

CLEARMath®
Elementary

Powered by Play Math Packet

Free K–5 math games and Mental Math Routines



Children are great at having fun, so that’s how they’ll learn best! That’s why these games and Mental Math Routines from ClearMath Elementary are powered by play.

Re-imagine your classroom as a place where you and your students play together, think together, and learn together as you tap into their curiosity and ignite a love of mathematics.

We can’t wait to help you get started—let’s play!

Instructions for use

Focused on key concepts from each grade, each set of activities includes playful learning opportunities to re-engage students with content and solidify their knowledge.

Math Games

During your math block, play these games with your students to reinforce grade-level learning. Practice the game with your whole class by watching the included videos, and divide students into small groups to play together as you circulate and facilitate. Don't forget to have fun!

Mental Math Routines

Mental Math Routines are whole-class, lively, and brief exercises that build students' mastery and skill fluency in critical arithmetic foundations of elementary math. These routines are done orally with children responding aloud.

You can use these routines during morning calendar time and repeat them throughout the day, while waiting in line, or any time you have a few minutes.

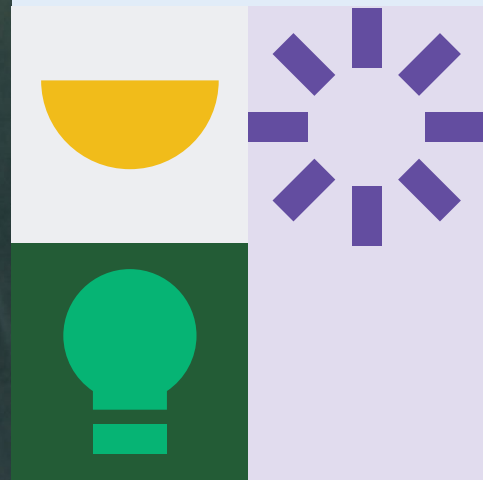


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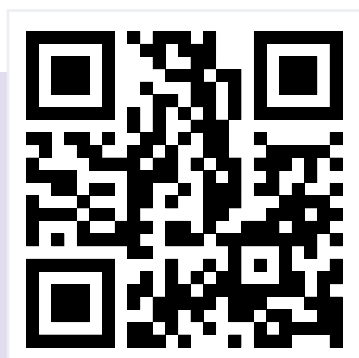
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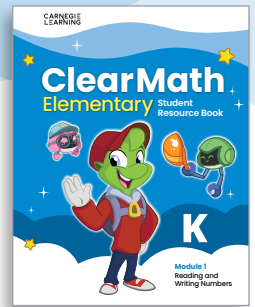
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To learn more about ClearMath Elementary,
a math solution powered by play, visit:
www.carnegielearning.com/cmel ▶



Kindergarten Math Game: Collecting Pennies

Use this optional Activate activity to prepare students to play Collecting Pennies.

Activate

Collecting Pennies

Directions: Circle a group of 1 penny, a group of 2 pennies, and a group of 3 pennies.



To play Collecting Pennies, you'll need to gather:

- 30–50 pennies
- A number cube labeled only with the numbers 1–3

Click to see how to play Collecting Pennies:

vimeo.com/carnegielearning/kindergarten-activity ▶




Kindergarten Mental Math Routines: Numbers to 5

One, Two, Three Fingers

Lesson 5: Identifying the Number 4

Mental Math Routine

One, Two, Three Fingers



Module 1: Reading and Writing Numbers
Topic 1: Numbers to 5

CARNEGIE LEARNING

How to use One, Two, Three Fingers:

- Show students 1, 2, or 3 fingers using one hand.
- Have students match your demonstration.
- Show each number again using one hand.
- Challenge students to show you a matching quantity, when possible, using two hands.

Five Fingers

Lesson 6: Identifying the Number 5

Mental Math Routine

Five Fingers



Module 1: Reading and Writing Numbers
Topic 1: Numbers to 5

CARNEGIE LEARNING

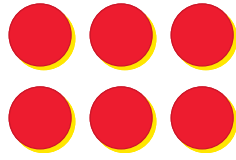
How to use Five Fingers:

- Display 5 fingers using one hand.
- Have students match your demonstration.
- Have students show 5 fingers using two hands in as many different ways as they can.
- Challenge students to show you a matching quantity, when possible, using two hands.
- Review the numbers 1 to 5, first by using fingers on one hand and then by using fingers on two hands.



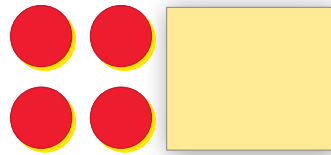
Hidden Counters

- 1 Player 1 determines how many counters to show and creates an arrangement.



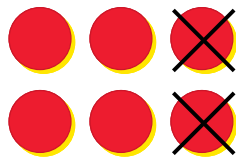
- 2 Player 2 counts the counters. Then, they close their eyes.

- 3 Player 1 uses the note card to hide some of the counters. Then, they write an equation with an unknown addend that represents the counters.



$$4 + \underline{\quad} = 6$$

- 4 Player 2 opens their eyes and determines the number of hidden counters.
- 5 Both players draw a picture of their counters and mark the hidden counters with an X. Then, they complete the equation.



$$4 + \underline{2} = 6$$

Hidden Counters

➤ Use this recording sheet to play the game.

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1

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

2

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

3

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

4

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$





1st Grade Mental Math Routines: Addition and Subtraction Strategies to 20


Fingers Up, Fingers Down

Lesson 7: Sums of 10

Mental Math Routine

 **Fingers Up, Fingers Down**

 $6 + 4 = 10$
up down



Module 1: Representing Quantities
Topic 2: Addition and Subtraction Strategies to 20

CARNEGIE LEARNING


How to use Fingers Up, Fingers Down:


- Show the back of both hands to the class with some fingers up so that students cannot count the fingers that are down.
- Ask, "How many fingers are up? How many fingers are down?"
- Increase the speed of showing combinations and reduce the questions to, "Up? Down?"
- Challenge students by eventually reducing to an upward and downward tilt of your head. This encourages students to name pairs of numbers with a sum of 10.

Skip Counting by 10s

Lesson 10: Subtraction Stories

Mental Math Routine

 **Skip Counting by 10s**

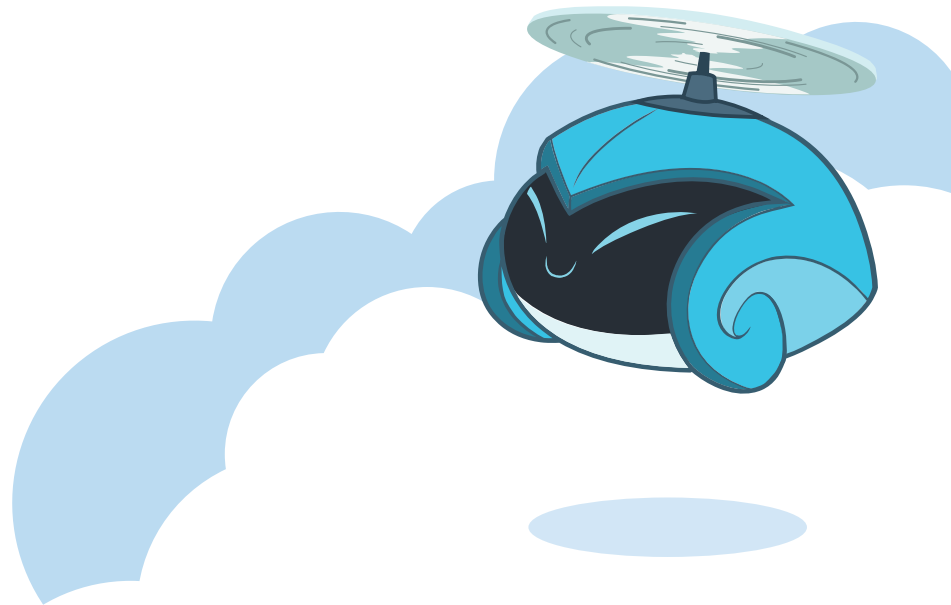


Module 1: Representing Quantities
Topic 2: Addition and Subtraction Strategies to 20

CARNEGIE LEARNING

How to use Skip Counting by 10s:

- Display a tower of 10 connecting cubes.
- Count the cubes together with the class.
- Display another tower of 10 and hold the two side by side.
- Guide students to conclude the second tower must also have 10 cubes.
- Have them check by counting, when necessary.
- Ask, "How many cubes are there altogether in both towers?"
- Have students predict and then count from 10 to 20 to check their predictions.
- Count several multiples of 10, then review the sequence by counting towers by 10s: 10, 20, 30...



Trading to 100

Goal: To be the first player to trade for a flat

- 1 Each player uses a gameboard to keep score.
- 2 Player 1 rolls the number cube and records the number in the Number Rolled column.
- 3 In the New Total column, Player 1 draws base-10 representations of the previous total. They then add base-10 representations of the number rolled.
- 4 When needed, the player draws the total regrouped with the fewest number of base-10 representations in the Regrouped Total When Possible column.
- 5 Player 2 takes a turn.
- 6 The first player to regroup 10 rods for a flat wins!

Levels:

- Level 1: Players trade to 100 using 1 number cube.
- Level 2: Players trade to 100 using 2 number cubes, adding both to get the total number for each round.
- Level 3: Players trade to 200 using 2 number cubes, with 1 number cube representing an amount of rods and the other number cube representing an amount of unit cubes.

When you and your partner finish Level 1, try Level 2!



Center 2: Revisiting Trading to 100

➤ Use the recording sheet to track your score.

Number Rolled	New Total	Regrouped Total When Possible

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2nd Grade Mental Math Routines: Place Value Through 999

Double the Number

Lesson 7: Re-Engaging with Place-Value Regrouping

Mental Math Routine

Double the Number



Module 1: Connecting Addition, Subtraction, and Place Value
Topic 2: Place Value Through 999

CARNEGIE LEARNING

How to use Double the Number:


- Have students double a number that you name.
- Use only single-digit numbers or multiples of ten.
- Encourage students to visualize base-10 blocks as they are doubling. Ask them:
 - How do you represent 10 using a set of base-10 blocks?
Sample answer: 2 rods
 - How do you represent twice that number using base-10 blocks?
Sample answer: 4 rods
 - What value does the new set of base-10 blocks represent?
Sample answer: 40
 - What patterns do you notice when you double numbers?
Sample answer: Each number has twice the value of the previous number.

Cover and Compare

Lesson 9: Connecting Numbers and Words

Mental Math Routine

Cover and Compare

$$\begin{array}{r} 45 \\ 47 \\ 43 \end{array}$$


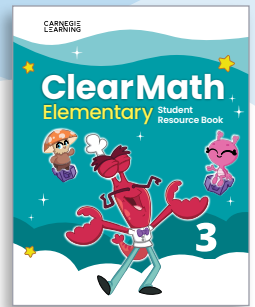
Module 1: Connecting Addition, Subtraction, and Place Value
Topic 2: Place Value Through 999

CARNEGIE LEARNING

How to use Cover and Compare:

- Display two 2-digit numbers with the same tens digit, one above the other, such as 45 and 47.
- Cover the numbers so that only the tens digits are showing and ask students which number is greater.
- Uncover the numbers and ask the same question again.
- After students determine the greater number, display a third number with the same tens digit below the other two numbers.
- Compare the second and third numbers by first looking at the tens and then the ones.
- Then, have students order all three numbers.
- Repeat the activity using numbers such as 53, 63, and 43 as time permits.





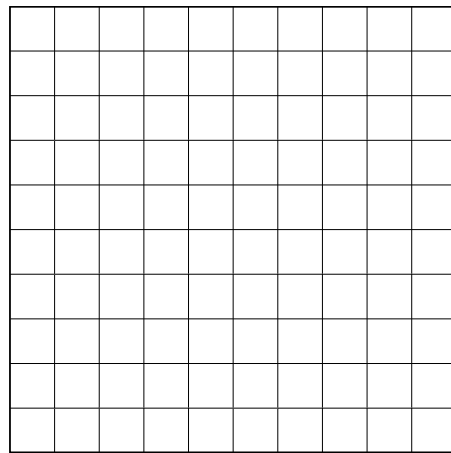
3rd Grade Math Game: Rectangular Fit!

Instructions for Rectangular Fit!

Game Instructions

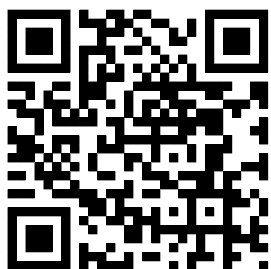
- 1 Play the game in pairs. Each player chooses a different color crayon and tosses 1 number cube to determine who goes first. The player with the greater number goes first.
- 2 Player 1 tosses both number cubes. The player then draws and colors a rectangle on the gameboard with the number of rows and columns they rolled on the number cubes.
 - Players must label their rectangles with the area.
- 3 Player 2 takes a turn rolling the number cubes and coloring a rectangle with the number of rolled rows and columns.
- 4 When a player cannot fit their rectangle on the gameboard they receive a strike and lose their turn.
- 5 Once a player has 3 strikes, the player cannot take another turn. The game ends when both players have 3 strikes.
- 6 The player with the greater total area from all their rectangles wins the game.

You may want to build your rectangle with unit cubes first before coloring it on your gameboard!



Strikes:

Player 1			
Player 2			



To play Rectangular Fit!, you'll need to gather:

- A number cube

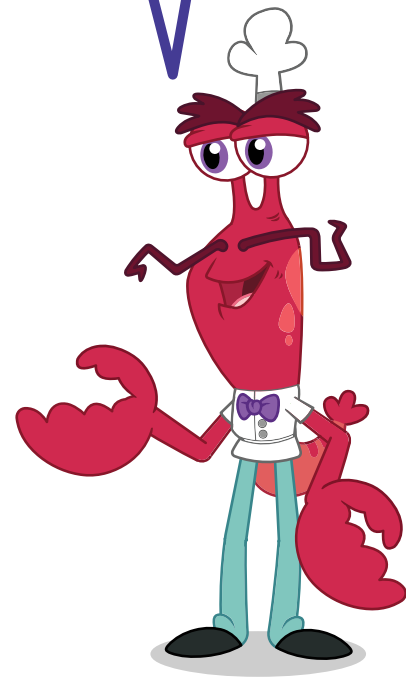
Click to see how to play Rectangular Fit!:

vimeo.com/carnegielearning/thirdgrade-activity ▶

Instructions for Rectangular Fit!

- 1 Play the game in pairs. Each player chooses a different color crayon and tosses 1 number cube to determine who goes first. The player with the greater number goes first.
- 2 Player 1 tosses both number cubes. The player then draws and colors a rectangle on the gameboard with the number of rows and columns they rolled on the number cubes.
 - Players must label their rectangles with the area.
- 3 Player 2 takes a turn rolling the number cubes and coloring a rectangle with the number of rolled rows and columns.
- 4 When a player cannot fit their rectangle on the gameboard they receive a strike and lose their turn.
- 5 Once a player has 3 strikes, the player cannot take another turn. The game ends when both players have 3 strikes.
- 6 The player with the greater total area from all their rectangles wins the game.

You may want to build your rectangle with unit cubes first before coloring it on your gameboard!



Rectangular Fit!

➤ Color the area of the rectangles based on the numbers you roll.

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Strikes:

Player 1			
Player 2			



3rd Grade Mental Math Routines: Area and Arrays

Counting Hidden Dots

Lesson 5: Tiling Rectangles

Mental Math Routine

Counting Hidden Dots

Module 1: Connecting Area, Addition, and Multiplication
Topic 1: Area and Arrays

CARNEGIE LEARNING

How to use Counting Hidden Dots:

- Show the partially covered arrays. Ask students:
 - How many rows, columns, and dots can you see?
4 rows, 4 columns, and 7 total dots
 - How many dots are there behind the rectangle?
9 dots behind the rectangle
 - How do you know how many dots there are behind the rectangle?
Sample answer: There are 3 rows of 4 dots behind the rectangle: $3 + 3 + 3 = 9$.
 - How did you determine the total number of dots in the array?
Sample answer: I added what I could see to what I could not see: $7 + 9 = 16$. There are 4 rows of 4 dots in the array: $4 + 4 + 4 + 4 = 16$.

Counting Hidden Dots 2

Lesson 6: Re-Engaging with Tiling

Mental Math Routine

Counting Hidden Dots

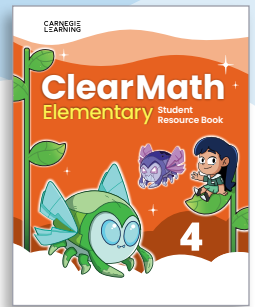
Module 1: Connecting Area, Addition, and Multiplication
Topic 1: Area and Arrays

CARNEGIE LEARNING

How to use Counting Hidden Dots 2:

- Show the partially covered arrays. Ask students:
 - How many rows, columns, and dots can you see?
6 rows, 4 columns, and 9 total dots
 - How many dots are there behind the rectangle?
15 dots behind the rectangle
 - How do you know how many dots there are behind the rectangle?
Sample answer: There are 5 rows of 3 dots behind the rectangle: $5 + 5 + 5 = 15$.
 - How did you determine the total number of dots in the array?
Sample answer: I added what I could see to what I could not see: $9 + 15 = 24$. There are 6 rows of 4 dots in the array: $6 + 6 + 6 + 6 = 24$.





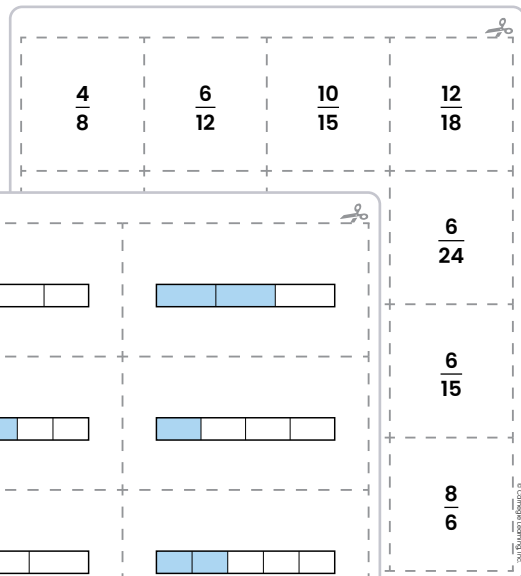
4th Grade Math Game: Fraction-tration

Fraction-tration

Game Instructions

- 1 Mix up the model cards and put them facedown in a stack.
- 2 Spread the fraction cards out facedown in front of both players.
- 3 Flip over 1 model card.
- 4 Player 1 turns over 2 fraction cards. Players work together to determine whether the fractions are equivalent and match the model card.
 - When the fraction cards are equivalent and match the model, the player removes the fraction cards from the board. Then, the player flips over another model card.
 - When the fraction cards are not equivalent or do not match the model cards, the player turns them back over.
- 5 Player 2 repeats Step 4.
- 6 Play continues until all cards are removed from the playing area.
 - The player with more cards is the winner of the game.

How do you determine whether the two fractions you flipped are equivalent?



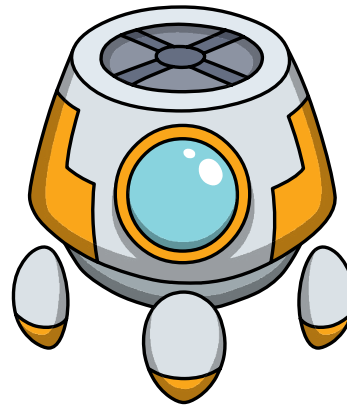
Click to see how to play Fraction-tration:

vimeo.com/carnegielearning/fourthgrade-activity ▶

Fraction-tration

- 1 Mix up the model cards and put them facedown in a stack.
- 2 Spread the fraction cards out facedown in front of both players.
- 3 Flip over 1 model card.
- 4 Player 1 turns over 2 fraction cards. Players work together to determine whether the fractions are equivalent and match the model card.
 - When the fraction cards are equivalent and match the model, the player removes the fraction cards from the board. Then, the player flips over another model card.
 - When the fraction cards are not equivalent or do not match the model cards, the player turns them back over.
- 5 Player 2 repeats Step 4.
- 6 Play continues until all cards are removed from the playing area.
 - The player with more cards is the winner of the game.

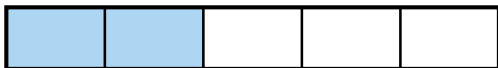
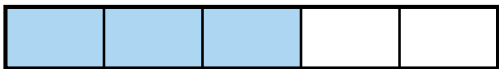
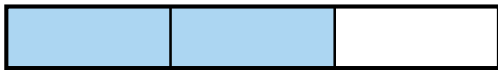
How do you determine whether the two fractions you flipped are equivalent?



Fraction-raction Cards



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$$\frac{4}{8}$$

$$\frac{6}{12}$$

$$\frac{10}{15}$$

$$\frac{12}{18}$$

$$\frac{15}{25}$$

$$\frac{18}{30}$$

$$\frac{5}{20}$$

$$\frac{6}{24}$$

$$\frac{3}{9}$$

$$\frac{2}{6}$$

$$\frac{4}{10}$$

$$\frac{6}{15}$$

$$\frac{9}{6}$$

$$\frac{6}{4}$$

$$\frac{20}{15}$$

$$\frac{8}{6}$$




4th Grade Mental Math Routines: Fraction Equivalence and Comparisons

Fractions That Make 1


Lesson 2: Fractions Greater Than 1 and Mixed Numbers

Mental Math Routine

Fractions That Make 1



$\frac{5}{7}$ are shaded.



Module 1: Composing and Decomposing Numbers and Measures
Topic 3: Fraction Equivalence and Comparisons

CARNEGIE LEARNING

How to use Fractions That Make 1:


- Draw a rectangle on the board and divide it into 7 equal sections.
- Ask students, "What fraction is represented?"
- Draw a figure that is divided into equal pieces and shade only some of the pieces.
- Ask students for the fraction that describes the shaded portion of the figure.
- Ask students for the fraction of the figure that is not shaded.
- Repeat with other figures divided into different numbers of equal pieces.

Decomposing 1 Whole by Unit Fractions

Lesson 3: Re-Engaging With Fractions Greater Than 1 and Mixed Numbers

Mental Math Routine

Decomposing 1 Whole by Unit Fractions



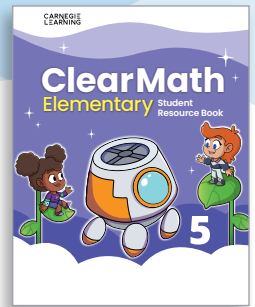
Module 1: Composing and Decomposing Numbers and Measures
Topic 3: Fraction Equivalence and Comparisons

CARNEGIE LEARNING

How to use Decomposing 1 Whole by Unit Fractions:

- Draw a rectangle on the board and divide it into 2 equal sections.
- Ask students to identify the unit fraction that represents one piece of the whole.
- Have students identify how many unit fractions compose the whole.
- Have students write an equation to show the whole, 1, decomposed into a sum of unit fractions.
 $1 = \frac{1}{2} + \frac{1}{2}$
- Repeat with whole models divided into thirds, fourths, fifths, sixths, and eighths, having students write an equation to show the whole decomposed into a sum of unit fractions for each.





5th Grade Math Game: Build My Figure

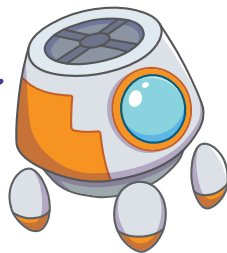
Build My Figure

Game Instructions

GOAL: To build and describe the mystery figure in 20 questions or less

- 1 Place the cards face down on the table.
- 2 Choose one player to be the Architect. The Architect selects a card, keeping it secret from the other players.
- 3 The other players are the Builders. They ask *yes* or *no* questions about the mystery figure and use unit cubes to build the mystery figure.
 - Record the information you learn on the recording sheet.
- 4 When the Builders correctly identify the mystery figure, they determine the volume of the mystery figure and record it in the recording sheet.
- 5 When the Builders have asked 20 questions without correctly identifying the mystery figure, the Architect reveals the card and all players determine the volume of the figure and record it in the recording sheet.
- 6 Select a different player to be the Architect and replay the game.

Do you like being the Builder or the Architect?



Center 2: Build My Figure
Use the recording sheet as you play the game.

Round 1
Record what you learn about the mystery figure.
Volume of the mystery figure: _____

Round 2
Record what you learn about the mystery figure.
Volume of the mystery figure: _____



To play Build My Figure, you'll need to gather:

- Building blocks

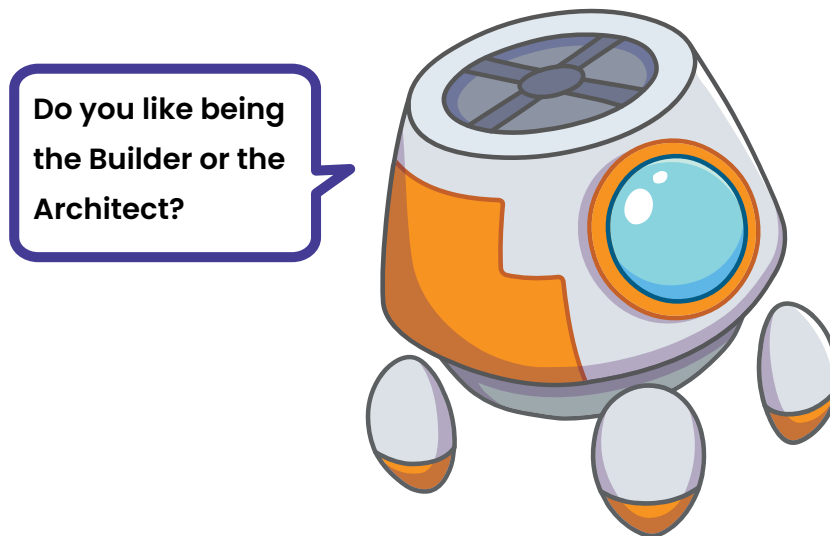
Click to see how to play Build My Figure:

vimeo.com/carnegielearning/fifthgrade-activity ▶

Build My Figure

GOAL: To build and describe the mystery figure in 20 questions or less

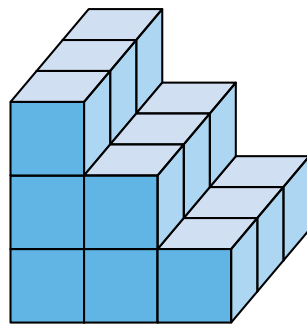
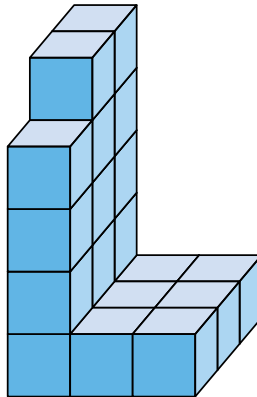
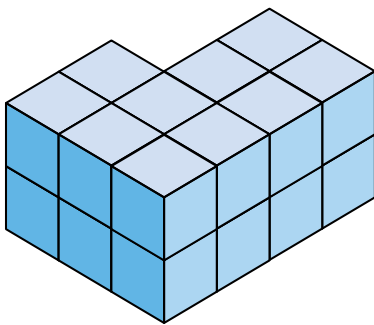
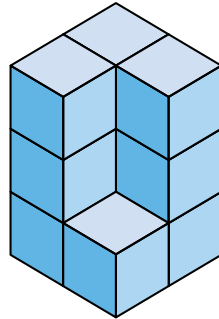
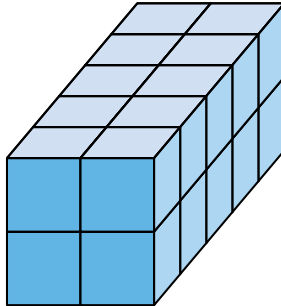
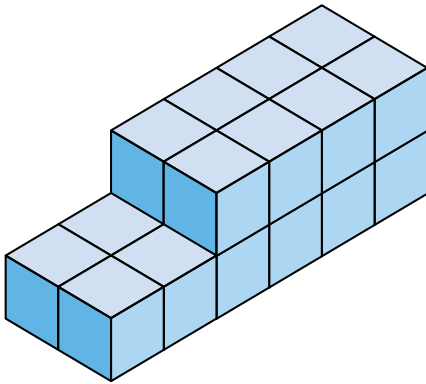
- 1 Place the cards face down on the table.
- 2 Choose one player to be the Architect. The Architect selects a card, keeping it secret from the other players.
- 3 The other players are the Builders. They ask *yes* or *no* questions about the mystery figure and use unit cubes to build the mystery figure.
 - Record the information you learn on the recording sheet.
- 4 When the Builders correctly identify the mystery figure, they determine the volume of the mystery figure and record it in the recording sheet.
- 5 When the Builders have asked 20 questions without correctly identifying the mystery figure, the Architect reveals the card and all players determine the volume of the figure and record it in the recording sheet.
- 6 Select a different player to be the Architect and replay the game.

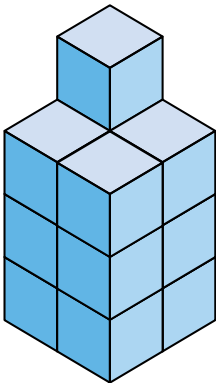
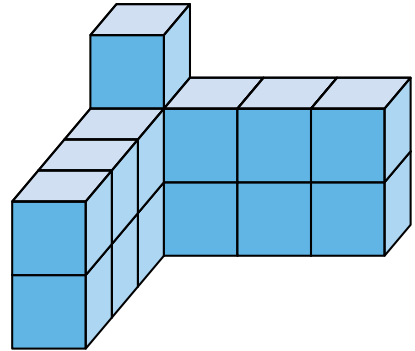
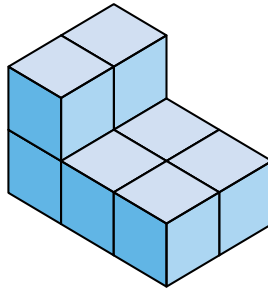
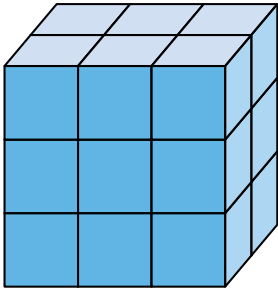


Build My Figure Cards



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Center 2: **Build My Figure**

➤ Use the recording sheet as you play the game.

Round 1

Record what you learn about the mystery figure.

Volume of the mystery figure: _____

Round 2

Record what you learn about the mystery figure.

Volume of the mystery figure: _____




5th Grade Mental Math Routines: Building to Volume

Volumes of Cubes

Lesson 8: Volume and Area

Mental Math Routine

Volumes of Cubes



Module 1: Unpacking Properties of Shapes and Expressions
Topic 1: Building to Volume

CARNEGIE LEARNING

How to use Volumes of Cubes:

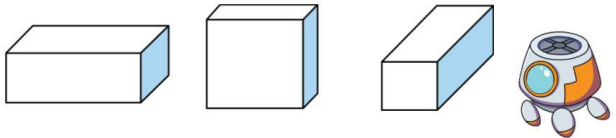
- Have students recall the features of a cube and also the way to compute the volume of a cube. Ask them:
 - What are the features of a cube?
 - How do you compute the volume of a cube?
- Pose the following questions and allow students time to perform the multiplication on their calculators.
 - When the length of the edge of a cube is each of the following, what is its volume?
 - 2 units?
 $2 \times 2 \times 2 = 8$, or 8 cubic units
 - 10 units?
 $10 \times 10 \times 10 = 1,000$, or 1,000 cubic units
 - 4 units?
 $4 \times 4 \times 4 = 64$, or 64 cubic units
 - 6 units?
 $6 \times 6 \times 6 = 216$, or 216 cubic units

Volumes of Rectangular Prisms

Lesson 9: Designing a Building

Mental Math Routine

Volumes of Rectangular Prisms



Module 1: Unpacking Properties of Shapes and Expressions
Topic 1: Building to Volume

CARNEGIE LEARNING

How to use Volumes of Rectangular Prisms:

- Sketch a rectangular prism on the board. Ask students:
 - What is the formula for the volume of the prism?
- Point to a three-dimensional figure and have a student give the unknown volume. Repeat problems with different numbers.



