**Visual Models of**

**Ratios, Rates, and Proportions**



A recipe calls for 2 eggs for every cup of sugar 🡪



**Concrete Models**

That means 🡪

Which is the same as 🡪

So, 2:1 = \_\_\_\_:\_\_\_\_\_

A table of values, such as a multiplication table, can help you to identify equivalent

ratios. You can see in the table below that 1:3 = 3:9.



**Using Tables**

If you are not given a table, then make one! Look for patterns in the numbers.

If 4 T-shirts cost $15, how much would 20 T-shirts cost?\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| T-shirts | 4 | 8 | 12 | 16 | 20 |
| Cost | 15 | 30 | 45 | 60 | 75 |

By drawing two number lines, it is easy to compare two quantities.

The double number line below represents the problem, “Sam bikes 20 miles in 1 hour.”

****

**Double Number Line**

**PRACTICE ☺ Making Visual Models of**

**Ratios, Rates, and Proportions**

Draw a CONCRETE MODEL

to represent this problem:

a. The Atlanta Zoo has one

giraffe for every 6 snakes.

b. How many giraffes do

they have for 18 snakes?

Make a TABLE to represent

this problem:

A class has 2 girls for every

3 boys.

If there are 12 girls, how

many boys are there?

Make a DOUBLE NUMBER

LINE to represent this problem:

Emma drove at a rate of 60 miles

per hour.

At this rate, how long did it take

her to drive 150 miles?

(Hint: You may want to look at

the section on “Partioning and

Iterating”.)

**PRACTICE ☺ Making Visual Models of**

**Ratios, Rates, and Proportions**

Use a TAPE DIAGRAM to

represent this problem:

Josefine’s iPod has 120

songs. For every 3

pop songs, she has 1

hip hop song. How many

pop songs are on her iPod?

Use a TAPE DIAGRAM to

represent this problem:

Deon scored 36 points,

which was 1 ½ times as

many points as Aidan.

How many points did

Aidan score?

According to the double number line to the right, Sam’s unit rate is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ per 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

At this rate, how far could Sam bike in 3 hours? \_\_\_\_\_\_\_\_\_ in 5 hours? \_\_\_\_\_\_\_\_\_ in ½ hour? \_\_\_\_\_\_\_\_\_

At this rate, how long would it take Sam to go 5 miles? \_\_\_\_\_\_\_\_\_ 50 miles? \_\_\_\_\_\_\_\_ 100 miles? \_\_\_\_\_\_\_\_\_

Use a DOUBLE NUMBER

LINE with PARTITIONING

AND ITERATING to

represent this problem:

TJ runs 12 miles every 4 days.

How long does it take to run

36 miles? 6 miles?

 **Visual Models of**

**Ratios, Rates, and Proportions**

 A tape diagram looks like a piece of tape, and is used to display relationships between

 numbers. For a part-to-whole diagram, draw one strip and split it into its “parts”.

 Example: Joni is making a quilt that requires 6 yards of fabric. She needs 3 parts

 dark fabric, 2 parts light fabric, and 1 part white fabric.

**Tape Diagram:**

**Part-to-Whole**

****

 If she is making 4 quilts, how many pieces of dark fabric would she need? \_\_\_\_\_\_\_\_\_

****

 A part-to-part tape diagram is similar to a double number line. Draw a tape diagram for each

 quantity being compared. Each tape should be the same length. Divide the diagrams accordingly.

 Example: School A has 500 students, which is 2 ½ (which is equal to 5/2) times more students than

**Tape Diagram:**

**Part-to-Part**

 School B. How many more students attend School A than School B?

****

 This diagram shows that 300 more students attend School A than School B.

 **Partition**: to *split* a unit **Iteration**: to *repeat* a unit



**Partitioning or**

**Iterating**

Remember: **Partitioning** or **iterating** will not change the relationship between quantities in a ratio.

In other words, the **ratio stays the same**.