RightStart™ Mathematics

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FOURTH GRADE LESSONS

Second Edition

Activities for Learning, Inc.

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RightStart™ Mathematics Objectives for Fourth Grade

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Numeration				
Understands and finds prime numbers	N/A			
Factors numbers	N/A			
Reads, writes, rounds, and compares numbers to the billions				
Addition and Subtraction				
Adds and subtracts multi-digit numbers in multiple ways				
Multiplication and Division				
Knows multiplication facts to 10 × 10	N/A			
Knows division facts, including remainders	N/A	N/A		
Applies commutative, associative, and distributive properties	N/A			
Multiplies multiples of 10, e.g. 80 × 7	N/A			
Multiplies multi-digit numbers by a 2-digit number	N/A	N/A		
Does short division to divide multi-digit number by a single digit	N/A	N/A		
Problem Solving				
Solves two-step problems involving four operations				
Writes equations to represent story problems				
Solves division story problems with remainders				
Solves elapsed time, distance, money, and capacity problems	N/A	N/A	N/A	
Measurement				
Understands square units: cm^2, dm^2, sq ft, and sq yd	N/A	N/A		
Finds perimeter and area in customary and metric units	N/A	N/A		
Converts measurements in same system (e.g., g to kg)	N/A	N/A	N/A	
Fractions				
Adds and subtracts simple fractions and mixed numbers	N/A			
Understands a/b as $1/b$ multiplied by a	N/A			
Understands $n\frac{a}{b}$ as a whole number plus a fraction	N/A			
Compares and finds equivalences on the fraction chart	N/A			
Multiplies fractions times a whole number	N/A			
Decimals and Percents				
Understands decimals as fractions of tenths or hundredths	N/A	N/A		
Converts decimal fractions from tenths to hundredths and back	N/A	N/A		
Adds, subtracts, and compares decimals to two decimal places	N/A	N/A		
Understands and uses simple percents	N/A	N/A		
Patterns				
Recognizes and continues numeric and geometric patterns	N/A	N/A	N/A	
Uses algebraic thinking to write a pattern symbolically				
Solves simple equations	N/A			
Data				
Makes line plots and interprets data	N/A	N/A	N/A	
Geometry				
Locates lines of symmetry and draws reflections	N/A	N/A	N/A	
Knows angles 30°, 45°, 60°, 90°, 180°, and 360°	N/A	N/A	N/A	
Classifies shapes by attributes	N/A	N/A	N/A	
Constructs equilateral triangle and other shapes	N/A	N/A	N/A	

Fourth Grade Table of Contents

Fourth Grade Table of Contents

Fourth Grade Table of Contents

Fourth Grade Table of Contents

Lesson 56: Adding Mixed Numbers with Eighths

OBJECTIVES:

1. To learn the terms *proper fraction* and *improper fraction*
2. To practice adding fractions with eighths
3. To convert improper eighths to proper eighths

MATERIALS:

1. Fraction charts and fraction pieces
2. *Math Card Games* book, F22.1
3. Math journals

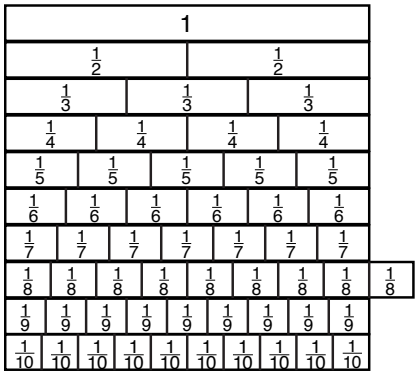
ACTIVITIES FOR TEACHING:

Warm-up. Ask: In the fraction one fifth, what is the denominator? [5] In the fraction one fifth, what number is the numerator? [1] If the denominator and numerator are the same, what does the fraction equal? [1]

Improper fractions. Distribute the fraction charts and fraction pieces.

Write: $\frac{9}{8}$

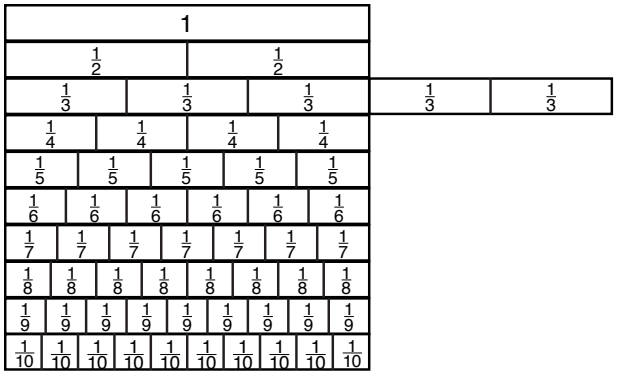
and ask the children to show it with their fraction chart and fraction pieces. [8 eighths plus 1 more eighth] See figure below.



Showing $\frac{9}{8}$ with the fraction chart and pieces.

Write: $\frac{5}{3}$

and tell them to show it with the fraction materials. See figure below.



Showing $\frac{5}{3}$ with the fraction chart and pieces.

EXPLANATIONS:

ACTIVITIES FOR TEACHING CONTINUED:

Write: $\frac{9}{8}$ $\frac{5}{3}$ $\frac{3}{4}$

Ask: Which of these three fractions is less than one? [$\frac{3}{4}$] How can you tell by looking only at the numerators and denominators? [The numerator is less than the denominator.]

Say: When the numerator is less than the denominator, the fraction is called a *proper fraction*. This name results from hundreds of years ago when people thought a "real" fraction had to be less than one. The word "fraction" comes from the Latin word "frangere" meaning "to break." Two other words from this root word are fracture and fragment. Mathematicians realized fractions were division and often were not less than one. They called fractions equal to or greater than one *improper fractions*.

Write: $\frac{4}{8}$ $\frac{7}{4}$ $\frac{4}{3}$ $\frac{8}{8}$ $\frac{12}{8}$ $\frac{1}{6}$

Ask: Which of these are proper fractions? [only the first and last fractions, $\frac{4}{8}$ and $\frac{1}{6}$]

Ask: How can we rewrite the improper fractions using a whole number plus a fraction? [$1\frac{3}{4}$, $1\frac{1}{3}$, 1, $1\frac{4}{8}$]

Preparation for Corners™ with Eighths game. Explain that the game for the day will be a Corners™ Three game variation. Now each number on the cards will be *eighths*. For example, 3 is $\frac{3}{8}$ and 9 is $\frac{9}{8}$.

Write: $1\frac{3}{8} + \frac{9}{8} =$

and ask the children to add it. Ask several children to explain their work to the class.

One way is: $1\frac{3}{8} + \frac{9}{8} = 1\frac{12}{8} = 2\frac{4}{8}$

Another way is: $1\frac{3}{8} + \frac{9}{8} = 2\frac{4}{8}$ (with $1\frac{1}{8}$ above the 9/8)

Give them another example: $2\frac{5}{8} + \frac{18}{8} = [2\frac{23}{8} = 4\frac{7}{8}$ or $2\frac{5}{8} + 1\frac{8}{8} = 4\frac{7}{8}]$ (with $2\frac{2}{8}$ above the 18/8)

Corners™ with Eighths game. Play Corners™ with Eighths game, found in *Math Card Games* book, F22.1. Stress that the fractions in the scoring sums must be proper fractions. Tell them to write the scoring in their math journals.

In conclusion. Ask: What do we call a fraction when the numerator is greater than the denominator? [improper] What is a fraction called when the denominator is greater than the numerator? [proper]

EXPLANATIONS CONTINUED:

This can be done by referring to the fraction chart. No algorithm is necessary.

The answers need not be in lowest terms.

4.NF.B.3.C

Lesson 59: Multiplying by Two Digits

OBJECTIVE:

1. To develop a procedure for multiplying by two digits

MATERIALS:

1. Worksheet 37, Multiplying by Two Digits

ACTIVITIES FOR TEACHING:

Warm-up. Ask: What is 31 × 2? [62] What is 31 × 20? [620] What is 31 × 200? [6200]

Ask: What is 23 × 3? [69] What is 23 × 30? [690] What is 23 × 300? [6900]

Multiplying by two digits. Write these three problems:

312	312	312
× 2	× 30	× 32
624	9360	

Say: You have been multiplying problems like the first one for several months now. In yesterday's lesson you multiplied numbers with tens like the second problem. Today you will multiply numbers with two digits like the third problem.

Ask: How do you think you could do it? Tell the children to share their thoughts with a neighbor and then ask someone to share with the class. Two solutions are below.

312	312
× 32	× 32
624	9360
9360	624
9984	9984

EXPLANATIONS:

It is acceptable to multiply the leftmost digit first.

Worksheet 37. Distribute the worksheets and tell the children to do the first two rows in the left box. The solutions are below.

Then tell them to discuss their answers with a neighbor and the class.

63	63	63	825	825	825
× 5	× 30	× 35	× 6	× 50	× 56
315	**1890**	**315**	**4950**	**41,250**	**4950**
		1890			**41250**
		2205			**46,200**

ACTIVITIES FOR TEACHING CONTINUED:

Repeat for the last two rows in the left box. The solutions are below.

3674	3674	3674	9062	9062	9062
× 1	× 80	× 81	× 7	× 20	× 27
3674	**293,920**	**3674**	**63,434**	**181,240**	**63434**
		293920			**181240**
		297,594			**244,674**

Writing the 'carries.' Write:

$$\begin{array}{r} 28 \\ \times\ 43 \\ \hline \end{array}$$

and multiply the 28 × 3 part. See below.

$$\begin{array}{r} {\scriptstyle 2} \\ 28 \\ \times\ 43 \\ \hline 84 \end{array}$$

Do not insist that all children write the little ones. Some can do it mentally.

Continue with multiplying the 28 × 40.

$$\begin{array}{r} {\scriptstyle 3} \\ {\scriptstyle 2} \\ 28 \\ \times\ 43 \\ \hline 84 \\ 1120 \\ \hline 1204 \end{array}$$

Technically, it is not necessary to write the 0 in the right column of the second line. However, it helps children in their understanding that they are multiplying by 3 tens and not by 3 ones.

Unfortunately, some students have been taught to write an "x" as the placeholder. This nonstandard use of x has caused those students considerable confusion when they studied algebra.

Explain that the carries, the little numbers, can be written in rows above the problem, but many people do not write them at all; they do it mentally.

Worksheet 37. Tell the children to complete the worksheet. The solutions are below.

81	143	572	2927	
× 52	× 33	× 64	× 81	
162	**429**	**2288**	**2927**	
4050	**4290**	**34320**	**234160**	
4212	**4719**	**36,608**	**237,087**	
365	**365**	**365**	**365**	**365**
× 2	**× 9**	**× 10**	**× 55**	**× 26**
730	**3285**	**3650**	**1825**	**2190**
			18250	**7300**
			20,075	**9490**

In conclusion. Ask: If you multiply 2 by 50 and then 2 by 3 and add them together, what is the answer? [106, 2 × 53] If you multiply any number by 50 and then by 3 and add them together, what is the answer? [number × 53]

If there is additional time following this lesson, play the Multiples Solitaire game, found in *Math Card Games* book, P19.

EXPLANATIONS CONTINUED:

4.NBT.B.5

Name: _____

Date: _____

1. Find the products by using your previous answers wherever possible.

63 × 5	63 × 30	63 × 35
825 × 6	825 × 50	825 × 56
3674 × 1	3674 × 80	3674 × 81
9062 × 7	9062 × 20	9062 × 27

2. Multiply.

81 × 52	143 × 33	572 × 64
		2927 × 81

3. How many days are in the following number of years? Ignore leap years.

2 yr	9 yr	10 yr	55 yr	26 yr
365				

Lesson 78: Using Decimal Points for Hundredths

OBJECTIVES:

1. To understand decimals as an alternate way of writing tenths and hundredths
2. To subtract tenths and hundredths in decimal format

MATERIALS:

1. Warm-up Practice 3
2. Cotter Abacuses and 10 centimeter cubes
3. Place-value cards
4. *Math Card Games* book, N43 and F22.2, and Math journals
5. Worksheet 51, Using Decimal Points for Hundredths

ACTIVITIES FOR TEACHING:

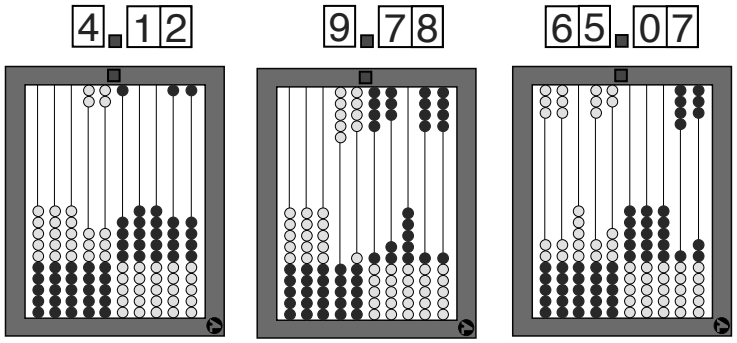
Warm-up. Distribute the warm-up practice sheets. Tell the children to do the second section on the page. Solutions are on the right.

Writing hundredths as decimals. Distribute the abacuses, centimeter cubes, and place-value cards.

Write: $4\frac{12}{100}$

and ask: How do you think you could write this using a decimal point? Write it: 4.12

Say: We read it as 4 and 12 hundredths. Compose the number with your place-value cards and enter it on your abacus. See the left figure below.



Entering 4.12. **Entering 9.78.** **Entering 65.07.**

Repeat for nine and 78 hundredths. See the middle figure above.

Repeat for 65 and 7 hundredths. (To get the zero, turn a tens card for example, the 30-card, upside down and cover the 3 with the 7.) See the right figure above. Ask: Why did you need a zero before the 7? [Without it, it would be 65 and 7 tenths.]

Practice. Write and ask them to read the following:

30.72 [30 and 72 hundredths]

72.8 [72 and 8 tenths]

72.08 [72 and 8 hundredths]

9.40 [9 and 40 hundredths]

EXPLANATIONS:

5678 (**8**)	5678 (**8**)	5678 (**8**)
× 2 (**2**)	× 70 (**7**)	× 72 (**0**)
11 356 (**7**)	**397 460** (**2**)	**11 356**
		397 460
		408 816 (**0**)
	213 459 (**6**)	
	× 35 (**8**)	
	1 067 295	
	6 403 770	
	7 471 065 (**3**)	

This question encourages the children to think of the big picture and to continue to think intuitively about math.

Do not at this point read 4.12 as "four point one two." This lesson is to help the children understand the relationship between fractions and decimals.

ACTIVITIES FOR TEACHING CONTINUED:

Can You Find game. Play this variation of the Can You Find game, found in *Math Card Games* book, N43. Use place-value cards with ones and tens and seven centimeter cubes. Below are the numbers to say. Tell the children to compose the number and set it aside. All the cards will be collected at the end of the game.

1. Can you find 90 and 5 tenths?
2. Can you find 8 tenths?
3. Can you find 60 and 87 hundredths?
4. Can you find 50 and 12 hundredths?
5. Can you find 24 and 3 tenths?
6. Can you find 71 and 36 hundredths?
7. Can you find 9 hundredths? (Hint: Turn the 40-card upside down to get a zero.)

Subtracting tenths and hundredths. Write:

4.1	2.37	3.26
– .3	– 1.31	– 1.48

and ask them to find the differences any way they can. [3.8, 1.06, 1.78] They could do it with the abacus or by thinking in terms in tenths and hundredths as fractions.

Worksheet 51. Distribute the worksheets to the children and tell them to do the problems. The solutions are below.

$1\frac{29}{100}$ **1.29**	$52\frac{52}{100}$ **52.52**	$63\frac{47}{100}$ **63.47**
$\frac{83}{100}$ **.83**	$8\frac{7}{100}$ **8.07**	$8\frac{9}{10}$ **8.9**

21.6	9.3	10.0	9.1
– 3.5	– 5.6	– 8.5	– 8.3
18.1	**3.7**	**1.5**	**.8**
11.63	9.47	9.53	7.41
– 2.31	– 2.87	– 5.28	– 5.53
9.32	**6.60**	**4.25**	**1.88**
5.68	5.15	8.00	3.40
– 2.08	– 2.90	– 1.25	– 1.25
3.60	**2.25**	**6.75**	**2.15**

Corners™ with Tenths game. Play this variation of Corners™ with Tenths game found in Math Card Games book, F22.2. Say: Use your math journal to write the scores using decimal points. In this game, all the numbers are considered to be hundredths. A score of 12 is now 12 hundredths, written with a decimal point (.12). Tell them to use their math journals for scoring.

In conclusion. Ask: Which is more, 7 tenths or 7 hundredths? [7 tenths] Which is more, 7 tenths or 70 hundredths? [the same] Which is more, 7 or 7 tenths? [7]

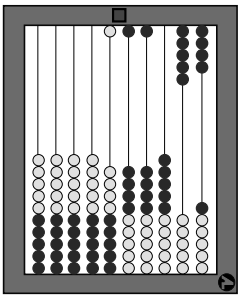
EXPLANATIONS CONTINUED:

4.NF.C.6

Name: _____

Date: _____

Write the quantities shown using fractions and decimal points.



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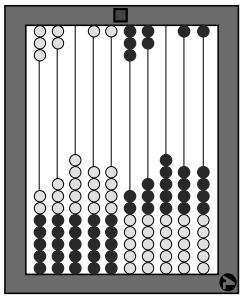

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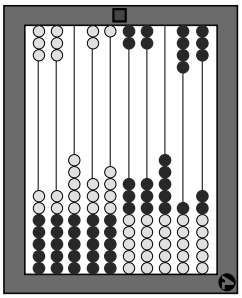

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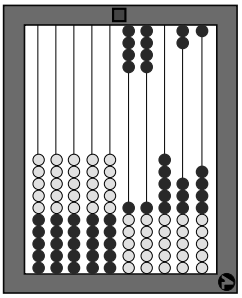
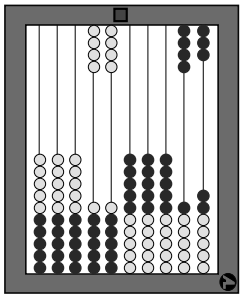


_____ _____



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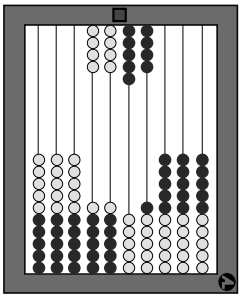


_____ _____

Subtract the following.

21.6 − 3.5	9.3 − 5.6	10.0 − 8.5	9.1 − 8.3
11.63 − 2.31	9.47 − 2.87	9.53 − 5.28	7.41 − 5.53
5.68 − 2.08	5.15 − 2.90	8.00 − 1.25	3.40 − 1.25

Lesson 95: More Percentage Problems

OBJECTIVES:

1. To solve more common problems involving percentages
2. To learn about tipping and sales tax

MATERIALS:

1. Warm-up Practice 9
2. Worksheet 67, More Percentage Problems
3. *Math Card Games* book, F48

ACTIVITIES FOR TEACHING:

Warm-up. Distribute the warm-up practice sheets. Tell the children to do the second multivide on the page. Solutions are on the right.

Worksheet 67. Distribute the worksheets and ask the children to read and solve the first problem. Then tell them to explain it to a neighbor and the class.

1. In a certain class 50% of the children are girls. There are 12 girls. How many children are in the class? [24 children]

If 50% are girls, then 50% must be boys. The total number will be 12 × 2 = 24 children.

Repeat for the remaining problems.

2. The usual tip at a restaurant is 15% of the cost of the food. Many people figure it out by first finding 10%, then finding 5%, which is half of 10%, and adding them together. What is the tip if the food costs $8.00? [$1.20]

Ten percent of $8 is $0.80. Half of that is $0.40. Adding $0.80 and $0.40 is $1.20.

3. What is the 15% tip if the food bill is $12.00? What is the total cost? [$13.80]

Tip is $1.20 + $0.60 = $1.80. Total is $12 + $1.80 = $13.80.

4. In some places people pay sales tax on certain things they buy. If the sales tax is 5%, what is the total bill for a car that cost $4000? [$4200]

Ten percent of $4000 is $400. Half of that is $200. Total is $4000 + $200 = $4200 total cost.

EXPLANATIONS:

24 (**6**)
× 18 (**0**)
192
240
432 (**0**)
× 6 (**6**)
2 592 (**0**)
× 35 (**8**)
12 960
77 760
90 720 (**0**)
× 96 (**6**)
544 320
8 164 800
9) **8 709 120** (**0**)
8) **967 680** (**0**)
7) **120 960** (**0**)
6) **17 280** (**0**)
5) **2 880** (**0**)
4) **576** (**0**)
3) **144** (**0**)
2) **48** (**3**)
24

ACTIVITIES FOR TEACHING CONTINUED:

5. The original price for a game is $10.00. In Store A it went on sale at 10% off and then it went on sale again with 50% off of the sale price. In Store B it went on sale at 50% off and then it went on sale again with 10% off of the sale price. Which store has the better price? [the same, $4.50]

At Store A, the price after the first reduction is $10 × 90% = $9. After the second price reduction, it is $9 × 50% = $4.50.

At Store B, the price after the first reduction is $10 × 50% = $5. After the second price reduction, it is $5 × 90% = $4.50.

Percentage War game. Have them play the Percentage War game, found in *Math Card Games* book, F48.

In conclusion. Ask: Which is more, one half or 60%? [60%] Which is more, three eighth or 20%? [three eighths] Which is more, two thirds or four fifths? [four fifths]

EXPLANATIONS CONTINUED:

Note that the final price for Store A is $10 × 50% × 90% and for Store B it is $10 × 90% × 50%, which gives the same result.

4.MD.A.2

Name: _____

Date: _____

Solve the following problems.

1. In a certain class 50% of the children are girls. There are 12 girls. How many children are in the class?

2. The usual tip at a restaurant is 15% of the cost of the food. Many people figure it out by first finding 10%, then finding 5%, which is half of 10%, and adding them together. What is the tip if the food costs $8.00?

3. What is the 15% tip if the food bill is $12.00? What is the total cost?

4. In some places people pay sales tax on certain things they buy. If the sales tax is 5%, what is the total bill for a car that cost $4000?

5. The original price for a game is $10.00. In Store A it went on sale at 10% off and then it went on sale again with 50% off of the sale price. In Store B it went on sale at 50% off and then it went on sale again with 10% off of the sale price. Which store has the better price?

Lesson 122: Isometric Drawings

OBJECTIVES:

1. To introduce isometric drawing
2. To practice visualizing objects
3. To make some simple isometric drawings

MATERIALS:

1. Warm-up Practice 12
2. Worksheet 94, Isometric Drawings
3. 35 centimeter cubes per child
4. Drawing boards
5. T-squares and 30-60 triangles
6. Colored 1" × 1" Tiles - 10 per child

ACTIVITIES FOR TEACHING:

Warm-up. Distribute the warm-up practice sheets. Tell the children to do the second multivide on the page. Solutions are on the right.

Worksheet 94. Distribute the worksheets, centimeter cubes, drawing boards, T-squares, triangles, and tiles to the children. Tell them to tape the worksheet to their drawing boards.

Problem 1. Tell the children to read the instructions on the worksheet for Problem 1. Tell them to use their triangle to find the angles of the lines. [90° and 30°]

Explain that the word "isometric" (i-so-MET-ric) comes from two Greek words, "iso" meaning "equal" and "metric" meaning "measure." Ask: What other mathematical word starts with "iso"? [isosceles] What does isosceles mean? [equal legs]

Ask: What small figures makes up the background for the isometric drawings? [equilateral triangles] What is special about them? [All three sides are equal.] Say: This means that the units are the same in each direction. Isometric drawings are a way to show three dimensions on a flat surface.

Tell the children that the terms *width*, *length*, and *height* do not have exact definitions. Sometimes *breadth* and *depth* are also used. Because of possible confusion, companies that sell boxes do not use these words to describe the dimensions of their boxes, but use drawings or just the measurements instead.

Tell them to make a cube with their centimeter cubes that measures 2 cm on a side. See the left figure on the next page. Then tell them to make another cube that measures 3 cm on a side. See the right figure. Ask: How does the length, width, and height change? [increases by 1 cm]

EXPLANATIONS:

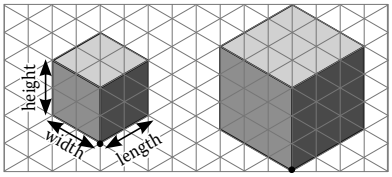
```
                16 (7)
             × 90 (0)
          1 440 (0)
             × 56 (2)
            8 640
           72 000
          80 640 (0)
             × 72 (0)
          161 280
        5 644 800
9)5 806 080 (0)
8)645 120 (0)
7)80 640 (0)
6)11 520 (0)
5)1 920 (3)
4)384 (6)
3)96 (6)
2)32 (5)
          16
```

ACTIVITIES FOR TEACHING CONTINUED:

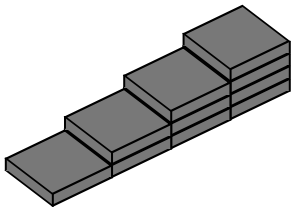
Cube with 2 cm side.

Cube with 3 cm side.

Tell them to draw the 3 cm cube for Problem 1. The solution is shown below. Tell the children to share their work with a neighbor and the class.

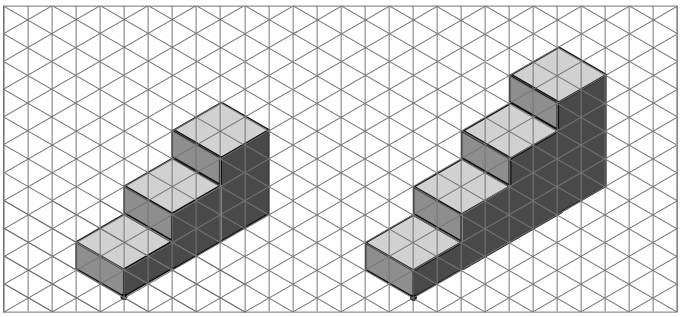


Problem 2. Tell the children to read the instructions for the second problem. Tell them to make the stairs they need with tiles first. See the figure below.

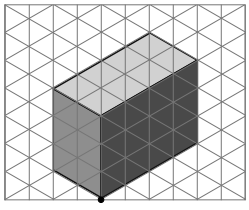


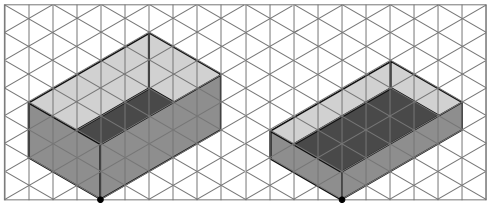
The stairs built with tiles.

Then tell them to draw the stairs. The solution is shown below. Tell them to share with a neighbor and the class.



Problems 3 and 4. Tell them to complete the worksheet. The solutions are below.





In conclusion. Ask: Do you see any rectangular prisms in the room? [possibly a brick, book, picture frame, box, table top, and window glass.]

EXPLANATIONS CONTINUED:

Shading isn't strictly necessary, but it makes the figure more realistic.

The children will need this worksheet for the next lesson.

If there is additional time following this lesson, play the Card Exchange game, found in *Math Card Games* book, P27.

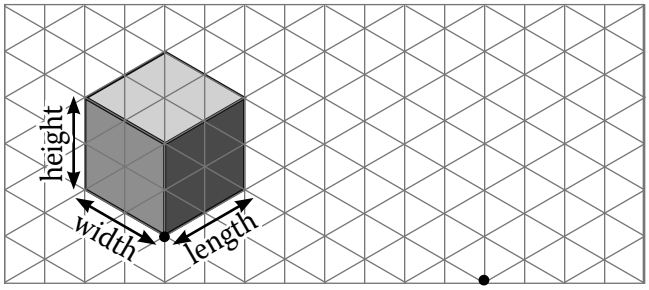
4.OA.C.5

Name: _____

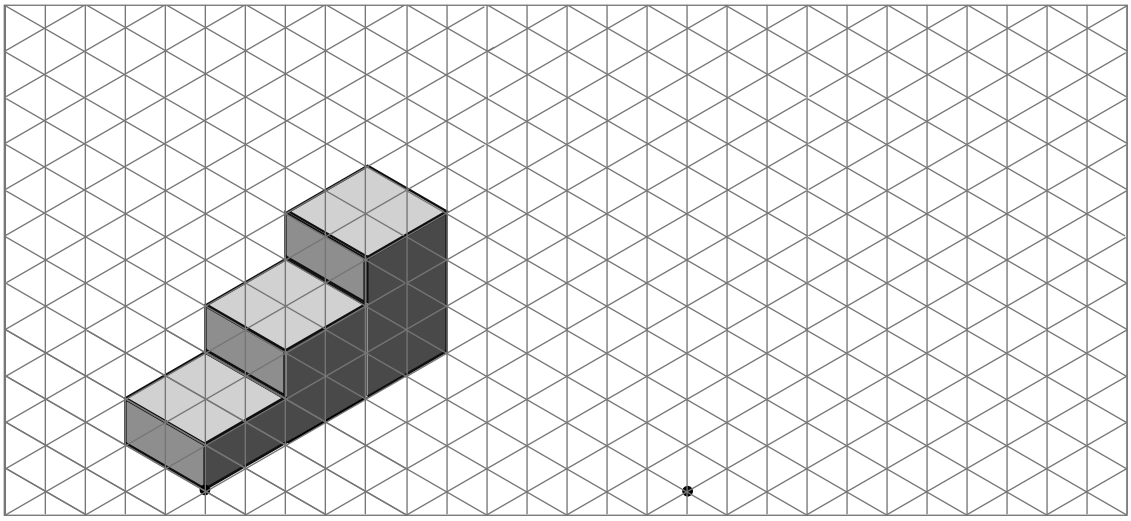
Date: _____

1. The drawing at the right is called an isometric drawing. Isometric drawings show equal distances along the three dimensions: width, length, and height. Engineers, architects, and designers use isometric drawings to show how a product will look.

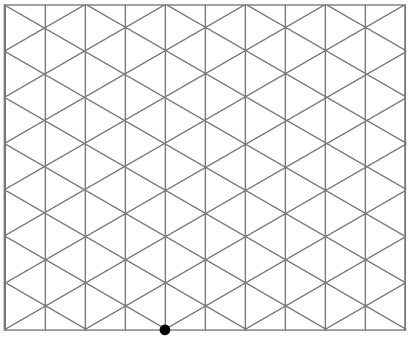
The cube shown is 2 units on each edge. Using your drawing tools, draw another cube that is 3 units on an edge. Start at the dot. Make each side different by shading or hatching.



2. Copy the stairs, but make it one step higher.



3. Draw a rectangular prism (a box) that is 2 units wide, 4 units long, and 3 units high.



4. Draw an empty box like the box shown, but make it only 1 unit high. Be sure the bottom of the box shows.