**Algebra Concepts – Lesson 3-6**

**Proportional Reasoning and Visual Models**

**Big Idea**

Proportional reasoning is important in many areas of life from using recipes to cook to estimating travel times and figuring out what you should earn for a test grade. In this lesson, we will once again use visual models to help us solve proportion problems?

**The models**

In building visual models for proportions, we will be comparing two sets of numbers. Usually it makes sense to use boxes to represent one of the quantities in the comparison. For example, if you travel 120 miles on 4 gallons of gas, it makes sense to represent the 4 gallons of gas with boxes instead of the 120 miles. Why do you think this is true?

|-----------------------------------120 miles----------------------------------|

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|--1 gallon of gas--|

How many miles would you be able to travel on 3 gallons of gas? Let’s show this by marking off 3 of the 4 boxes in the model.

|-----------------------------------120 miles----------------------------------|

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|----------------------? miles -----------------------------|

We know how to do this now. We figure out how many miles we can travel on 1 gallon of gas. This is the number that goes in each box. Then we answer the question.

Example 1

Chuck found that a recipe for chocolate chip cookies calls for 30 chocolate chips for 4 cookies. How many chocolate chips will Chuck need to make 12 cookies?

Think about the following questions.

What should we use boxes to represent, chocolate chips or cookies?

How many boxes should we use to represent the cookies?

Where do we mark of 30 chocolate chips?

Do you like chocolate chip cookies?

Where should we place the question mark?

Here is one model that will work:

|----------------------------------------?-----------------------------------|

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |

|-------30 chips-------|

Example 2

Brianna earned $34 for 4 hours of work at a retail outlet. At this rate, how much would Brianna earn for 20 hours of work.

Build the model. Explain at least two different ways to solve the problem.

|  |
| --- |
| Kassie’s Earnings |

**Guided Practice**

1. Find the value of the question mark.

|-----------------------------------------?-------------------------------|

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

|------------18-------------|

1. Find the value of the question mark.

|-------------------------------48------------------------------|

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|------------------------?-----------------------|

1. Use the model to answer the question.

If there are 100 calories in a cup of Cheerios, how many calories are there in  of a cup?

1 cup

|-------------------------------------100 calories----------------------------------|

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|-----------------------------? calories-----------------------|

**Build Your Own Model**

1. Drew hiked 5 miles in 2 hours. At this rate, how far will Drew be able to hike in 7 hours?