thinking!

Create your own line plot using this information.

Name	Glasses of Water Each Day
Ava, Lily, Zoe	4
Eli, Ryan	2
Zane, Luna	3
Jack	6

Write a question based on the line plot you created. Ask a partner to answer the question.

Name: _____ Date: _____

Construct and Critique Arguments

Reflect and Write

Student 1: "How did we prove that our answers are correct?"

Student 2: Respond.

Student 2: "Do we agree or disagree with each other's problem-solving process?"

Student 1: Respond.

Both reflect: "How did we construct and critique arguments?"

Both write (select one):

We constructed arguments by _____

_____

_____

_____

Or

We critiqued arguments by _____

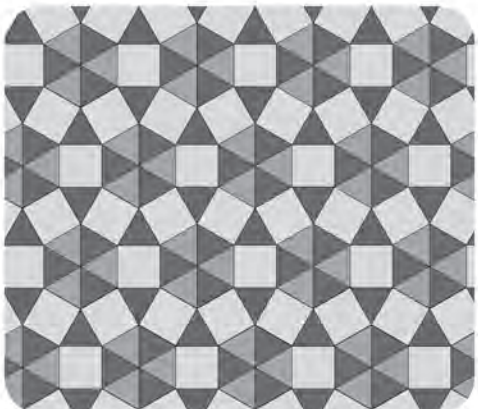
_____

_____

_____ .

Teacher Notes

Tessellation



Procedure

1. Lead a discussion about the image with the class.
2. Place students into pairs. Ask students to generate mathematical questions about the image. Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.
3. Ask students to share their questions with the class. Record questions on the board. At this point, decide whether to have everyone pursue the same question or have partners focus on their own questions. Consider giving partners choices of questions that they would like to pursue. You may also decide that developing questions and considering information needed to solve the problem is enough work for this day or this task.
4. Have students answer questions independently. Then, have them share their thinking with partners.

Answer: Answers will vary depending upon the questions students choose.

Possible Misconception: Students may want to explore questions that are not quantifiable, such as, "Is that a flower?" Encourage students to think of a question that can be answered using mathematics. For example, "How many triangles are seen in this picture?"

Additional Information

After students determine the mathematical question they'd like to answer, ask them what information they would need to know to answer their question. Here are some ideas that could be used for this image. This list is not exhaustive.

- For every hexagon, there are 6 squares.
- For every hexagon, there are 6 triangles.
- Each square touches 2 triangles and 2 hexagons.
- The distance around a hexagon is 6 cm.

Language Support

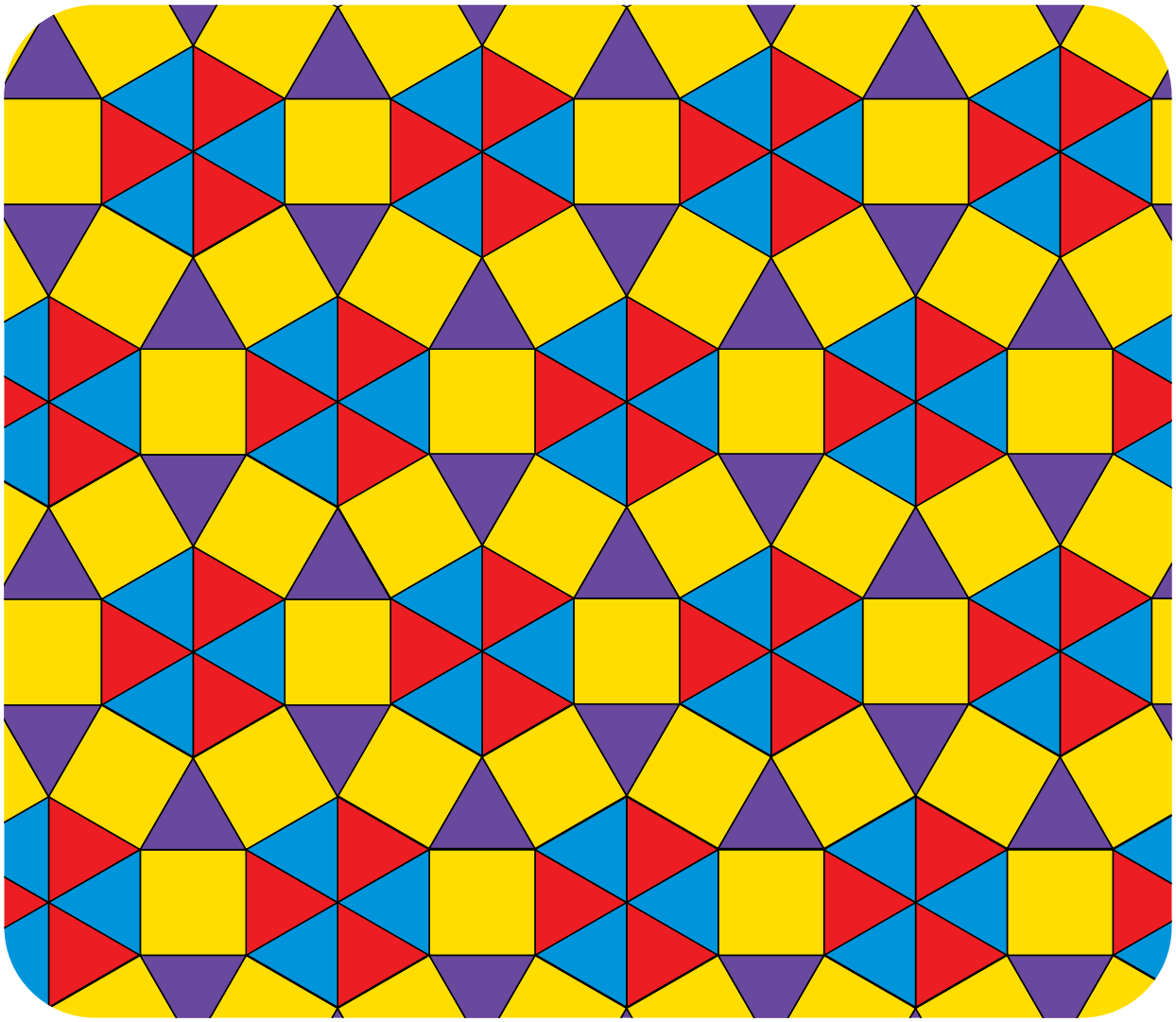
- **Tier 3:** square, triangle, pentagon, hexagon, trapezoid, tessellation
- **Tier 2:** shapes

Differentiation

Scaffolding: Consider making a list of questions that are not quantifiable, such as, "Why are the triangles different colors?" and a list of questions that are quantifiable, such as, "How many triangles are seen in this picture?" Creating this list can be done as a whole class discussion or can be written as partners share the question that they would like to explore.

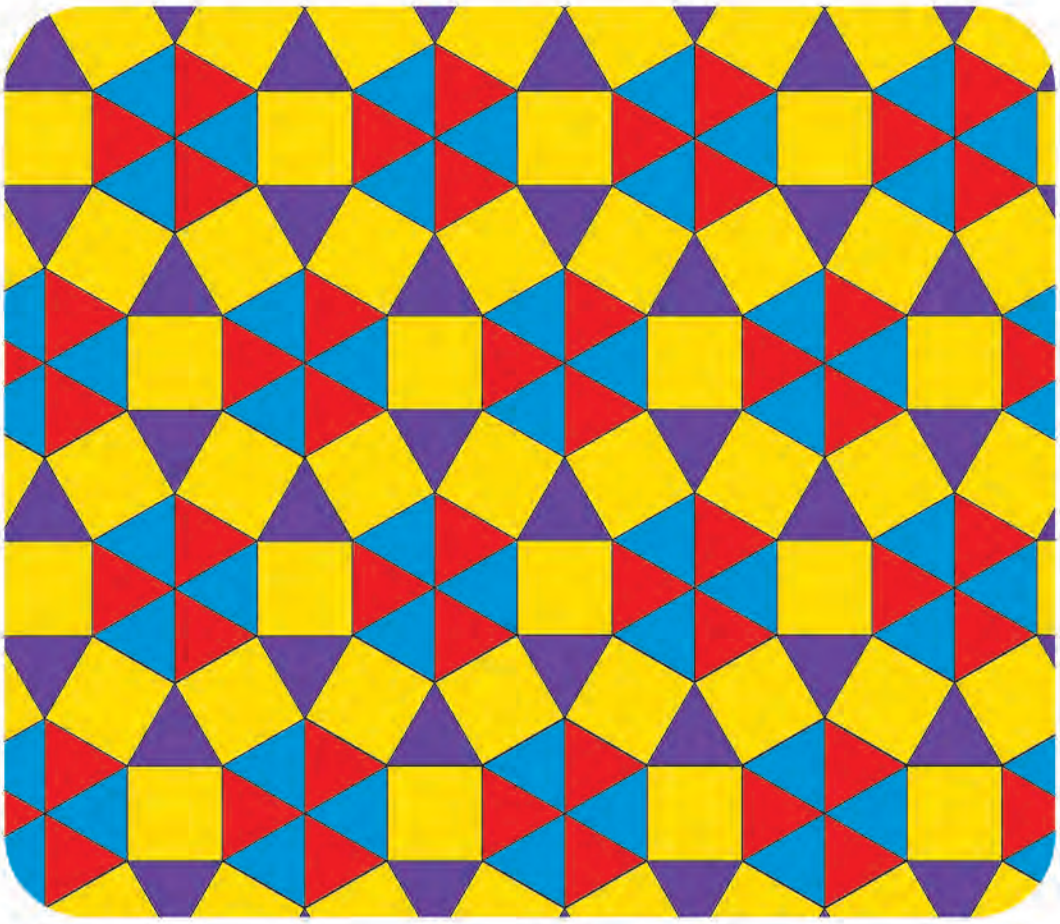
Extension: Suggest that students extend their questions in some manner. For example, If they explored the number of triangles in this picture, ask them to name all the different shapes they can find. Remind them to include composed shapes.

Tessellation



Name: _____ Partner: _____

Tessellation



Name: _____ Date: _____

Mathematize the Situation

Reflect and Write

Both reflect: How did we use mathematics to answer our question about this picture?

Both write: We mathematized the situation by _____

Teacher Notes

Mia's and Missy's Measurements

Mia and Missy are measuring. They each measure the height of the door handle. Mia gets 3 units. Missy gets 36 units. Both girls measured correctly. How could this be?

What tool might each girl have used? Explain how you know.

Procedure

Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.

Answer: Mia measured in feet, while Missy measured in inches. Any appropriate tool that measures feet or inches would work for this task (e.g., a yardstick). Explanations will vary.

Possible Misconception: Students may struggle to identify a measurement tool without specific units provided.

Language Support

- **Tier 3:** units
- **Tier 2:** measured, height, tool
- **Tier 1:** door handle

Differentiation

Scaffolding: Provide each student with a 12-inch ruler and a yardstick. Ask students what they notice and what they are wondering about. Reread the story if necessary.

Extension: Have students solve the following:

- Which measurement is more accurate: Mia's or Missy's? Why? Explain your thinking.
- Mia measures the height of the entire door. She says it is 183 centimeters. Missy measures the length of her desk. She says it is 92 centimeters. How much taller is the height of the door than the length of the desk? (91 cm taller)

Mia's and Missy's Measurements

Mia and Missy are measuring. They each measure the height of the door handle. Mia gets 3 units. Missy gets 36 units. Both girls measured correctly. How could this be?

What tool might each girl have used? Explain how you know.

Extend your thinking!

Which measurement is more accurate: Mia's or Missy's? Why? Explain your thinking.

Mia measures the height of the entire door. She says it is 183 centimeters. Missy measures the length of her desk. She says it is 92 centimeters. How much taller is the height of the door than the length of the desk?

Name: _____ Partner: _____

Mia's and Missy's Measurements

Mia and Missy are measuring. They each measure the height of the door handle. Mia gets 3 units. Missy gets 36 units. Both girls measured correctly. How could this be?

What tool might each girl have used? Explain how you know.

Extend your thinking!

Which measurement is more accurate: Mia's or Missy's? Why? Explain your thinking.

Mia measures the height of the entire door. She says it is 183 centimeters. Missy measures the length of her desk. She says it is 92 centimeters. How much taller is the height of the door than the length of the desk?

Name: _____ Date: _____

Use Tools Strategically

Reflect and Write

Student 1: "What tool(s) did we use to solve the task?"

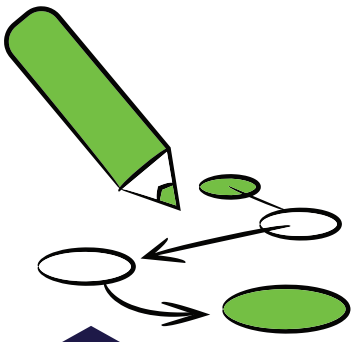
Student 2: Respond.

Student 2: "Why did we select those tools?"

Student 1: Respond.

Both reflect: "How did we use tools strategically in this task?"

Both write: We used tools strategically by _____



Teacher Notes

Show What You Know!

Peter's work	Wanda's work
67 + 38 = ?	67 + 38 = ?
60 + 30 = 90	65 + 40 = 105
7 + 8 = 15	
90 + 15 = 105	

Mr. Sherlock writes 67 + 38 on the board. Look at Peter's work, and then look at Wanda's work. Select one student's work. What does that student know about ways to add numbers together? Explain why this student's method works.

Procedure

Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.

Answer: Example responses are: Peter's method works because he added by place value. First, he added the tens. Then, he added the ones. He knows that if you add by place value, you have to add the tens to the tens and the ones to the ones. Wanda's method works because she added 2 to one addend and subtracted 2 from the other to keep the sum the same, or decomposed 67 into 65 and 2 to be able to regroup the addends to make a multiple of 10 (65 + 2 + 38). She knows that you can adjust numbers to make them easier to work with.

Possible Misconception: Some students might think that Wanda just changed the problem rather than noticing she adjusted the addends.

Language Support

- **Tier 2:** board, work, select, add, method
- **Tier 1:** numbers

Differentiation

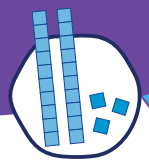
Scaffolding: Begin by asking students to compare two methods using smaller values, such as finding the sum of 18 + 15.

Peter's Work	Wanda's Work
18 + 15 = ?	18 + 15 = ?
10 + 10 = 20	20 + 13 = 33
8 + 5 = 13	
20 + 13 = 33	

Ask students to describe the steps used by Peter and Wanda.

Extension: Have students solve the following:

- Peter solves a different problem: 56 + 32. Here is his work: 60 + 32 = 92
  Peter's work is incomplete. Help him by finishing his work. What would he do next?
- Write a story problem that could be solved by this equation: 36 + ?= 48.



Show What You Know!

Peter's work	Wanda's work
67 + 38 = ?	67 + 38 = ?
60 + 30 = 90	65 + 40 = 105
7 + 8 = 15	
90 + 15 = 105	

Mr. Sherlock writes 67 + 38 on the board. Look at Peter's work, and then look at Wanda's work. Select one student's work. What does that student know about ways to add numbers together? Explain why this student's method works.

Peter solves a different problem: 56 + 32. Here is his work:

60 + 32 = 92

Peter's work is incomplete. Help him by finishing his work. What would he do next?

Write a story problem that could be solved by this equation: 36 + ? = 48.

Name: _____ Partner: _____

Show What You Know!

Peter's work	Wanda's work
67 + 38 = ?	67 + 38 = ?
60 + 30 = 90	65 + 40 = 105
7 + 8 = 15	
90 + 15 = 105	

Mr. Sherlock writes 67 + 38 on the board. Look at Peter's work, and then look at Wanda's work. Select one student's work. What does that student know about ways to add numbers together? Explain why this student's method works.

Extend your thinking!

Peter solves a different problem: 56 + 32. Here is his work:

60 + 32 = 92

Peter's work is incomplete. Help him by finishing his work. What would he do next?

Write a story problem that could be solved by this equation: 36 + ? = 48.

Name: _____ Date: _____

Analyze the Structure

Reflect and Write

Student 1: "What did we look for to help make the task easier?"

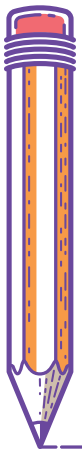
Student 2: Respond.

Student 2: "How did we apply what we know to help us?"

Student 1: Respond.

Both reflect: "How did we analyze the structure in this task?"

Both write: We analyzed the structure by_____



Teacher Notes

Columns and Rows

Row 1	5	6	7	
Row 2	9	10		12
Row 3		14	15	16
Row 4		?		?
Row 5		?		
Row 6	?		?	

Mrs. Nguyen has a chart. Look at the first row. Then, look at the next 2 rows. The rest of the rows are missing the numbers. Some boxes have question marks. Find the numbers that should replace the question marks. What rule did you use to help you?

Procedure

Remind students to use the Understand and Plan, Share and Discuss, and Reflect and Write routines as they work through the task.

Answer: Rules may vary. An example rule is: Add 4 to a number to get the number below it in the column.

Row 1	5	6	7	8
Row 2	9	10	11	12
Row 3	13	14	15	16
Row 4	17	**18**	19	**20**
Row 5	21	**22**	23	24
Row 6	**25**	26	**27**	28

Students may generalize that the numbers increase by 1 in each row or that the numbers increase by 4 going down each column.

Possible Misconception: Students may simply fill in the blanks by counting rather than seeing that the next value in the column is 4 greater than the one above it. Students also may not notice that the number of columns indicates how much to add to a number in the previous row to get the number in the next row.

Language Support

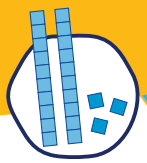
- **Tier 2:** row, missing, columns, rule
- **Tier 1:** numbers

Differentiation

Scaffolding: Ask students what they notice about how the numbers change from row to row. Capture what students notice on the board. Look for students to say that the chart does not begin at 1. The chart increases by 1 each time. As you go down the chart, the numbers increase by 4.

Extension: Have students solve the following:

- What numbers will be in row 10 of the chart? (41, 42, 43, 44) How do you know?
- Make a new chart with your own pattern. Leave some numbers missing. Ask your partner to find the missing numbers.



Columns and Rows

Row 1	5	6	7	
Row 2	9	10		12
Row 3		14	15	16
Row 4		?		?
Row 5		?		
Row 6	?		?	

Mrs. Nguyen has a chart. Look at the first row. Then, look at the next 2 rows. The rest of the rows are missing the numbers. Some boxes have question marks. Find the numbers that should replace the question marks. What rule did you use to help you?

What numbers will be in row 10 of the chart? How do you know?

Make a new chart with your own pattern. Leave some numbers missing. Ask your partner to find the missing numbers.

Name: _____ Partner: _____

Columns and Rows

Row 1	5	6	7	
Row 2	9	10		12
Row 3		14	15	16
Row 4		?		?
Row 5		?		
Row 6	?		?	

Mrs. Nguyen has a chart. Look at the first row. Then, look at the next 2 rows. The rest of the rows are missing the numbers. Some boxes have question marks. Find the numbers that should replace the question marks. What rule did you use to help you?

Extend your thinking!

What numbers will be in row 10 of the chart? How do you know?

Make a new chart with your own pattern. Leave some numbers missing. Ask your partner to find the missing numbers.

Name: _____ Date: _____

Generalize Your Thinking

Reflect and Write

Student 1: "What stayed the same in the task?"

Student 2: Respond.

Student 2: "What changed in the task?"

Student 1: Respond.

Both reflect: "What rule or conjecture did we make to generalize our thinking?"

Both write: Our conjecture or rule is _____