Ratios and Proportions

Grade 7

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Ratios and Proportional Relationships

7th grade
Missouri Learning
Standards (MLS)

7.RP.A.3

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Common Core State Standards

CCSS.MATH.CONTENT.7.RP.A.1

Objective

- **Analyze proportional relationships and use them to solve problems.**

- **Solve problems involving ratios, rates, percentages and proportional relationships.**

- **Project-based Learning Activity (PBL)**

Key terms:

Ratio
Indicates how many times one number contains another. Example: There are 8 oranges and 6 apples in a bowl, then the RATIO of oranges to apples is 8 to 6 (8:6 which can be reduced 4:3)

Percentage
A part of a whole expressed in hundredths.
Example: 5 out of 100, 5/100 = 0.05, or multiply 0.05 by 100 to get a percentage of 5%.

Proportional Relationship
Relationship between two variables where their ratios are equivalent.

Prior Knowledge Needed

- Students will need to know how to read and write.
- Students will need to know how to set up a fraction.
- Students will need to know how to multiply fractions.
- Students will need to know how to find equivalent fractions.

Let's look at RATIOS

Write the ratio comparing the number of _____ pelts to the number of _____pelts.

4 coyote
10 raccoon
3 skunk
8 fox
5 opossum

(x:y, x/y, or x to y)

Let's find the rate!

James is rowing down the river. For the first 3 hours, he travels 20 mph. For the next 2 hours he travels 25 mph. Assuming that he has not stopped, what is his average traveling speed in miles per hour?

3 x 20 = 60 miles
2 x 25 = 50 miles

60 + 50 = 110 miles / 5 hours
James traveled an average speed of 22 mph

Find the rate.

Jonna and Jill are best friends and live in the same village.

One morning, both left at 9:00 AM to go to the river on horseback, but on different horses. Jonna arrived at 10:10 AM; Jill arrived 30 minutes later. If Jonna's average speed was 12 miles per hour, what was Jill's average speed (nearest whole number).
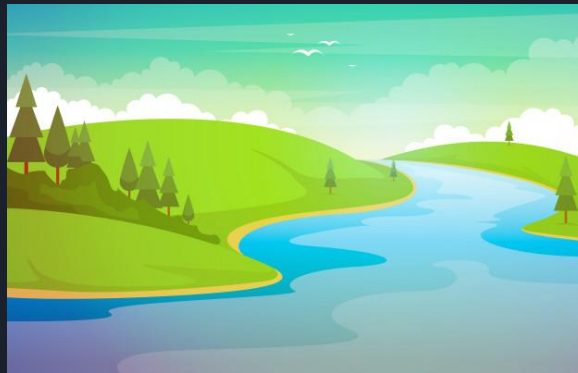
Percentages

While at the river, Jonna and Jill each caught 5 fish for dinner. To feed their families, they will need to catch 50% more. How many more fish do they need to catch?
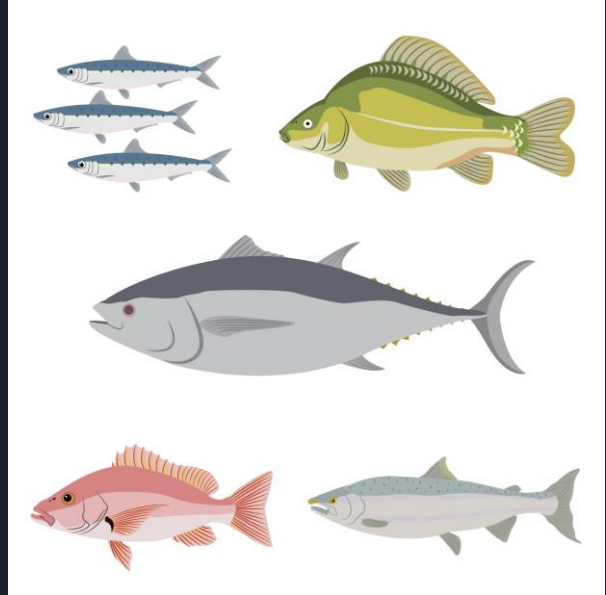
Percentages (Answer)

While at the river, Jonna and Jill each caught 5 fish for dinner. To feed their families, they will need to catch 50% more. How many more fish do they need to catch?   Known value: They caught **10** fish total.

How much is 50% more? We need to set up the problem: **x / y = % / 100**

For this problem, they have given you the percentage (50%) and the **y** value (10 fish).

x / 10 = 50 / 100   Cross multiply since you have to solve for x.

10*50 = 100x

500 = 100x   Solve for x by dividing both sides by 100.

500/100 = 100x / 100   100x / 100 is 1x, or simply x.   500 divided by 100 is 5.

x = 5. We have solved for the variable! Jonna and Jill need to catch 5 more fish to feed their families.

Let's look at Ratios/Fractions to see if they are proportional.

1/2 = 4/8   12:6 to 2:1

1/2 = 3/4   6:12 to 3:2

3:4 to 9:18   4/4 = 1

3:4 to 12:16   9 to 16 and 3 to 4

PBL: Now it is your turn!

Everyone needs to get a partner. You and your partner will go outside and each count as many different animals as you can. Do this for exactly 5 minutes.

- After 5 minutes is up, find the ratio of your animals compared to your partner's list of animals.

- Then, figure out the % increase or decrease.

- **Next,** find the rate. How many animals did you see per minute?

- **Lastly,** your group shall compare your ratio to another group. Are they proportional or non-proportional?