## Unit 3 Lesson 3 Guided Notes

| Unit Guiding Question | When and why do I use proportional comparisons? |
| :--- | :--- |
| Objective | I can calculate the constant of proportionality and explain its connection <br> to unit rate. |

Directions: As you go through the PPT and watch the video made by your teacher, complete the guided notes below to ensure your understanding of the content. Be sure to challenge yourself and persevere through new concepts. If you have a question: 1) Re-watch the video 2) Ask a friend 3) Ask your teacher

## Constant of Proportionality

$\rightarrow$ Remember: A $\qquad$ is a symbol (such as a letter) that is a placeholder for a number.
$\rightarrow$ If a proportional relationship exists in a set of ordered pairs (x,y), we can assign the set of ordered pairs a constant of proportionality, or $\qquad$ . The letter k is the variable we will use to represent $\qquad$ .
$\rightarrow \mathrm{k}$ describes the $\qquad$ between measures x and y and can be represented in the form of two different equations:

## 1.

$\qquad$ 2. $\qquad$

## The Constant of Proportionality

Marine biologists are concerned that the sea turtle population might not be constant across the North Shore. The marine biologists found that there were 144 sea turtles in a 16-square-mile area of the ocean. In another part of the ocean, marine biologists counted 117 sea turtles in a 13 -square-mile area. Yet a third marine biologists counted 216 sea turtles in a 24-square-mile plot of the ocean. Do marine biologists need to be worried?

Create a table to organize the data in this scenario.

| Square Miles (x) | Number of Turtles (y) |
| :---: | :--- |
|  |  |
|  |  |
|  |  |

When we look at the relationship between square miles and number of turtles in the table, how do we know if the relationship is proportional?

We call this constant (or same) value the: $\qquad$

## In Summary:

- The $\qquad$ per 1 square mile is 9 turtles.
- The $\qquad$ is also 9 .
- This means that there are 9 turtles for every 1 square mile of ocean.

In the example with the sea turtle population, we are looking for the number of sea turtle per square mile, so the number of square miles could be defined as $x$, and the number of sea turtles could be defined as $y$. The unit rate of sea turtles per square mile is 9 turtles/ 1 square mile. The constant of proportionality, $k$, is 9 .

We could represent this relationship using either equation...
$\qquad$ or $\qquad$

Can we use these same equations to make predictions? YES!

1. How many turtles would you expect to find in 207 square miles?
2. Determine the number of square miles in which you would likely find 486 turtles.

## You Try!

Brandon came home from school and informed his mother that he had volunteered to make cookies for his entire grade level. He needs 3 cookies for each of the 96 students in seventh grade. Unfortunately, he needs the cookies the very next day! Brandon and his mother determined that they can fit 36 cookies on two cookie sheets.

1. How many cookies can they fit on 1 sheet? (unit rate)
2. What is the constant of proportionality, $k$ ?
3. Write two equations that would represent the relationship between cookies and cookie sheets.
4. How many cookie sheets do they need in all?
