

Operation Building Blocks



Standard: 4.OA.1 Use the four operations with whole numbers to solve problems.

Group Size: 2-6, Working in pairs

Materials: *Set of Building Blocks such as LEGO blocks, 1 bag per pair of students
*Large Building Block Base, 1 per pair of students
*Felt work mat, 1 per pair

*Operation Building Blocks Recording Sheet

*3-Minute Timer

*Examples (pictures or real building blocks)

*Word Problem Cards

*Answer Cards, 1 per group

*Equation Answer Key

*Point Sheet

Directions:

1. Each pair of students looks through their container of building blocks to determine sizes and categorize pieces. This container is placed near their felt work mat.
2. All pairs review and discuss the examples.
3. The Leader and Co-Leader answer any questions student might have.
4. The leader begins by turning over one of the word problem cards.
5. Each pair of students independently determines how to represent the problem using the building blocks. When they know they have the correct concrete representation using the building blocks, they put their hands on their shoulders.
6. Each pair shares their model with the group and shares why they feel it is correct. The
7. When all pairs have a response, the Leader turns over the answer card for pairs to check. The 1st pair to have a correct response receives 5 points. All other pairs who are correct receive 3 points.
8. Each pair is given 3 minutes to record the equation and solve the problem. The Co-Leader shows the answer key. All pairs who are correct receive 5 points.
9. The next problem card is turned over and the process continues as time allows.

Challenge: Create new word problems for the equation and/or the blocks used for the word problems on the cards.

1. A blue hat costs \$6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost?

2. Chris can go 4 miles on his bike. Jill can go 7 times as fast on her motorcycle. How fast can Jill go on her motorcycle?

3. Nick has two bags of coins. The first bag has 6 coins. The second bag has 7 times as many coins. How many coins are in the second bag?

4. Malcolm has 2 dogs. Brute is a 10 inch tall beagle. Shep, the collie, is 3 times taller than Brute. How tall is Shep?

**5. Jayden planted a 4 foot tall pear tree with his dad. His dad said, "Wow, that maple tree was the same size when I planted it and now it's 6 times taller."
• How tall is the maple tree?**

6. Mya collected 32 aluminum cans for recycling during one week. She collected 4 times as much as her brother. How many cans did her brother collect in one week?

7. It costs \$48 to play paint ball half-day from when Main Event opens at 9am till 2pm. This is 4 times as much as it costs for 1 hour of paint ball. Is the half-day ticket worth it? Why?

8. A vintage sailing ship's top speed is 4 knots. A United States battleship's top speed is 24 knots. How many times faster is the battleship than the sailing ship? Which would you rather be on? Give mathematical reasons why.

9. Jamaal and his sister Brandi can download 8 video games a month. They have downloaded 32 video games. What is the least number of months they have been downloading?

Operation Building Blocks

Equation and Answer

Sketch of Building Blocks

Equation and Answer

Sketch of Building Blocks

Equation and Answer

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Equation and Answer

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Equation and Answer

Sketch of Building Blocks

Operation Building Blocks, EXAMPLE

Word Problem

Sarah and her little brother Miles baked cookies one morning. Miles made 2 dozen. Sarah made 4 times as many as Miles. How many dozens of cookies did they make together?

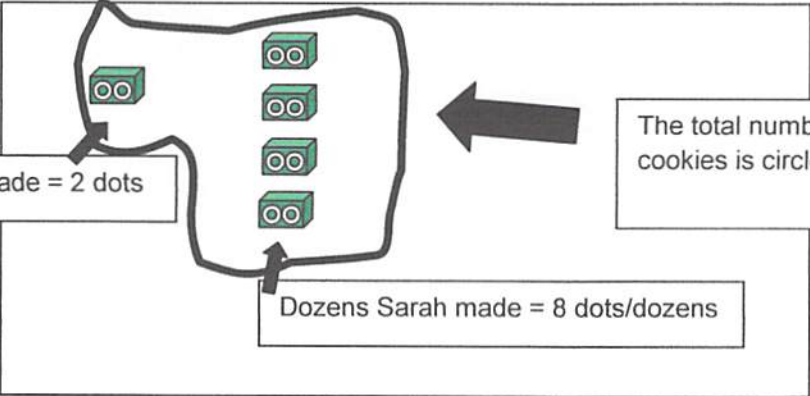
Equation: $4 \times 2 = ND$ (number of dozens Sarah made)

$4 \times 2 = 8$ dozen

8 dozen (Sarah) + 2 dozen (Miles) = 10 dozen cookies made

$8 + 2 = 10$

Sketch of Building Blocks



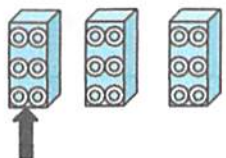
Challenge: Calculate the total number of cookies per person and the total number of cookies made that morning.

Operation Building Blocks **Answer Key**

1. A blue hat costs \$6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost?

Equation: $B \times 3 = R$

$$\$6 \times 3 = \$18$$



3 blue hats = 18 dots/dollars

1 blue hat = 6 dots/dollars

2. Chris can go 4 miles an hour on his bike. Jill can go 7 times as fast on her motorcycle. How fast can Jill go on her motorcycle?

Equation: $4 \times 7 = \text{Speed}$

$$4 \times 7 = 28\text{mph (miles per hour)}$$



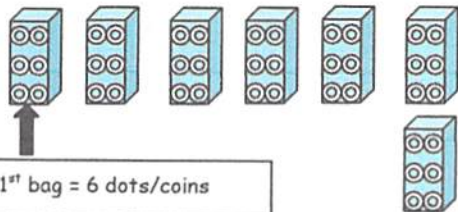
7 times Chris' = 28 dots/mph

Chris' speed = 4 dots/mph

3. Nick has two bags of coins. The first one has 6 coins. The second bag has 7 times as many coins. How many coins are in the second bag?

Equation: $6 \times 7 = C$

$$6 \times 7 = 42$$

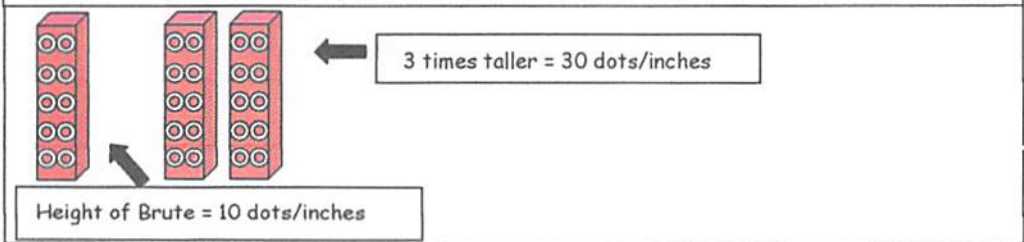


1st bag = 6 dots/coins

7 time that many coins = 42 dots/coins

Operation Building Blocks Answer Key

4. Malcolm has 2 dogs. Brute is a 10-inch tall beagle. Shep, the collie, is 3 times taller than Brute. How tall is Shep?



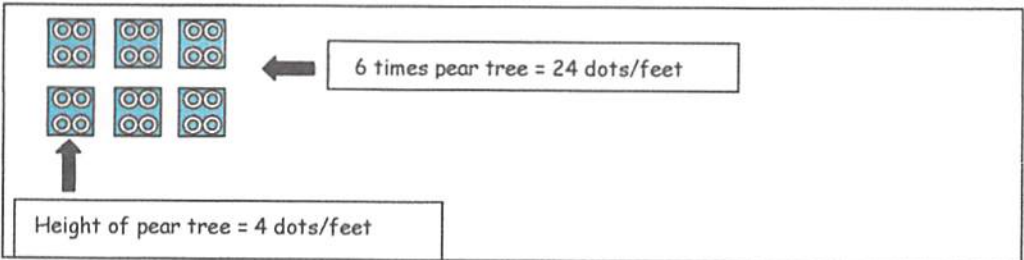
Equation: $3 \times 10 = \text{Height of Shep}$

$3 \times 10 = 30 \text{ inches}$

5. Jayden planted a 4 foot tall pear tree with his dad. His dad said, "Wow, that maple tree was the same size when I planted it and now it is 6 times taller. How tall is the maple tree?"

Equation: $4 \times 6 = \text{Height of maple tree}$

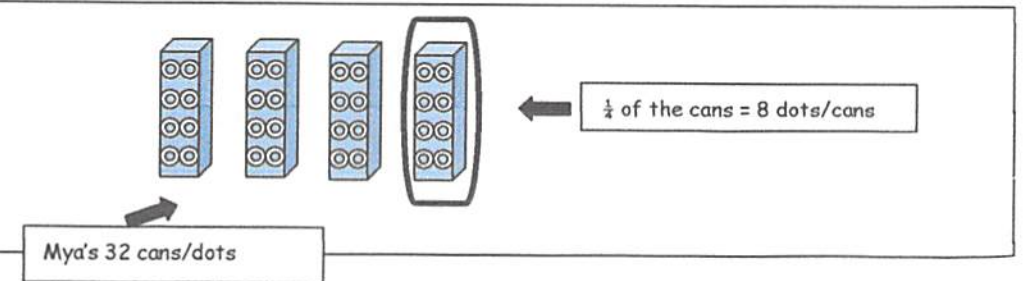
$4 \times 6 = 24 \text{ feet}$



6. Mya collected 32 aluminum cans for recycling during one week. She collected 4 times as many as her brother. How many cans did her brother collect in one week?

Equation: $32 \div 4 = \text{Cans}$

$32 \div 4 = 8 \text{ cans}$



Operation Building Blocks **Answer Key**

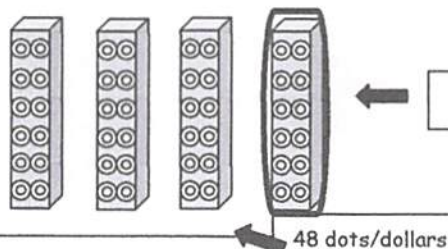
7. It costs \$48 to play paint ball for a half-day from when Main Event opens at 9am till 2pm. This is 4 times as much as it costs for 1 hour of paint ball. Is the half-day ticket worth it? Why?

Equation: $48 \div 4 = C$ (cost for 1 hour)

$$48 \div 4 = 12 \text{ (dollars per hour)}$$



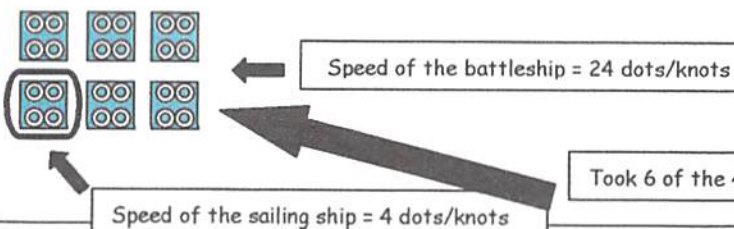
Is the half-day ticket worth it???



8. A vintage sailing ship's top speed is 4 knots. A United States battleship's top speed is 24 knots. How many times faster is the battleship than the sailing ship? Which would you rather be on? Give mathematical reasons why.

Equation: $4 \times F = 24$

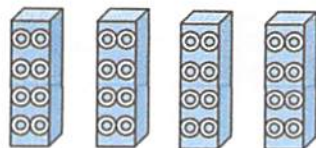
$$4 \times 6 \text{ (number of times faster)} = 24$$



9. Jamaal and his sister Brandi can download 8 video games a month. They have downloaded 32 video games. What is the least number of months they have been downloading?

Equation: $32 \div 8 = M$ (months)

$$32 \div 8 = 4$$



4 months minimum to have 32 downloads

Total of 32 dots/video game downloads

Name _____

The Ants Go Marching

Garrett and Erin were playing a game on a numbered game board. A section of their game board is shown below.

In the game, players have to cover numbers that are multiples of both 2 and 3.

Circle all the numbers on this section of the game board that are multiples of both 2 and 3.

The game board Garrett and Erin are using has all the numbers from 1 to 100. Identify three other numbers on the game board besides the ones you circled below that are also multiples of both 2 and 3. _____

5	6	7	8
15	16	17	18
25	26	27	28
35	36	37	38

Operation Building Blocks

Read each of the problems below. Draw a picture of how you could use building blocks to solve the problem. Write the equation and the answer. Explain what you drew and why on the blank lines.

Amanda grew two plants for the science fair. The first plant was eight centimeters tall. The second plant was three times as tall. How tall was the second plant?

A rabbit can go two feet in one jump. A kangaroo can go five times as far as a rabbit. How far can a kangaroo go in one jump?
