

Title: Function Fever

Brief Overview:

Students will describe, extend, and make generalizations about numeric patterns. They will identify and describe situations with constant or varying rates of change and compare them. They will develop an understanding of graphing by creating models and developing abstract representations using real-life situations.

NCTM Content Standard/National Science Education Standard:

Algebra

Analyze change in various contexts:

- Investigate how change in one variable relates to change in the second variable;
- Identify and describe situations with constant or varying rates of change and compare them.

Grade/Level:

5

Duration/Length:

3 days for 60 minutes daily

Student Outcomes:

Students will:

- Create a table of values for a given pattern in the context of a problem;
- Graph a given table of values;
- Identify the independent (x) and dependent (y) variables
- Discuss and identify the shape of the graphs and what the graphs tell about the "growth" of the pattern.
- Analyze and identify functions for graphs.

Materials and Resources:

Lesson 1

Snap cubes

Copy of Student Resource Sheet 1, "Money, Money, Money" for each student

Copy of Teacher Resource Sheet 1, answer key for "Money, Money, Money"
Overhead transparency of "Money, Money, Money"
Copy of Student Resource Sheet 2, centimeter grid paper
Overhead transparency of centimeter grid paper
Copy of student resource 3, "Functions and Graphs Vocabulary"
Copy of Student Resource Sheet 4, "Babysitting Versus Cutting Grass"
Copy of Teacher Resource Sheet 2, "Teacher Observation Checklist-Day1"

Lesson 2

Chart paper
Copy of Student Resource Sheet 2, centimeter grid paper
Overhead transparency of centimeter grid paper
Copy of Student Resource Sheet 5, "When's Vacation?"
Copy of Teacher Resource Sheet 3, "Teacher Observation Checklist-Day2"

Lesson 3

Copy of Student Resource Sheet 2, centimeter grid paper
Overhead transparency of centimeter grid paper
Copy of Teacher Resource Sheet 4, "Functions and Graphs"
Copy of Teacher Resource Sheet 5, "Teacher Observation Checklist-Day3"
Copy of Teacher Resource Sheet 6, "Lemonade Stand"
Copy Student Resource Sheet 6, "Functions and Graphs"
Copy of Student Resource Sheet 7, "Lemonade Stand"
Copy of Student Resource Sheet 8, "Math Rubric"

Development/Procedures:

Lesson 1.....

Preassessment –

- Distribute the Student Resource Sheet 1, "Money, Money, Money". Refer to Teacher Resource Sheet 1, "Money, Money, Money" for the answer key.

You have to make \$1000 in the fastest way possible to go on a vacation. You are offered a babysitting job where your salary will be increased by \$6 each day you work. You are also offered a job cutting grass where your salary will be doubled each day you work. Which choice will you make?

Choice A: *You will earn \$6 the first day, \$12 the second day, \$18 the third day, and so on.*

Choice B: *You will earn \$1, the first day, \$2 the second day, \$4 the third day, and so on.*

- Tell the students that they need to figure out which job is the better choice. They need to support their answers mathematically.

Launch –

- Have the students complete the table for each of the choices. Then tell them to stop computing the earnings at day 5.
- *Ask: Which choice is the best at this point? (Choice A.)*
- *Ask: Why? (The total earnings are \$90 for choice A, but only \$31 for choice B.)*
- Have the students compute the earnings up to day 10.
- *Ask: Which choice is the best? (Choice B.)*
- *Ask: Why? (The total earnings are \$1023 for choice B but only \$330 for choice A.)*
- *Ask: What has happened? (The earnings are accumulating at a faster rate for choice B.)*

Teacher Facilitation –

- Tell the class that there is another way to represent the data in the function table by using a graph.
- Distribute the snap cubes and Student Resource Sheet 2, centimeter grid paper, to each student.
- As you model on the overhead, have the children make a concrete representation of the graphs on their centimeter grid paper.
- Tell them to start with the choice A.
- Have them place six snap cubes on the first column, 12 on the second, and 18 on the third and shade in the areas after taking them off.
- Have the children connect the bars diagonally with a line, using a ruler, to help them come up with an answer.
- *Ask: What do you notice about the data? (It is increasing.)*
- *Ask: How is it increasing? (The graph is increasing the same interval, \$6, each time.)*
- Introduce and define the term constant with the children. At this point, distribute Student Resource Sheet 3, "Functions and Graphs Vocabulary".
- Discuss the idea of constant rate of change.
- *Ask: Do you think all data will produce a graph like this one with a constant rate of change? (No, all patterns are not the same. They do not always increase, and if they increase, they do not have to increase at the same rate.)*

Student Application-

- You want to earn money quickly to go on a vacation. What's the fastest way to earn the most money, babysitting or cutting grass?
- Tell the class to look at the data for Choice B and distribute Student Resource Sheet 4, "Babysitting Versus Cutting Grass", to complete.
- Have them (on their own) place 1 snap cubes on the first column, 2 on the second, 4 on the third, and 8 on the fourth and shade in the areas after taking them off.
- *Ask: What do you notice about the data? (It is increasing.)*
- *Ask: How is it increasing? (Answers vary. Some children might say that it is increasing at a constant rate of change. Others will hopefully see that it starts out with a curve that will lead to the following discussion.)*
- Compare the two models with the children
- *Ask: How are the models the same? (They are both increasing.)*
- *Ask: Are there any differences? (Choice A is increasing at a faster rate than choice B.)*
- *Ask: How is it increasing at a faster rate? Is it the same interval each time? (No, it is increasing by 1, 2, 4, 8, 16, and so on.)*
- *Ask: Is it increasing at a constant rate of change? (No, it changes each time.)*
- *Ask: Is there a pattern to the change? (Yes, it is doubling each time, but since it is not the same amount each time, it is not constant.)*
- *Which format, the table or the graph, would you use to communicate the results of these two function tables? (Answers vary. Some may say graph because it is easier to see the rate of growth, and the shape of the graph can clearly be seen. Some may say the table because it shows how much the growth there is from day to day.)*

Embedded Assessment –

- While students are completing Student Resource Sheet 4, observe and record behaviors on the Teacher Resource Sheet 2, "Teacher Observation Checklist-Day1". Share with students how you will assess their performance as they complete the assignment. Discuss with students the criteria being used to assess them, and give a few examples.

Reteaching/Extension –

- Assist students having difficulties by placing them in a small group and providing them with additional instructions and/or examples. Adjusting the first scenario from an increase of \$6 to \$2 (multiples of 2 are easier to work with), guide the students to complete another function table and graph.
- Early finishers may review function tables by visiting the website: General Coordinates Games: The students will investigate the coordinate

system through identifying the coordinates of points, or requesting that a particular point be plotted.

<http://www.shodor.org/interactivate/activities/coords2/index.html>

Lesson 2

Preassessment –

- Have the students brainstorm real-life situations where the y value increases by a constant value and another one where the y value doubles.

Launch –

- Have the students share their ideas from the preassessment, and write them on chart paper.
- Display the two models from the previous day on the overhead.
- Distribute centimeter graph paper.
- Have the children attempt to complete a line graph for the function tables. Although they may not have a complete knowledge of graphing function tables, based on previous ability of graphing ordered pairs and the previous day's lesson, they should understand how to complete it.

Teacher Facilitation –

- Discuss the results of the preassessment.
- Graph both function tables, from the previous day, using the overhead transparency of the centimeter grid paper.
- *Ask: What do you notice about the two graphs? (They are increasing.)*
- *Ask: How are they increasing? (Answers vary. Some may say at a constant rate of change. Hopefully, some will say that they see a difference, and describe the difference as a straight line versus a curved line.)*
- Introduce the terms "linear" and "exponential", referring to Student Resource Sheet 3, "Function and Graphing Vocabulary".
- Explain the idea of graphing a linear equation that produces a straight line due to a constant rate of change.
- Explain the idea of graphing other equations or functions that may produce different shapes, such as an exponential equation.
- Introduce and define the terms independent and dependent variables.
- *Ask: Which coordinate is the independent variable? (The x- coordinate is the independent variable.)*
- *Ask: Why? (Because x is a given, and it stands on its own.)*
- *Ask: Why is the y-coordinate the dependent variable? (Because the value of y depends on the value of x.)*
- Tell the students that they will be completing function tables and graphing the data by using real-life situations.

Student Application –

- Now that you have data for babysitting and cutting grass, plot the data on a line graph to visually see which is the fastest way to earn more money.
- Have the students graph the total earnings for each of the choices by using Student Resource Sheet 2, centimeter grid paper, and Student Resource Sheet 5, "When's Vacation?" Have them place the two graphs on one coordinate system.
- *Ask: For what days do choice B yield better total earnings than choice A? (Choice B is better from day 8 on..)*
- *Ask: Which choice first achieves the \$1000 needed for your vacation? (Choice B.)*
- *Ask: Why? (For choice A, the daily earnings increase by \$6, whereas for choice B, the daily earnings are doubled.)*
- *Ask: On which day do you reach \$1000? (For choice A, the \$1000 amount is reached on day 18. For choice B, the \$1000 amount is reached on day 10.)*
- *Ask: Which format, the table or graph, would you use to communicate the results of this investigation? Why? (Some students may select the graph because it is easier to see how the money grows. Others may choose the table because you can see exactly how the money increases from day to day.)*

Embedded Assessment –

- While students are completing Student Resource Sheet 5, observe and record behaviors on the observation checklist, Teacher Resource Sheet 3, "Teacher Observation Checklist-Day 2". Share with students how you will assess their performance as they complete the assignment. Discuss with students the criteria being used to assess them, and give a few examples.

Reteaching/Extension –

- Assist students having difficulties by placing them in a small group and providing them with additional instructions and/or examples. Guide the students to complete two function tables and graphing the data on one coordinate system. Use the following example: x increases by 1 and x times 3.

Lesson 3

- Early finishers may review function tables by visiting the website: Function and Algebra Concepts: Function Machine: Students investigate very simple functions by trying to the guess algebraic form from inputs and outputs.
<http://shodor.org/interactivate/activities/fm/index.html>

Preassessment –

- Write the following on the chalkboard, and have students complete.

Write the following relationships as expressions.

- There are 2 boys for every 1 girl in the class. ($2x$)
- You earned \$15, but owed your friend some money. ($15-x$)
- Each word spelled incorrectly on the test costs you 4 points out of a total of 100 points. ($100-4x$)
- You win a bet and double your money, and you get \$7 for your allowance. ($2x+7$)

Launch –

- Demonstrate how to make a function table by using number one in the preassessment. Draw the function table on the chalkboard.
- *Ask: What is the value of y for $x=1$? ($y=2$)*
- *Ask: What is the value of y for $x=2$? ($y=4$) for $x=3$? ($y=6$)*
- *Ask: What will the value of y be if $x=23$? ($y=46$)*
- *Ask: Which column represents x and y ? (The first column represents x , and the second column represents y .)*
- *Ask: Which one is the independent and dependent variable? (The x is the independent variable, and y is the dependent variable.)*
- *Ask: Why? (Because the value of x is given, and the value of y is determined by the value of x .)*

Teacher Facilitation –

- Use Teacher Resource Sheet 4, "Functions and Graphs", to complete problem 4 with the class by creating a function table and graph.
- *Ask: What is the independent variable or x ? (The number of incorrect spelling words.)*
- *Ask: What is the dependent variable or y ? (The total number of points.)*
- *Ask: How is this relationship written as an equation? ($100-4x=y$)*
- *Ask: What is the value of y for $x=1$? (96) for $x=2$? (92) for $x=3$? (88), etc.*
- *Ask: What will be the interval for the x -axis? (1)*
- *Ask: What will be the interval for the y -axis? (10) Why? (The graph needs to go up to 100.)*
- *Ask: What is the trend of the graph? (The graph is decreasing by 4 each time. It is a constant rate of change at a decreasing rate.)*
- *Ask: Is it a linear function? (Yes.)*
- *Ask: Why? (Because all the points are on the straight line.)*
- *Ask: What are independent and dependent variables? (The independent variable is x or how many incorrectly spelled words. The dependent variable or y is the total number of points for correctly spelled words or the score.)*
- *Ask: Who can explain the relationship between x and y in the context of the problem? (Every time a word is spelled incorrectly 4 points is subtracted from 100 points to give a total score/grade.)*

Student Application –

- Distribute Student Resource Sheet 6, “Functions and Graphs” template.
- Have the students complete the function table and graph using Student Resource Sheet 6.
- Tell them to use scenario number 4 from the preassessment
- Review the assignment by asking the following questions.
- *Ask: What is the equation? ($2x+7=y$)*
- *Ask: What is y when the value of $x=3$? (13)*
- *Ask: Why? (Because $x=3$ so $2(3)+7=y$ and $6+7=13$.)*
- *Ask: What is the trend of the graph? (The graph is increasing by 2 each time. It is a constant rate of change at an increasing rate.)*
- *Ask: Is it a linear function? (Yes.)*
- *Ask: Why? (Because all the points are on the straight line.)*
- *Ask: How do you know by graphing if one of the points you found is not a solution to the linear equation? (The point will not be on the straight line.)*
- *Ask: What are independent and dependent variables? (The independent variable is x or the amount of money you bet. The dependent variable or y is the total amount of money you have.)*
- *Ask: Who can explain the relationship between x and y in the context of the problem? (Every time the bet is increased by one, the total amount of money increases by two.)*
- *Discuss the similarities/differences between the two graphs. The spelling scores graph which was done as a class and the one they just completed.*
- *Ask: Do you see any similarities or differences between the two graphs? (The spelling scores graph is decreasing at a non-constant rate of growth. The money graph is increasing at a constant rate of growth.)*
- *Ask: How do you know if the graph displays a constant rate of growth? (The data will be linear when graphed if it is a constant rate of growth. If it is not, it will display a curve before the constant rate of growth begins.)*
- *Ask: Are there any other observations? (One graph has the data plotted in / line, and the other is a \ line.)*

Embedded Assessment –

- While students are completing Student Resource Sheet 6, observe and record behaviors on the observation checklist, Teacher Resource Sheet 5, “Teacher Observation Checklist-Day3”. Share with students how you will assess their performance as they complete the assignment. Discuss with students the criteria being used to assess them, and give a few examples.

Reteaching/Extension –

- Assist students having difficulties by placing them in a small group and providing them with additional instructions and/or examples. Guide the

students to complete the above problem by modifying the equation to $y=x+7$.

- Early finishers may review function tables by visiting the website: Function and Algebra Concepts: Linear Function Machine: Students investigate linear functions by trying to guess the slope and intercept from inputs and outputs.
<http://shodor.org/interactivate/activities/lfm/index.html>

Summative Assessment:

- You're back from vacation. You had such a great time that you want to start early to make money for your next vacation. Will a lemonade stand help you achieve your goal?
- You are selling lemonade. Do you use Susan's function table or Jeanette's function table?
- Students will complete Student Resource Sheet 7, "Lemonade Stand", to demonstrate an understanding of graphing functions by making a function table and graphing the data for a real-life situation. They will need to use the appropriate mathematical reasoning to justify their answers. Answer key is on Teacher Resource Sheet 6, "Lemonade Stand".
- Use the MSA Extended Response "Kid Speak" Mathematics Rubric to guide you in developing your answer to the BCR on page 2 of Student Resource Sheet 7.

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Money, Money, Money

You have to decide what job would be the best one to choose. You want to find the job that you would make the most money. What job could you earn \$1,000 in the shortest time?

Choice A: Your salary will increase \$6.00 the first day, \$12.00 the second day, \$18.00 the third day, and so on.

Day	Daily Salary in dollars	Total Earnings in dollars
1	6	
2	12	
3	18	
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
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23		
24		

Choice B: Your salary will double each day you work. You will earn \$1.00 the first day, \$2.00 the second day, \$4.00 the third day, and so on.

Day	Daily Salary in dollars	Total Earnings in dollars
1	1	
2	2	
3	4	
4		
5		
6		
7		
8		
9		
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11		
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FUNCTIONS AND GRAPHS VOCABULARY

Expression - A mathematical phrase that combines numbers, operation signs, and sometimes [variables](#), but doesn't have an equal sign.

Examples:

$$3 \times (2 + 6)$$

$$4 + n$$

$$4 + 3$$

$$9 - 2$$

Equation: An algebraic or numerical sentence that shows that two quantities are equal.

Examples:

$$3 + 7 = 10$$

$$4 - 1 = 3$$

$$12 + n = 21$$

Exponent - A number that shows how many times the [base](#) is used as a [factor](#).

Example:

$$\begin{array}{c} \text{exponent} \\ \downarrow \\ \text{base} \rightarrow 8^3 = 8 \times 8 \times 8 \end{array}$$

The exponent is 3, indicating that 8 is used as a factor 3 times.

Example: $y = x + 5$

Function: A relationship between two quantities in which one quantity depends on the other.

Function Table: A table that matches each input value of a function with an output value. The output values are determined by the [function](#).

Example:

$$y = 5x + 4$$

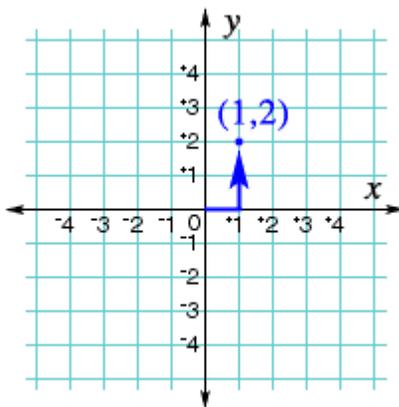
x	0	5	10	15	20
y	4	29	54	79	104

Linear Equations - An equation whose solution lies on a line in a graph.

Ordered Pairs -

A pair of numbers used to locate a [point](#) on a [coordinate plane](#); the first number tells how far to move horizontally and the second number tells how far to move vertically.

Example: (1,2) represents 1 unit to the right of zero and 2 units up.



Variable - A letter or symbol that stands for one or more numbers.

Example:

$$7 + n$$

↑
variable

Independent Variable - X is a given and stands on its own.

Dependent Variable - Y depends on the value of X.

$$X + 2 = Y \quad \text{If } X \text{ equals } 1 \text{ then } Y \text{ will equal } 3.$$

$$X - 3 = Y \quad \text{If } X \text{ equals } 6 \text{ then } Y \text{ will equal } 3.$$

BABYSITTING VERSUS CUTTING GRASS

Using the model for Choice B, answer the following questions.

1. What do you notice about the data?

2. How is it increasing?

Now, compare the models for Choice A and Choice B, and answer the following questions.

3. How are the models alike?

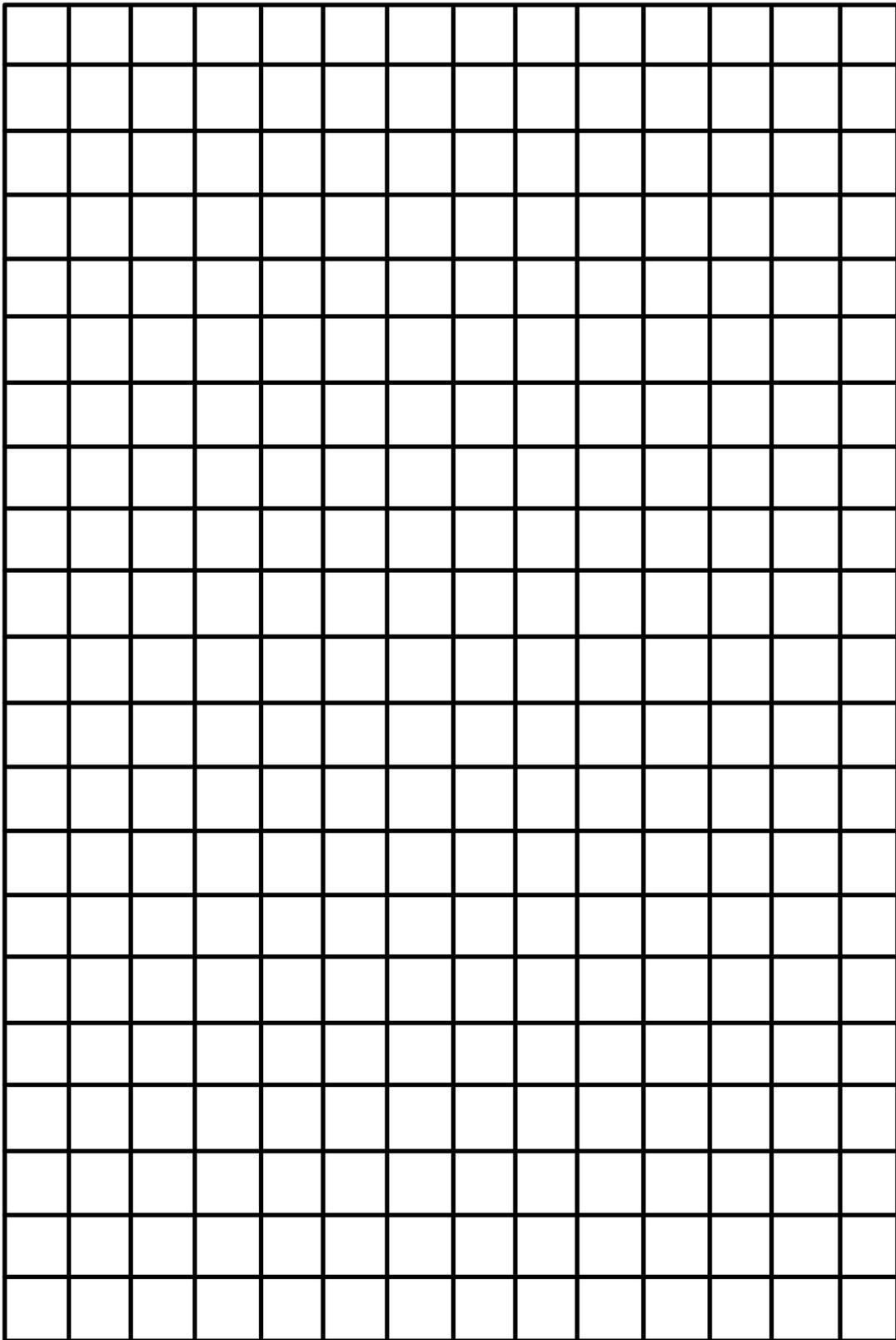
4. Are there any differences? If so, what are they?

5. How is choice B increasing at a faster rate? Is it the same interval each time?

6. Is choice B increasing at a constant rate of change?

7. Is there a pattern to the change?

CENTIMETER GRID PAPER



Teacher Observational Checklist- Day 1

Criteria	Names of Students																			
<i>Placement of snap cubes</i>																				
<i>Draws lines to connect snap cubes</i>																				
<i>Observes increase of functions</i>																				
<i>Identifies the difference between 2 graphs</i>																				
<i>Supports answer</i>																				

Teacher Notes / Anecdotal Records

WHEN'S VACATION?

Using the total earnings graph, answer the following questions.

1. What day does Choice B begin earning more than Choice A?

2. Which choice first earns the \$1000 needed for your vacation? Why?

3. If your job is Choice A, when do you make a \$1000? Choice B?

4. Which format, the table or graph, would you use to communicate the results of this investigation? Why?

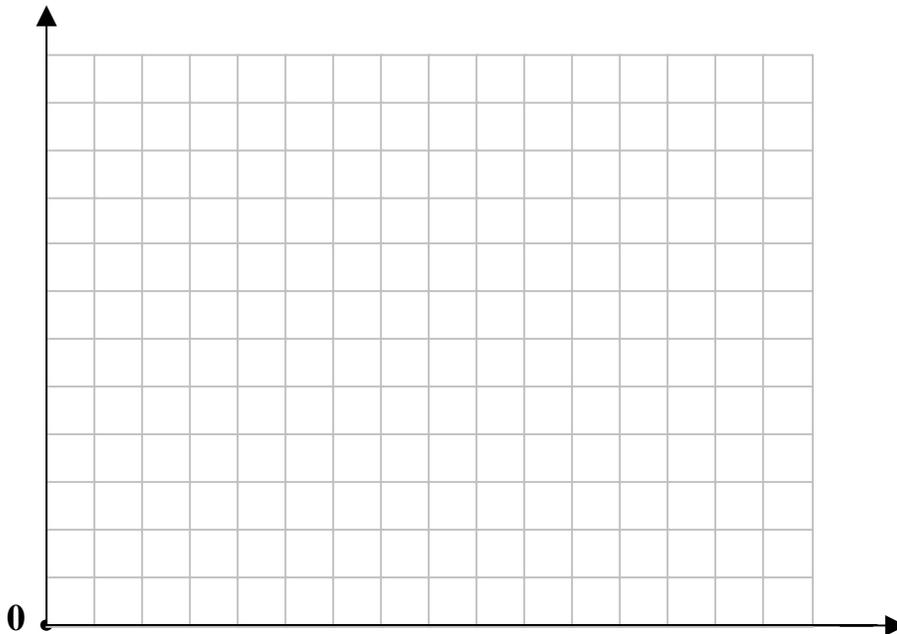
Teacher Observational Checklist- Day 2

Criteria	Names of Students																			
<i>Graphs x and y coordinates</i>																				
<i>Labels x and y coordinates</i>																				
<i>Includes title</i>																				
<i>Includes key</i>																				
<i>Supports answer</i>																				

Teacher Notes / Anecdotal Records

FUNCTIONS AND GRAPHS

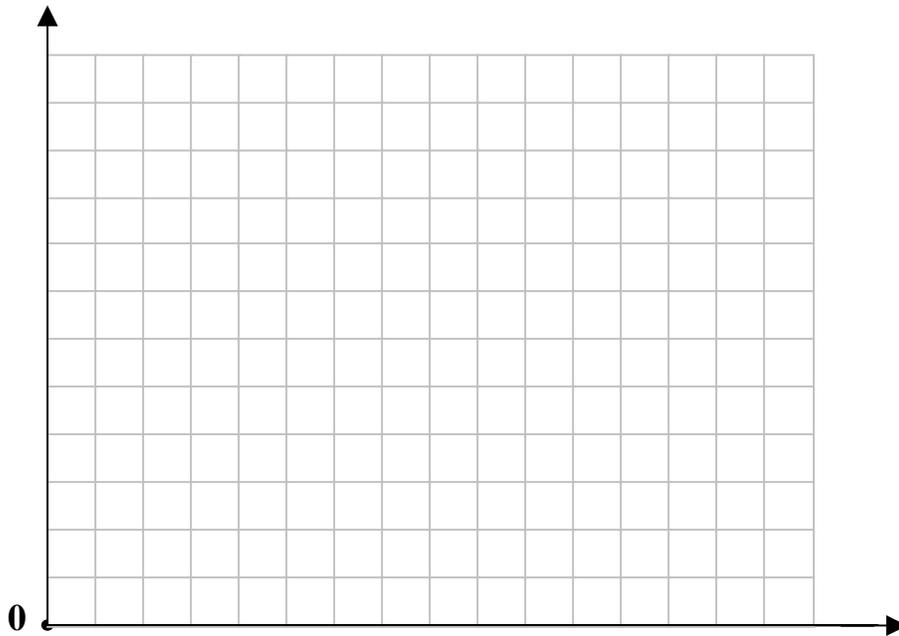
x	Equation	y	Ordered Pairs (x,y)
1	$2x+7=y$	9	(1,9)



Describe the trend in your graph using your math vocabulary words. Explain what you know about functions and graphs to explain this problem.

FUNCTIONS AND GRAPHS

x	Equation	y	Ordered Pairs (x,y)



Describe the trend in your graph using your math vocabulary words. Explain what you know about functions and graphs to explain this problem.

Teacher Observational Checklist- Day 3

Criteria	Names of Students																			
<i>Completes function table correctly</i>																				
<i>Graphs x and y coordinates</i>																				
<i>Labels x and y coordinates</i>																				
<i>Adds title and labels to graph</i>																				
<i>Supports answer</i>																				

Teacher Notes / Anecdotal Records

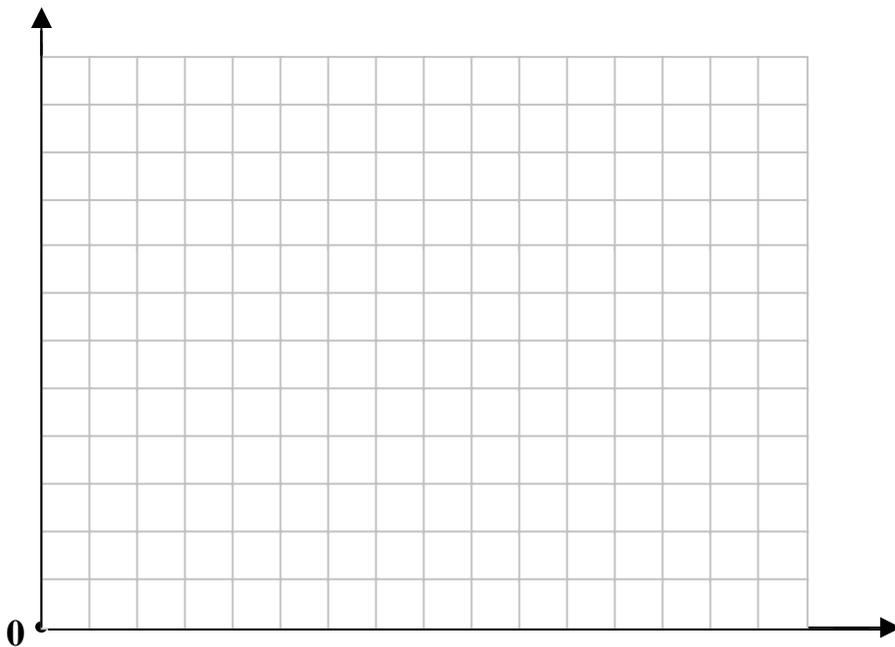
Function Tables and Graphs

Susan's Stand

x	Equation	y	Ordered Pairs (x,y)

Jeanette's Stand

x	Equation	y	Ordered Pairs (x,y)



Describe the trend in your graph using your math vocabulary words. Explain what you know about functions and graphs to explain this problem.

Answer the following questions using your knowledge of functions and graphs. Don't forget to use your math vocabulary.

1. Who makes more money after selling \$11?

2. What is the equation for Susan's lemonade stand?

3. What is the equation for Jeanette's lemonade stand?

4. Using the double line graph, what are the differences and similarities between the two graphs?

Extended Constructed Response

5. Will Jeanette ever make more money than Susan? If so, how much and when?

Using what you know about functions and graphs, explain why your answer is correct. Use words, numbers, and/or diagrams to support your response.

Answer the following questions using your knowledge of functions and graphs. Don't forget to use your math vocabulary.

1. Who makes more money after selling 4 cups?

Susan made \$1.60 after selling 4 cups. Jeanette made \$1.20 after selling 4 cups. $\$1.60 > \1.20 , so Susan made more money after selling 4 cups.

2. What is the equation for Susan's lemonade stand?

$$X(\$.40)=y$$

3. What is the equation for Jeanette's lemonade stand?

$$x(\$.30)=y$$

4. Using the double line graph, what are the differences and similarities between the two graphs?

Both graphs are increasing at a constant rate. Jeanette's graph is increasing at a greater rate than Susan's graph because the line is steeper.

5. Will Jeanette ever make more money than Susan? If so, how much and when?

Yes, when Jeanette sells 8 cups she will make \$3.20, and when Susan sells 8 cups, she will make \$2.40.

Extended Constructed Response

Using what you know about functions and graphs, explain why your answer is correct. Use words, numbers, and/or diagrams to support your response. Be sure to refer to the rubric on Student Resource Sheet 8.

In the beginning, Susan did not make as much money as Jeanette because she sells only 1 cup (x) at a time for more money whereas Jeanette sells 2 cups at a time for less money. Eventually, Susan makes more money because she's charging more money. Both graphs show an increasing trend at a constant rate. Susan's line increases at a faster rate in the beginning. However, once the lines meet, Jeanette's line increases at a faster rate than Susan's. In the end, Jeanette will make more money.

LEMONADE STAND

Function Tables and Graphs

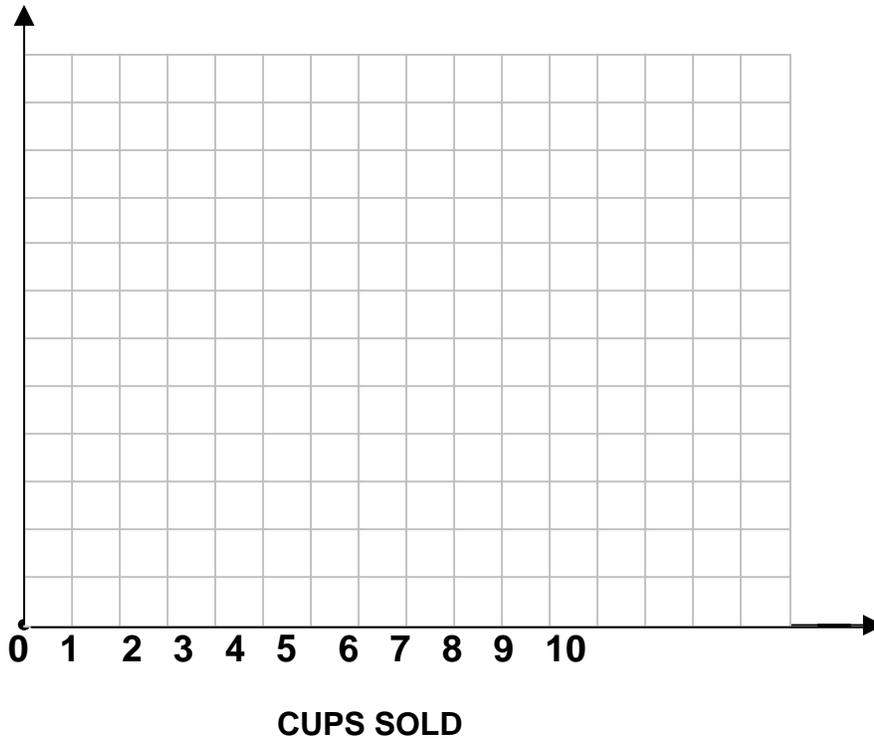
Susan's Stand

x	Equation	y	Ordered Pairs (x,y)
1	$X(40)=y$	\$.40	(1,\$.40)
2		\$.80	(2,\$.80)
3		\$1.20	(3,\$1.20)
4		\$1.60	(4,\$1.60)
5			(5,\$2.00)

Jeanette's Stand

x	Equation	y	Ordered Pairs (x,y)
2	$X(30)=y$	\$.60	(1,\$.60)
4		\$.1.20	(4,\$1.20)
6		\$1.80	(6,\$1.80)
8		\$2.40	(8,\$2.40)
10		\$3.00	(10,\$3.00)

Lemonade Stand



Describe the trend in your graph using your math vocabulary words. Explain what you know about functions and graphs to explain this problem.

Both lines are increasing at a constant rate. Jeanette's line is increasing at a greater rate because it is steeper. Both functions have an independent variable (x), number of cups sold, and a dependent variable (y), the amount of money made. Both functions are increasing because they are multiplication number sentences, but Jeanette's function is increasing at a faster rate because the cups are sold two at a time.

**MSA Extended Constructed Response “Kid Speak”
Mathematics Rubric
Grades 4 through 8**

Score	
3	<p>My answer shows I completely understood the problem and how I solved it:</p> <ul style="list-style-type: none"> • I used a very good, complete strategy to correctly solve the problem. • I used my best math vocabulary to clearly explain what I did to solve the problem. My explanation was complete, well-organized and logical. • I applied what I know about math to correctly solve the problem. • I used numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem.
2	<p>My answer shows I understood most of the problem and how I solved it:</p> <ul style="list-style-type: none"> • I used a good strategy to solve the problem. • I used math vocabulary and my explanation was mostly complete, well-organized and logical. • I was able to apply some of what I know about math to solve the problem. • I tried to use some numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem.
1	<p>My answer shows I knew only a little about the problem and how I solved it:</p> <ul style="list-style-type: none"> • I used only part of a good strategy to solve the problem. • I needed to use better math vocabulary and my explanation needed to be more complete, organized or more logical. • I needed to apply more about what I know about math to solve the problem. • I tried to use some numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem, but I may not have been correct in what I used.
0	<p>My answer shows I didn’t understand the problem and how I solved it:</p> <ul style="list-style-type: none"> • I didn’t use a good strategy to solve the problem. • My strategy wasn’t related to what was asked. • I didn’t apply what I know about math to solve the problem. • I left the answer blank.