**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per.\_\_\_\_\_\_\_**

**U3 CWK #4** *Proportional Relationships as Linear Relationships*

Two cousins, Grace and Kelly, are both headed to the same summer camp. They both leave from their own house for camp at the same time. The graph below represents the girls’ trips to camp.



1. What do you notice? What do you wonder?
2. Analyze the graph to determine which girl is traveling faster. Show your thinking.

**Distance from Grace’s house (miles)**

**Kelly**

**Grace**

**Time (hours)**

1. Complete the table below for Grace and Kelly. (Hint: Complete the x and y columns of each table and then set up the ratio of y-value divided by x-value for each row, simplify when appropriate.)

|  |
| --- |
| **Kelly** |
| ***Time(x)*** | ***Distance(y)*** | $$\frac{y}{x}$$ |
| 0 |  |  |
|  | 140 |  |
| 2 |  |  |
|  | 260 |  |
| 4 |  |  |

|  |
| --- |
| **Grace** |
| ***Time(x)*** | ***Distance(y)*** | $$ \frac{ y}{x}$$ |
| 0 |  |  |
| 1 | 60 |  |
|  | 120 |  |
| 3 |  |  |
|  | 240 |  |

1. What do you notice about the ratio $\frac{y}{x}$for Grace?
2. What do you notice about the ratio $\frac{y}{x}$for Kelly?
3. What is this ratio describing?

1. Which of the girls driving relationship is proportional? What characteristics show this?
2. Describe why Kelly’s driving relationship is not proportional?

1. Is it possible to still describe the rate at which Kelly drives? If so, what is it?

Often the rate at which a relationship changes is shown by seeing that the changes from one measurement to another are proportional; that is, the quotient ($÷$) of the change in *y* values with respect to the change in *x* values is constant. This is called the **Rate of Change**.

Both of the relationships described above have a constant rate of change of 60 mph. This constancy defines them as **linear relationships.** (Their graphs produce straight lines).

1. Use what you learned above to see if you can write an equation that represents each girl’s distance *y* from Grace’s house after *x* hours.

 Grace: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Kelly: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Directions:** With a partner, use what you have learned to solve the following situation.

1. Agatha makes $26 for selling 13 bags of popcorn at the Juab County Fair.
2. Find and describe the rate of change for this relationship. Show your thinking.

|  |  |
| --- | --- |
| 1. Complete the table that shows the amount of money Agatha makes for selling up to three bags of popcorn.

 Show your work below. | 1. Label the graph with a title, x and y axes, numbers appropriate for the data.
2. Graph the dollars to bags of popcorn relationship.
 |

|  |  |
| --- | --- |
| *x* | *y* |
|  |  |
|  |  |
|  |  |
|  |  |

