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Teacher Created Materials

Created *by* Teachers *for* Teachers and Students

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## Let's Talk Math

**This sample includes the following:**

LEVEL 5

# Let's Talk Math

## TEACHER'S GUIDE

Support Videos Included!

TCM Teacher Created Materials

# Table of Contents

## Introduction



## How to Use This Resource



## Teacher Notes for the Tasks

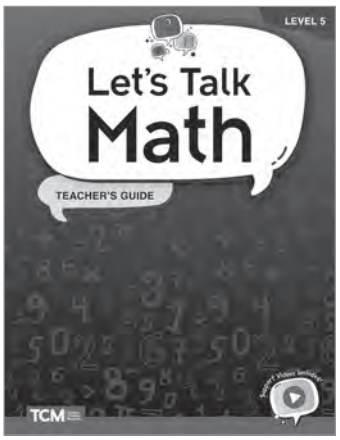


## Appendixes

# How to Use This Resource

## Components

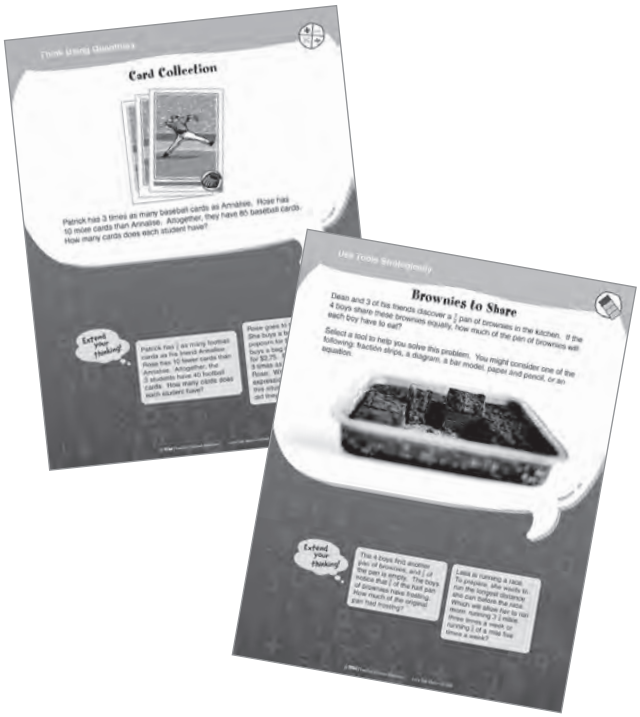
### Teacher's Guide



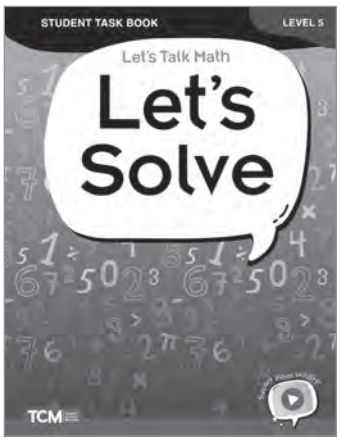

The *Let's Talk Math* Teacher's Guide is an informative, detailed guide that facilitates implementation of this supplemental resource. Every lesson includes a common student misconception for the particular task as well as differentiated support for both scaffolding and extension. Each lesson includes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

### Task Cards

There are 60 full-color, double-sided cards for small-group lessons and workstations. Each card features 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.



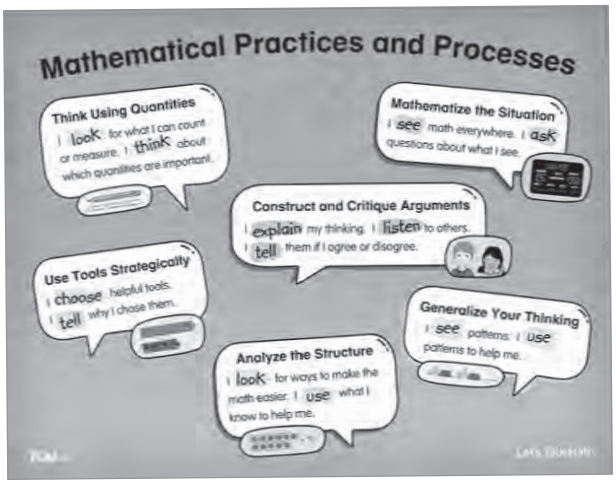

### Let's Solve: Student Task Book

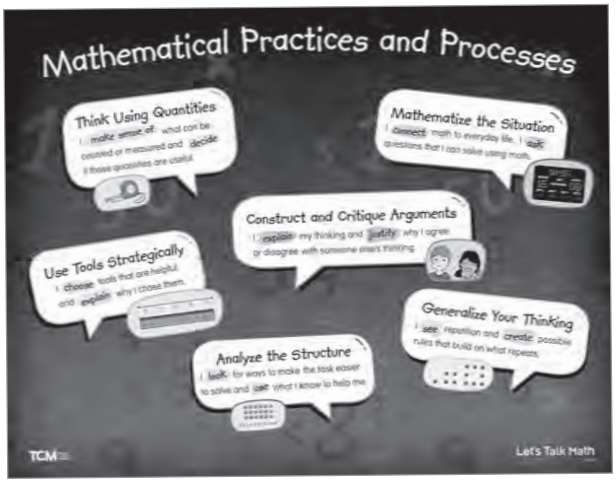



The 120 student tasks are provided in an easy-to-use book with perforated pages for easy distribution to students or for use as students' personal math journals. Each student page includes an opportunity for students to reflect and write.

### 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.



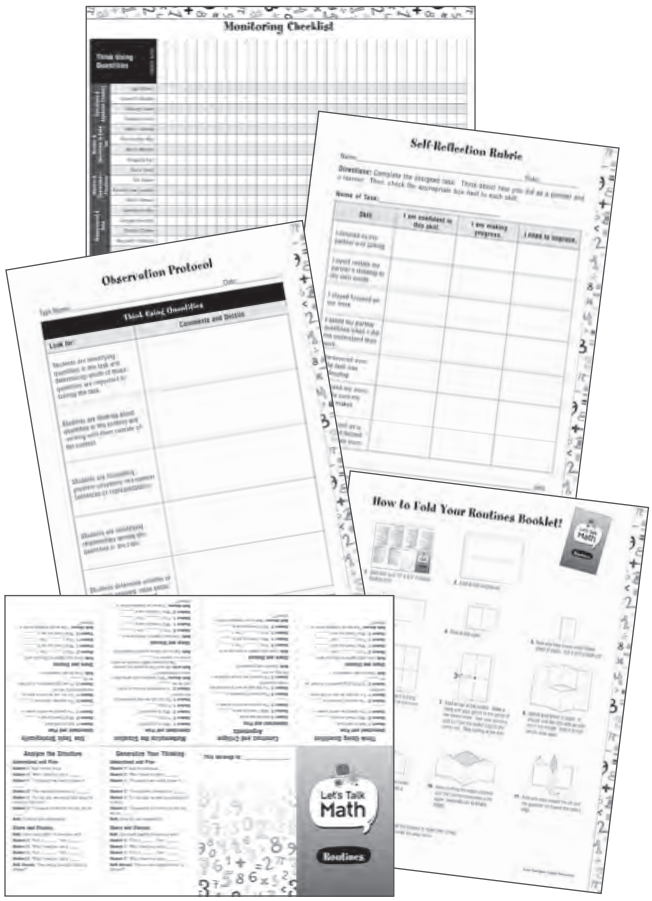
# How to Use This Resource *(cont.)*

## 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.

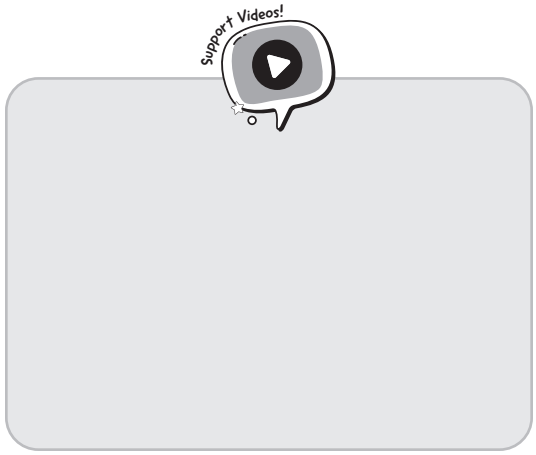
- Digital versions of **Task Cards, Student Task Book** pages, and the **poster** can be used on interactive whiteboards, for virtual sessions, in LMS platforms, and more!
- Assessment tools such as **Observation Protocols**, **Monitoring Checklists**, and **Student Reflection** and **Feedback** templates 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

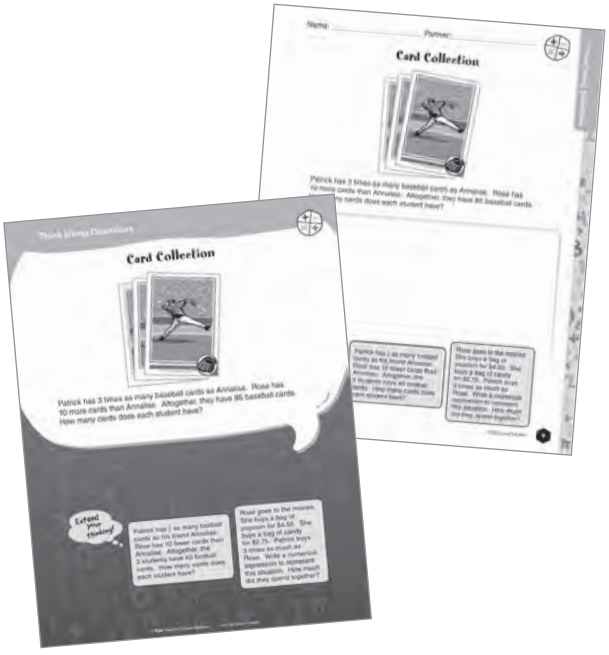



# How to Use This Resource *(cont.)*

## 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 four 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.

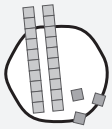
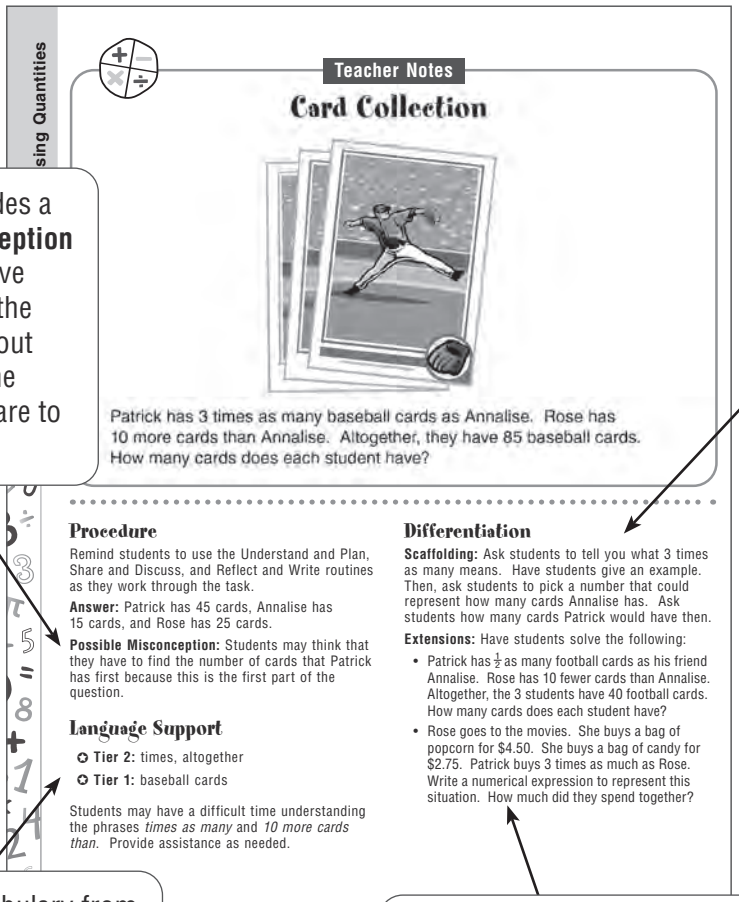
| Mathematical Domain | Icon |
|---|---|
| Operations and Algebraic Thinking |  |
| Number and Operations in Base Ten |  |
| Number and Operations—Fractions |  |
| Measurement and Data |  |
| Geometry |  |

**Figure 6**—Domain Icons

# Teacher Notes Table of Contents





Teacher Notes

Card Collection

Patrick has 3 times as many baseball cards as Annalise. Rose has 10 more cards than Annalise. Altogether, they have 85 baseball cards. How many cards does each student have?

**Procedure**

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

**Answer:** Patrick has 45 cards, Annalise has 15 cards, and Rose has 25 cards.

**Possible Misconception:** Students may think that they have to find the number of cards that Patrick has first because this is the first part of the question.

**Language Support**

- **Tier 2:** times, altogether
- **Tier 1:** baseball cards

Students may have a difficult time understanding the phrases *times as many* and *10 more cards than*. Provide assistance as needed.

**Differentiation**

**Scaffolding:** Ask students to tell you what 3 times as many means. Have students give an example. Then, ask students to pick a number that could represent how many cards Annalise has. Ask students how many cards Patrick would have then.

**Extensions:** Have students solve the following:

- Patrick has $\frac{1}{2}$ as many football cards as his friend Annalise. Rose has 10 fewer cards than Annalise. Altogether, the 3 students have 40 football cards. How many cards does each student have?
- Rose goes to the movies. She buys a bag of popcorn for $4.50. She buys a bag of candy for $2.75. Patrick buys 3 times as much as Rose. Write a numerical expression to represent this situation. How much did they spend together?

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.

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

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

# Card Collection

Patrick has 3 times as many baseball cards as Annalise. Rose has 10 more cards than Annalise. Altogether, they have 85 baseball cards. How many cards does each student have?

## Procedure

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

**Answer:** Patrick has 45 cards, Annalise has 15 cards, and Rose has 25 cards.

**Possible Misconception:** Students may think that they have to find the number of cards that Patrick has first because this is the first part of the question.

## Language Support

- **Tier 2:** times, altogether
- **Tier 1:** baseball cards

Students may have a difficult time understanding the phrases *times as many* and *10 more cards than*. Provide assistance as needed.

## Differentiation

**Scaffolding:** Ask students to tell you what *3 times as many* means. Have students give an example. Then, ask students to pick a number that could represent how many cards Annalise has. Ask students how many cards Patrick would have then.

**Extensions:** Have students solve the following:

- Patrick has $\frac{1}{2}$ as many football cards as his friend Annalise. Rose has 10 fewer cards than Annalise. Altogether, the 3 students have 40 football cards. How many cards does each student have? (Annalise has 20 cards, Patrick has 10 cards, and Rose has 10 cards.)
- Rose goes to the movies. She buys a bag of popcorn for $4.50. She buys a bag of candy for $2.75. Patrick buys 3 times as much as Rose. Write a numerical expression to represent this situation. $(4.50 + 2.75) \times 4$ How much did they spend together? ($29.00)

# Card Collection

Patrick has 3 times as many baseball cards as Annalise. Rose has 10 more cards than Annalise. Altogether, they have 85 baseball cards. How many cards does each student have?

## Extend your thinking!

Patrick has $\frac{1}{2}$ as many football cards as his friend Annalise. Rose has 10 fewer cards than Annalise. Altogether, the 3 students have 40 football cards. How many cards does each student have?

Rose goes to the movies. She buys a bag of popcorn for $4.50. She buys a bag of candy for $2.75. Patrick buys 3 times as much as Rose. Write a numerical expression to represent this situation. How much did they spend together?

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Name: _____ Partner: _____

# Card Collection

Patrick has 3 times as many baseball cards as Annalise. Rose has 10 more cards than Annalise. Altogether, they have 85 baseball cards. How many cards does each student have?

**Extend your thinking!**

Patrick has $\frac{1}{2}$ as many football cards as his friend Annalise. Rose has 10 fewer cards than Annalise. Altogether, the 3 students have 40 football cards. How many cards does each student have?

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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

# Who Is Right?

Tiffany adds $\frac{1}{3} + \frac{3}{4}$. Her answer is $\frac{4}{7}$. Andrew adds $\frac{1}{3} + \frac{3}{4}$. His answer is $1\frac{1}{12}$. Write a convincing argument stating why Andrew's answer is correct.

## Procedure

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

**Answer:** Answers will vary. Andrew is correct because to add fractions, there needs to be a common denominator. This ensures that the fractions are referring to the same whole.

$\frac{1}{3} + \frac{3}{4} =$

$\frac{4}{12} + \frac{9}{12} = \frac{13}{12}$

$1\frac{1}{12}$

Students may also present a diagram that shows how they can find the same-sized pieces.

**Possible Misconception:** Students frequently think that adding fractions means adding numerators and denominators. Just as fractions can only be compared when they are referring to the same whole, fractions can only be added when they are referring to the same whole. This requires finding a common denominator.

## Language Support

- **Tier 2:** adds, convincing, correct
- **Tier 1:** argument

## Differentiation

**Scaffolding:** Show students a fraction strip that represents $\frac{1}{3}$ and another 3 strips that represent $\frac{1}{4}$. Then, show how they line up against 13 strips that represent $\frac{1}{12}$.

**Extensions:** Have students solve the following:

- Find a second way to prove Andrew's thinking.
- What mistake did Tiffany make when she answered $\frac{4}{7}$? (She added the numerators together and then added the denominators together.) Write an explanation of her error to help her understand the correct process.

# Who Is Right?

Tiffany adds $\frac{1}{3} + \frac{3}{4}$. Her answer is $\frac{4}{7}$. Andrew adds $\frac{1}{3} + \frac{3}{4}$. His answer is $1\frac{1}{12}$. Write a convincing argument stating why Andrew's answer is correct.

Extend your thinking!

Find a second way to prove Andrew's thinking.

What mistake did Tiffany make when she answered $\frac{4}{7}$? Write an explanation of her error to help her understand the correct process.

Name: _____ Partner: _____

# Who Is Right?

Tiffany adds $\frac{1}{3} + \frac{3}{4}$. Her answer is $\frac{4}{7}$. Andrew adds $\frac{1}{3} + \frac{3}{4}$. His answer is $1\frac{1}{12}$. Write a convincing argument stating why Andrew's answer is correct.

Extend your thinking!

Find a second way to prove Andrew's thinking.

What mistake did Tiffany make when she answered $\frac{4}{7}$? Write an explanation of her error to help her understand the correct process.

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 _____

_____

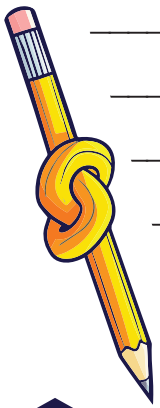
_____

_____

_____

_____

_____



Teacher Notes

# Soccer Stadium

## Procedure

1. Lead a discussion about the image with the class.
2. Place students into pairs. Tell students to use the Understand and Plan routine to generate mathematical questions about the image.
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. If appropriate, have students answer questions independently. Tell them to use the Share and Discuss and Reflect and Write routines to complete the task.

**Answer:** Answers will vary depending on the question chosen.

**Possible Misconception:** Students may want to explore questions that are not quantifiable, such as, "Which teams are playing?" Encourage students to think of a question that can be answered using mathematics. For example, "If this stadium is full, how many people are at this game?"

## 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.

- The world's largest stadium is in Pyongyang, North Korea. It has 114,000 seats.
- The average cost of a soft drink is $6 at most large arenas in the United States.
- An average professional soccer match lasts about 94 minutes.

## Language Support

- **Tier 2:** stadium, fans
- **Tier 1:** soccer, seats

## Differentiation

**Scaffolding:** Consider making a list of questions that are not quantifiable, such as, "Where is this stadium?" and a list of questions that are quantifiable, such as, "How many calories do soccer players burn in 1 hour of playing time?" Creating this list can be done as a whole class discussion or can be written as partners share the question they would like to explore.

**Extensions:** Suggest that students extend their question in some manner. For example, if they explored the number of ticket holders in the stadium, tell them that tickets on average cost $50. Ask them to determine a new question and explore finding the answer.

# Soccer Stadium

Name: _____ Partner: _____

# Soccer Stadium

Questions we might be able to explore: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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

# Max Toy Company

Max Toy Company is packaging toys to send to other stores. They are putting the toys in boxes. Each box will have 18 toys. If Max Toy Company has 3,742 toys to package, how many boxes will they need?

Select a tool, and solve this question. Consider a drawing, a diagram, an equation, an area model, pencil and paper, base-ten blocks, place value disks, place value chart, or mental math.

## Procedure

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

**Answer:** Max Toy Company will need 208 boxes, with the last box only partially filled.

**Possible Misconception:** Students may ignore the remainder, thinking that it does not impact the answer.

## Language Support

- **Tier 3:** equation, area model, base-ten blocks, mental math
- **Tier 2:** packaging, place, tool, question, diagram

Students may struggle to understand the question because of the causal use of "if."

## Differentiation

**Scaffolding:** Ask students to work with smaller numbers using the same context. Perhaps the company wants the toys to be packed 4 in a box, and they have 55 toys. Ask students to find the number of boxes that they need.

**Extensions:** Have students solve the following:

- Max Toy Company pays $1.25 for every box. How much will it cost to buy all the boxes to pack up all the toys? ($260)
- Max Toy Company is repacking the 3,742 toys into new boxes. Each box will now have 9 toys. How does the total number of boxes change? (The number of boxes doubles.)

# Max Toy Company

Max Toy Company is packaging toys to send to other stores. They are putting the toys in boxes. Each box will have 18 toys. If Max Toy Company has 3,742 toys to package, how many boxes will they need?

Select a tool, and solve this question. Consider a drawing, a diagram, an equation, an area model, pencil and paper, base-ten blocks, place value disks, place value chart, or mental math.

Extend your thinking!

Max Toy Company pays $1.25 for every box. How much will it cost to buy all the boxes to pack up all the toys?

Max Toy Company is repacking the 3,742 toys into new boxes. Each box will now have 9 toys. How does the total number of boxes change?

Name: _____ Partner: _____

# Max Toy Company

Max Toy Company is packaging toys to send to other stores. They are putting the toys in boxes. Each box will have 18 toys. If Max Toy Company has 3,742 toys to package, how many boxes will they need?

Select a tool, and solve this question. Consider a drawing, a diagram, an equation, an area model, pencil and paper, base-ten blocks, place value disks, place value chart, or mental math.

Extend your thinking!

Max Toy Company pays $1.25 for every box. How much will it cost to buy all the boxes to pack up all the toys?

Max Toy Company is repacking the 3,742 toys into new boxes. Each box will now have 9 toys. How does the total number of boxes change?

Name: _____ Date: _____

# Use Tools Strategically

## Reflect and Write

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

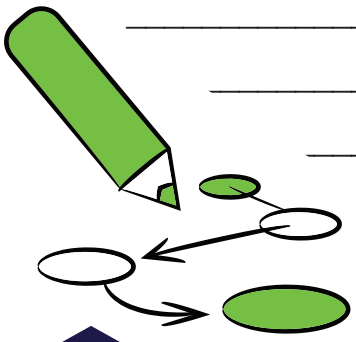
**Student 2:** Respond.

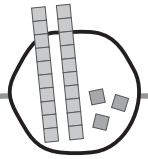
**Student 2:** "Why did we select those tools?"

**Student 1:** Respond.

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

**Both write:** We used tools strategically by _____





Teacher Notes

# Composing Numbers

Harry is studying place value. He writes 2,456.35 on his paper. Harry asks his friends, "How many hundreds are in this number?" His friends seem a little confused, so he makes a table:

| 2,456.35 | |
|---|---|
| 2 | thousands |
| 24 | hundreds |
| | tens |
| | ones |
| | tenths |
| | hundredths |

Complete the rest of the table.

## Procedure

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

**Answer:**

| 2,456.35 | |
|---|---|
| 2 | thousands |
| 24 | hundreds |
| 245 | tens |
| 2,456 | ones |
| 24,563 | tenths |
| 245,635 | hundredths |

**Possible Misconception:** Students may be focused on the value of a certain place value or the digit in a specific place value. This question calls for students to determine how many tens, ones, tenths, and hundredths are in this number.

## Language Support

- **Tier 3:** place value, thousands, hundreds, tens, ones, tenths, hundredths
- **Tier 2:** writes, table
- **Tier 1:** studying, confused, complete

## Differentiation

**Scaffolding:** Provide students with base-ten blocks. Ask them to build 23 in as many ways as possible. After they have found all three ways, ask them to consider the number 146. Ask students to build this value in one way and then determine the total number of tens that are in this value.

**Extensions:** Have students solve the following:

- Determine the total number of thousandths in 304.297. (304,297) Then, determine the digit in the thousandths place and its value. (7 and 0.007) What makes these 2 questions different?
- How many times smaller is the value of the 2 in the number 904.2 compared to the value of the 4? (20 times)

# Composing Numbers

Harry is studying place value. He writes 2,456.35 on his paper. Harry asks his friends, "How many hundreds are in this number?" His friends seem a little confused, so he makes a table:

| 2,456.35 | |
|---|---|
| 2 | thousands |
| 24 | hundreds |
| | tens |
| | ones |
| | tenths |
| | hundredths |

Complete the rest of the table.

**Extend your thinking!**

Determine the total number of thousandths in 304.297. Then, determine the digit in the thousandths place and its value. What makes these 2 questions different?

How many times smaller is the value of the 2 in the number 904.2 compared to the value of the 4?

Name: _____ Partner: _____

# Composing Numbers

Harry is studying place value. He writes 2,456.35 on his paper. Harry asks his friends, "How many hundreds are in this number?" His friends seem a little confused, so he makes a table:

| 2,456.35 | |
|---|---|
| 2 | thousands |
| 24 | hundreds |
| | tens |
| | ones |
| | tenths |
| | hundredths |

Complete the rest of the table.

Extend your thinking!

Determine the total number of thousandths in 304.297. Then, determine the digit in the thousandths place and its value. What makes these 2 questions different?

How many times smaller is the value of the 2 in the number 904.2 compared to the value of the 4?

Name: _____ Date: _____

# Analyze the Structure

## Reflect and Write

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

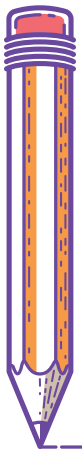
**Student 2:** Respond.

**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?"

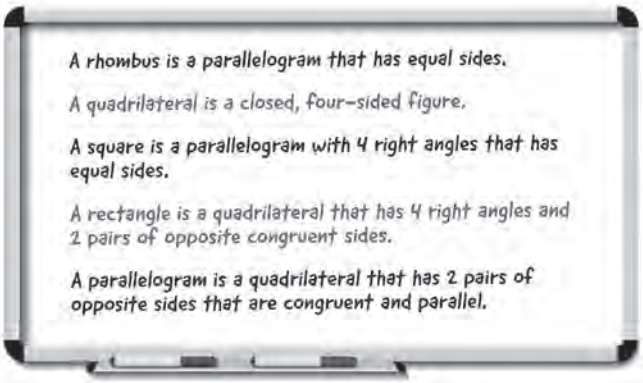
**Both write:** We analyzed the structure by _____



Teacher Notes

# Ms. Miller's Task

Ms. Miller writes these definitions on the board:



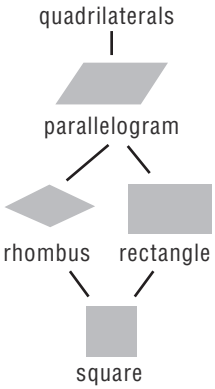

Then, Ms. Miller asks her students to organize the shapes into categories from the most general category to the most specific. Help her students by organizing these geometric shapes. Write a rule or conjecture about the relationships among these shapes.

## Procedure

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

**Answer:**

**Hierarchy of Quadrilaterals**




Students may conclude that the square is also characterized as being every polygon above it. The reverse statement is not true, however. An example rule: A square could be a rectangle or a rhombus. Squares are always a type of quadrilateral and a parallelogram.

**Possible Misconception:** Students may think that each one of these shapes is separate and distinct from the others.

## Language Support

- **Tier 3:** rhombus, square, quadrilateral, parallelogram, rectangle, geometric shapes, congruent, parallel, right angles
- **Tier 2:** definitions, equal, sides, organize, categories, general, specific, relationships

## Differentiation

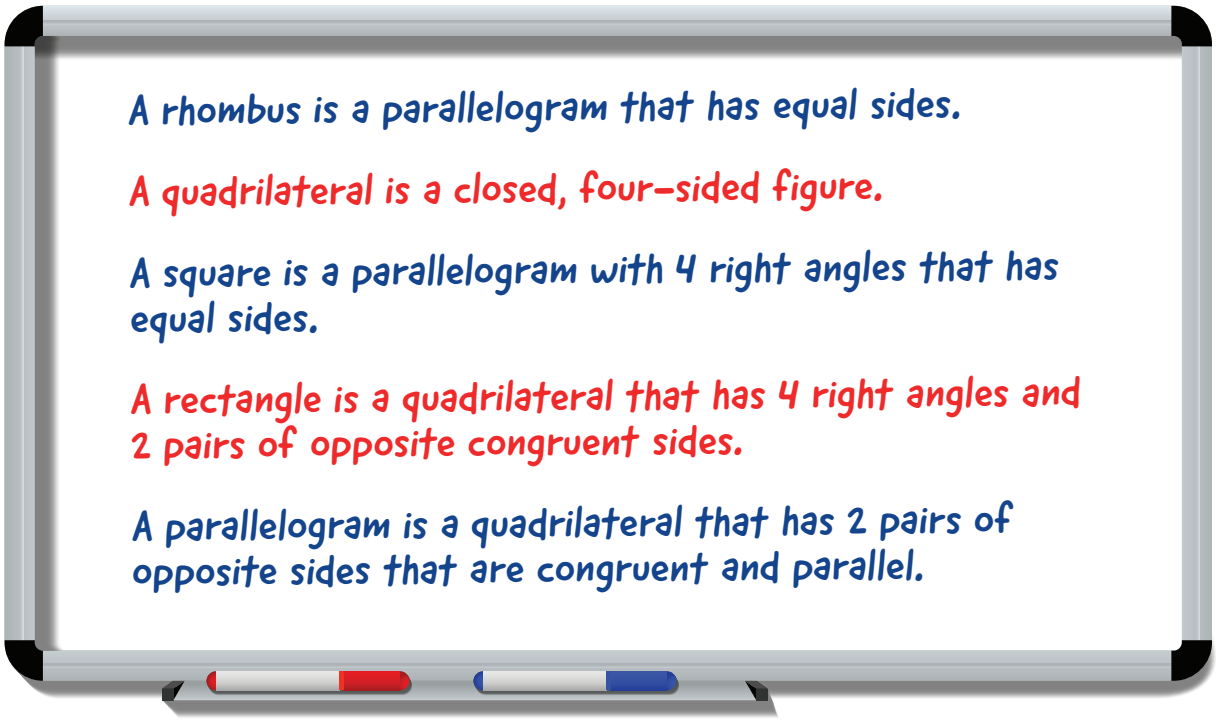
**Scaffolding:** Ask students to draw quadrilaterals and rectangles. Ask them whether the rectangle has the characteristics of the quadrilateral. Then, ask them to explain whether the quadrilateral has the characteristics of the rectangle.

**Extensions:** Have students solve the following:

- Where does a trapezoid fit into your organizational chart?
- Ms. Miller added one more definition to the board: A kite is a four-sided shape with 2 pairs of equal sides that are adjacent to each other, forming equal angles where the lines meet. The diagonals of this shape cross at right angles. Where does this shape belong on your organizational chart?

# Ms. Miller's Task

Ms. Miller writes these definitions on the board:




Then, Ms. Miller asks her students to organize the shapes into categories from the most general category to the most specific. Help her students by organizing these geometric shapes. Write a rule or conjecture about the relationships among these shapes.

Extend your thinking!

Where does a trapezoid fit into your organizational chart?

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Name: _____ Partner: _____

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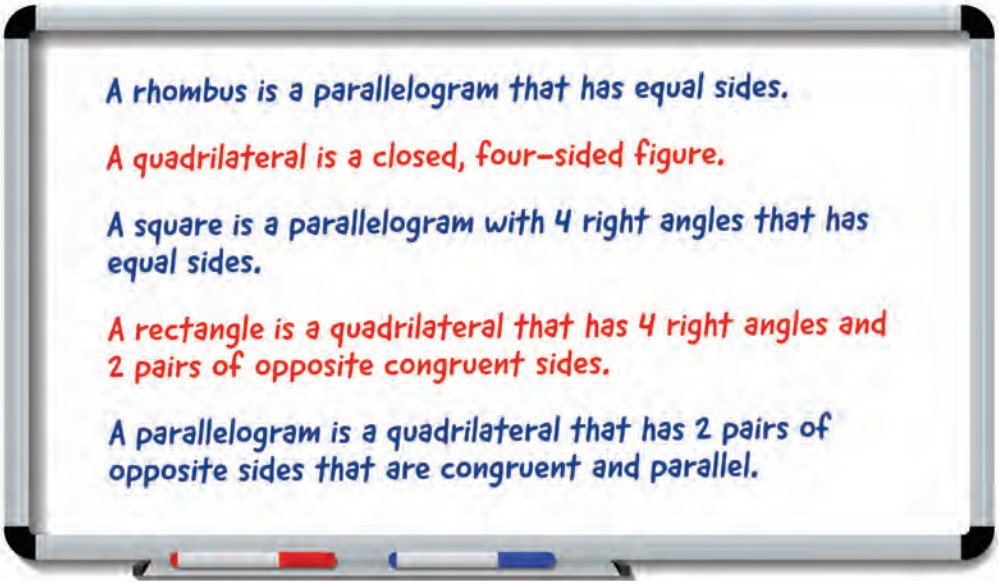


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Name: _____ Date: _____

# 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 _____

_____

_____

_____

_____

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