Title: Function Junction

Patterns, Function tables and Line Graphs

Brief Overview:

Students will use their knowledge of patterns and number operations to create a double line graph and determine which savings plan saves the most money the fastest.

NCTM Content Standard

Algebra-Use mathematical models to represent and understand quantitative relationships: model problem situations with objects and use representation such as graphs, tables, and equations to draw conclusions.

Grade/Level:

High 4th-6th grade

Duration/Length:

Four (60 minute) Lessons

Student Outcomes:

Students will:

- Complete function tables and find the rule
- Create a single and double line graph using a function table
- Identify trend and predict future outcomes

Materials and Resources:

All lessons will use "Functions and Graphing Observational Checklist" for informal assessment.

Lesson 1

- Chart Paper or Chalk Board
- Student Resource #1 "Follow the Rule"
- Student Resource #2 "Find the Rule"
- Student Resource #3 "More Rule Practice" (Reteaching)
- Student Resource #4 "Two Step Function Tables" (Extension)

Lesson 2

- Overhead and Overhead Pattern Blocks (optional)
- Green Triangle Pattern Blocks (about 10 per pair)
- Chart Paper or Chalk Board
- Student Resource #5 "Towers"
- Student Resource #6 "Function Table Story Problems"
- 25-35 snap cubes per pair

Lesson 3

- Overhead Projector
- Teacher Resource #7 "Types of Graphs"
- Student Resource #8 "Graphing a Function Table"
- Student Resource #9 "BCR"
- Student Resource #10 "Reteaching More Function Tables"

Lesson 4

- Teacher Resource # 11 "Double Line Graph"
- Student Resource #12 "Savings Plan 1 @ 2"

Development/Procedures:

Lesson 1

Preassessment – Ask students to take about 5 minutes to discuss with their partner what they think a function table is and ask them to make a list of vocabulary words that are associated with function tables.

Launch – Allow groups to share their answers and list vocabulary on the board for future reference.

- Tell students that one movie ticket costs $6.00.
- Ask students how many movie tickets they think they could get with $6.00. (One)
- Ask how much money they would need to purchase 2 movie tickets if they cost $6.00 each. ($12.00)
- Ask how many tickets they can purchase with $48.00 (8).
- Ask students to share how they found their answers.

Teacher Facilitation #1 (15 minutes)

- With student input, construct a function table for the movie ticket information to show how you could have found these answers.

Number of Tickets (x)	**Cost (y)**
1	$6.00
2	$12.00
3	$18.00
4	$24.00
5	$30.00
8	$48.00

- Explain to the students that when using a function table you put a number in, something happens to the number, and a new number comes out.
- Point out that we put the number 1 in and it was multiplied by six and 6 came out. We put in 2 and it was also multiplied by 6 so 12 came out. The same thing happens to all of the "in" numbers.
- Summarize the rule $6x = y$ (Explain that this is the same as 6 times x.
- Give the following rules and construct function tables with the class, on the board. Provide the inputs only.

1. Rule: $x + 10 = y$

INPUT (x)	**OUPUT (y)**
1	11
2	12
3	13
12	22
20	30
50	60

2. Rule: $x - 10 = y$

INPUT (x)	**OUTPUT (y)**
10	0
20	10
30	20
50	40
78	68
100	90

3. Rule: $x \div 2 = y$

INPUT (x)	**OUTPUT (y)**
2	1
4	2
6	3
10	5
48	24
72	36

4. Rule $9x = y$

INPUT (x)	**OUTPUT (y)**
1	9
2	18
3	27
9	81
10	90
11	99

Student Application (10 minutes)

- Students should complete Student Resource #1 "Follow the Rule" individually. Go over answers together and show answers on the board. (Answers can be found on Teacher Resource #1.)

Teacher Facilitation #2 (15 minutes)

- Give students the following function table and guide them in finding the rule ($x - 8 = y$). Ask the students what happened to make the 10 to make it turn into 2. They may say it was divided by 5 or 8 was subtracted from it. Encourage students to try each rule on the other input numbers to see which one works for everything. Once they have found the rule have them extend the chart.

Input (x)	**Output (y)**
10	2
16	8
20	12
30	
32	
60	

Student Application #2 (10 minutes)

- Have students complete Student Resource #2 "Find the Rule" with a partner or individually. (Answers can be found on Teacher Resource #2.)

Embedded Assessment (5 minutes)

- You can determine students's progress by watching them work on the student resource pages. Use the following exit card to get a final idea about where each student is. Have students find and state the rule ($x + 10 = y$). Then they should complete the function table.

Input (x)	**Output (y)**
0	10
1	11
2	12
5	15
8	
9	
	21
	40

Reteaching/Extension –

- For those who have not completely understood the lesson, pull them into a small group and work with them to complete Student Resource #3 "More Rule Practice". Make sure that you are encouraging the students to decide what they think the rule is and then allow them to check the rule. You may want to start off by giving them the rule and having them to complete the table by applying the rule. This can help you determine if they understand how a function table works. (Answers can be found on Teacher Resource #3.)

- For those who have understood the lesson, allow them to work on Student Resource #4 "Two Step Function Tables" individually or with a partner. These function tables have 2 steps in them. Make sure that the students know ahead of time that 2 things have been done to the in numbers to get the out numbers. . (Answers can be found on Teacher Resource #4.)

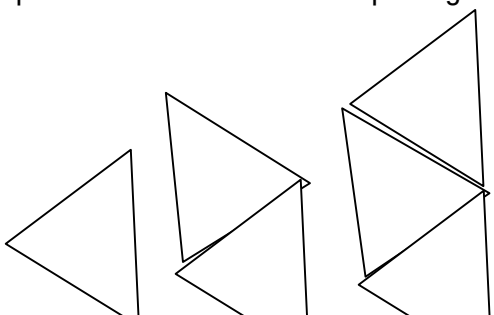
Lesson 2

Preassessment

- Ask students to discuss with a partner real life situations where using a function table could be useful.

Launch

- Have students examine the green triangle pattern block with a partner. Tell them to imagine that the triangles are tables, and one person can sit on each side of the table. Ask them how many people can fit at the table (3).
- Tell them that more people want to come over for dinner so they should add another table by placing two triangles together with flat sides touching. Once they have placed two tables together ask them how many people can sit at the table now (4).
- Even more people want to come so they should add another table. Ask them again how many people can fit with three tables put together (5).



Teacher Facilitation -

- Ask the students if they are having 32 people over how many tables they will need. Assist students in making a function table to find the answer. Have students discover the rule ($x + 2 = y$). Point out that 32 people will be in the y column because it represents the number of people. Have students discover a rule if the function table columns were switched ($y - 2 = x$). Tell the students that this works because subtraction is the opposite of addition.

Input **# Of tables** **(x)**	**Output** **#Of people** **(y)**
1	3
2	4
3	5
4	6
5	7
6	8
7	9
8	10
↓	↓
30	32

Student Application

- Students should complete Student Resource #5 "Towers" with a partner. (Answer: 100 cubes)

Embedded Assessment –

- Observe students working on student resource pages and the function tables they create.
- Have student complete Student Resource #6 "Function Table Story Problems" individually as an assessment for the lesson. (Answers can be found on Teacher Resource #5.)

Reteaching/Extension

- Students who need more practice can work with the teacher in small groups to practice following given rules for function table and finding rules. Use rules such as; 3x=7, x + 7 = y, etc.
- Students who have mastered the concepts can work to create their own function tables and have other students solve them.

Lesson 3

Preassessment

- Pass each student an index card. Have students put the following information into a function table and determine the rule. Sally got a new long-distance calling plan. She feels she is getting a good value because she is charged only $.50 for the first ten minutes. But, when she gets her bill, she realizes that it is not such a good value after all! The company is charging her $.50 for the first ten minutes, but then charges her $1.00 for the second ten minutes, $1.50 for the third ten minutes, and so on. Needless-to-say, Sally is shopping around for a new plan!

Launch

- Using concept attainment, read aloud The Fly on the Ceiling-A Math Myth by Dr. Julie Glass and discuss.

Teacher Facilitation

- Using the overhead, show examples of different "Types of Graphs" (TR #6) and have students identify each by name. Then, discuss with the students the similarities and differences of the different types and the best situation in which to use each type.
- Review what elements each graph should have (title, scale, labeled x and y axes) showing each element on the overhead as discussed.
- Model on the overhead the graphing of this function table. Elicit ideas from students about the type of graph that should be used (line graph-change over time).

# Of min.	Cost
10	$.50
20	$1.00
30	$1.50
40	$2.00
50	$2.50
60	$3.00
70	$3.50

Student Application

- Distribute graph paper to pairs of students and the function tables (SR#7). Students will work in pairs to graph the function table. Circulate to observe students using an observational checklist, offering suggestions as needed.

Embedded Assessment

- Distribute BCR -journal prompt (SR#8)

Reteaching/Extension –

- Reteaching: Have students practice finding various function table rules (SR#9 and SR#10)
- Extension: Students should extend the gumball function table to the 15th term. Make a prediction about how many gumballs they would receive if they put in 50 quarters.

Lesson 4

Preassessment-

- Pass each student an index card. Have students copy this function table and answer these questions:
  1. What scale would you use if you were to graph this table? (5)
  2. What is the rule? (x+10=y)

X	Y
5	15
25	35
45	55
65	75

Launch

- Show and discuss double line graph (TR #7). Highlight title, key, labels, axes, and scale. Discuss trends and possible future points and slope.

Teacher Facilitation

- On overhead, create a double line graph from the following data:

# Of hours of daylight	# Of hours of darkness	Date
15	9	June 21
14	10	July 21
13	11	August 21
12	12	September 21

Student Application

- Students use the modeled double line graph to create their own double line graph representing the 2 savings plans (SR#11).

Embedded Assessment

- Continue using checklist

Reteaching/Extension

- Reteaching- Students should practice plotting various points on the coordinate grid.
- Extension - Students should continue to find the amount of money earned for the next 10 or 20 terms using one of the two savings plans.

Summative Assessment:

- Student Resource #12.
- This will determine student progress toward understanding the concepts of the lessons.
- Answers can be found on Teacher Resource #s 8-11.

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Follow the Rule

Student Resource #1

1. Rule $x + 4 = y$

Input (x)	Output (y)
3	
4	
5	
7	
10	

2. Rule $x - 3 = y$

Input (x)	Output (y)
6	
7	
9	
12	
10	

3. Rule $x + 7 = y$

Input(x)	2	3	9	6	4
Output(y)					

4. Rule $x - 6 = y$

Input(x)	6	7	10	9	12
Output(y)					

Follow the Rule (Answers)

1. Rule $x + 4 = y$

Input (x)	Output (y)
3	7
4	8
5	9
7	11
10	14

2. Rule $x - 3 = y$

Input (x)	Output (y)
6	3
7	4
9	6
12	9
10	7

3. Rule $x + 7 = y$

Input(x)	2	3	9	6	4
Output(y)	9	10	16	13	11

4. Rule $x - 6 = y$

Input(x)	6	7	10	9	12
Output(y)	0	1	4	3	6

Find the Rule

Student Resource #2

1. Rule _____

Input (x)	Output (y)
5	14
6	15
8	17
10	
9	

2. Rule _____

Input (x)	Output (y)
5	10
7	14
8	16
4	
10	

3. Rule _____

Input(x)	3	4	5	6	9
Output(y)	9	12	15		

4. Rule _____

Input(x)	12	8	10	20	18
Output(y)	6	4	5		

Find the Rule (Answers)

1. Rule $x + 9 = y$

In (x)	Out (y)
5	14
6	15
8	17
10	19
9	18

2. Rule $2x = y$

In (x)	Out (y)
5	10
7	14
8	16
4	8
10	20

3. Rule $3x = y$

Input(x)	3	4	5	6	9
Output(y)	9	12	15	18	27

4. Rule $x \div 2 = y$

Input(x)	12	8	10	20	18
Output(y)	6	4	5	10	9

More Rule Practice

Student Resource #3

1. Rule $x + 10 = y$

Input(x)	5	6	8	10	9
Output(y)					

2. Rule $4x = y$

Input(x)	5	7	8	4	10
Output(y)					

3. Rule $2n = y$

Input(x)	3	4	5	6	9
Output(y)					

4. Rule _____

Input(x)	9	10	12	11	15
Output(y)	45	50	60		

5. Rule _____

Input(x)	24	33	18	27	45
Output(y)	8	11	6		

6. Rule _____

Input(x)	12	8	16	20	40
Output(y)	3	2	4		

More Rule Practice (Answers)

1. Rule $x + 10 = y$

Input(x)	5	6	8	10	9
Output(y)	15	16	18	20	19

2. Rule $4x = y$

Input(x)	5	7	8	4	10
Output(y)	20	28	32	16	40

3. Rule $2n = y$

Input(x)	3	4	5	6	9
Output(y)	6	8	10	12	18

4. Rule $\underline{5x = y}$

Input(x)	9	10	12	11	15
Output(y)	45	50	60	55	75

5. Rule $\underline{x \div 3 = y}$

Input(x)	24	33	18	27	45
Output(y)	8	11	6	9	15

6. Rule $\underline{x \div 4 = y}$

Input(x)	12	8	16	20	40
Output(y)	3	2	4	5	10

Two Step Function Tables

Student Resource #4

1. Rule: $x + 2 = y$

input(x)	4	8	12	15	20	26	30
output(y)							

2. Rule: $x + 2 - 1 = y$

input(x)	4	8	12	15	20	26	30
output(y)	5	9					

3. Rule: $x - 1 + 5 = y$

input(x)	2	4	7	10	15	24	28
output(y)	6	8	11				

4. Rule: _____

input(x)	4	7	8	10	11	12	15
output(y)	9	12	13	15			

5. Rule: _____

input(x)	3	5	6	7	8	10	12
output(y)	10	14	16	18			

6. Rule: _____

input(x)	3	6	10	22	8	12	20
output(y)	40	55	75				

Two Step Function Tables (Answers)

1. Rule: $x + 2 = y$

input(x)	4	8	12	15	20	26	30
output(y)	6	10	14	17	22	28	32

2. Rule: $x + 2 - 1 = y$

input(x)	4	8	12	15	20	26	30
output(y)	5	9	13	16	21	27	31

3. Rule: $x - 1 + 5 = y$

input(x)	2	4	7	10	15	24	28
output(y)	6	8	11	14	19	28	32

4. Rule: $\underline{x + 8 - 3 = y}$

input(x)	4	7	8	10	11	12	15
output(y)	9	12	13	15	16	17	20

5. Rule: $\underline{2x + 4 = y}$

input(x)	3	5	6	7	8	10	12
output(y)	10	14	16	18	20	24	28

6. Rule: $\underline{5x + 25 = y}$

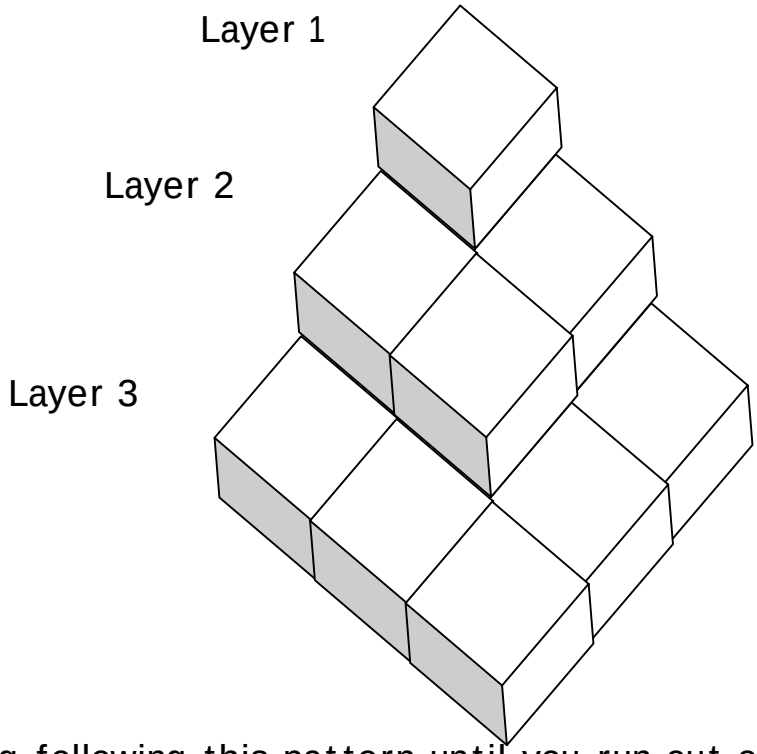
input(x)	3	6	10	4	8	12	20
output(y)	40	55	75	45	65	75	125

Towers

Student Resource #5

Work with a partner using snap cubes to build a tower following this description:

- Layer one will have one cube.
- Layer two will be 2 cubes wide and 2 cubes long.
- Layer three will be 3 cubes long and 3 cubes wide.



- Continue building following this pattern until you run out of snap cubes.
- Predict the number of cubes that will be in the 10th layer. Use a function table to verify your prediction.

Layer # (x)	# of cubes in the layer (y)
1	1
2	4
3	9
↓	↓

Rule _____

Function Table Story Problems

Student Resource #6

Solve the following problems using function tables.

1. The mice are getting tickets for "Mystery at the Trap." Terry pays for one ticket and gets five tickets! Sara pays for three tickets and gets seven tickets! Rick pays for four tickets and gets eight tickets! Rick scratches his head and says, "What's going on? This is a mystery!" He watches Molly pay for six tickets. How many tickets will Molly get?

Tickets paid for (x)	1	3	4	6
Tickets received (y)	5	7	8	

Rule _____

2. Funny things are happening in the Down-Home Hotel. Fred gets on the elevator and presses button 8. The elevator goes to floor 3! Fred presses button 10 and the elevator goes to floor 5! Fred presses button 15, and the elevator goes to floor 10. What's happening? If Fred presses button 21, what floor will the elevator take him to?

Button Pressed (x)	8	10	15	21
Floor it goes to (y)				

Rule _____

Function Table Story Problems(Answers)

Solve the following problems using function tables.

3. The mice are getting tickets for "Mystery at the Trap." Terry pays for one ticket and gets five tickets! Sara pays for three tickets and gets seven tickets! Rick pays for four tickets and gets eight tickets! Rick scratches his head and says, "What's going on? This is a mystery!" He watches Molly pay for six tickets. How many tickets will Molly get?

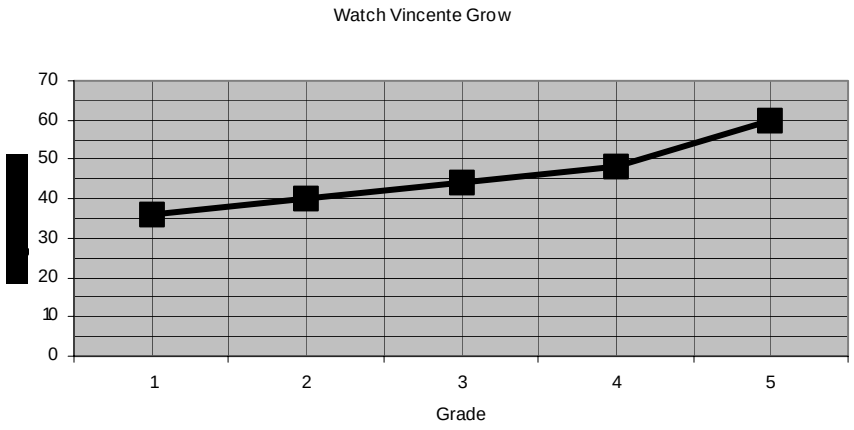
Tickets paid for (x)	1	3	4	6
Tickets received (y)	5	7	8	10

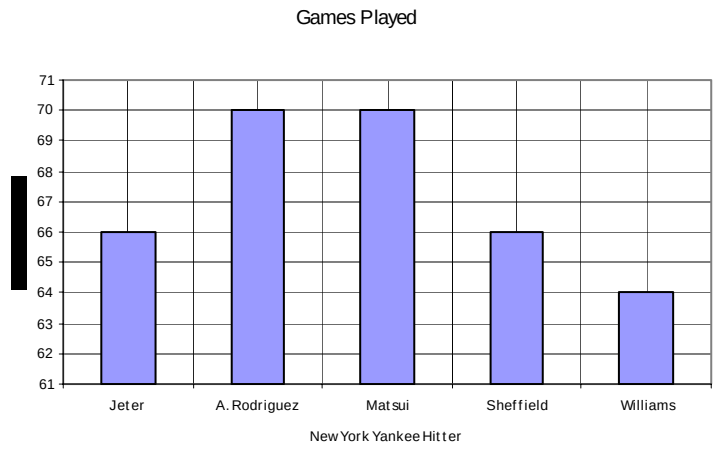
Rule $x + 4 = y$

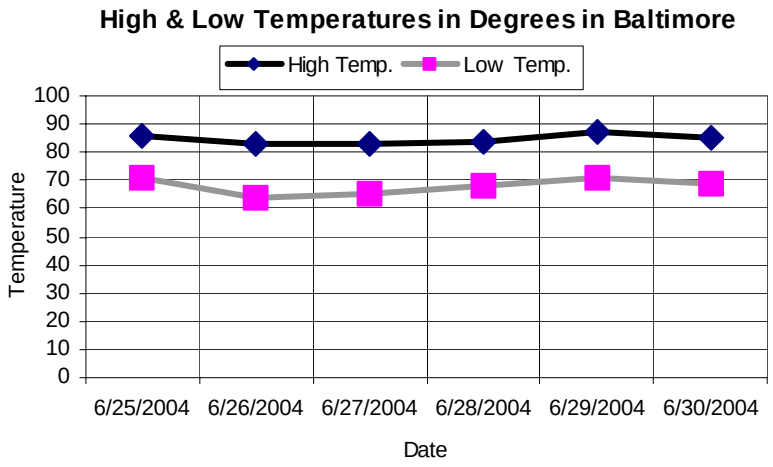
4. Funny things are happening in the Down-Home Hotel. Fred gets on the elevator and presses button 8. The elevator goes to floor 3! Fred presses button 10 and the elevator goes to floor 5! Fred presses button 15, and the elevator goes to floor 10. What's happening? If Fred presses button 21, what floor will the elevator take him to?

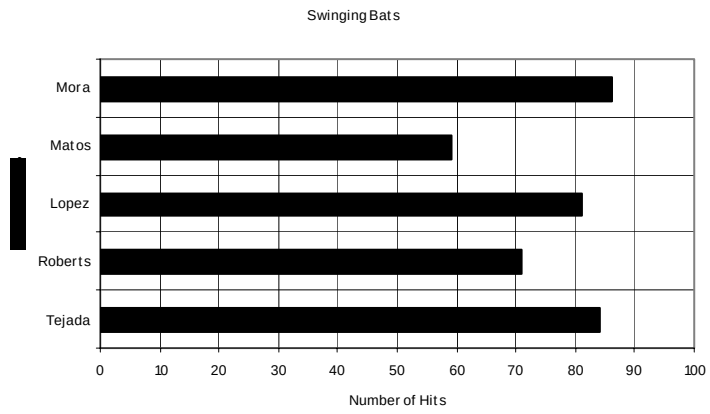
Button Pressed (x)	8	10	15	21
Floor it goes to (y)	3	5	10	16

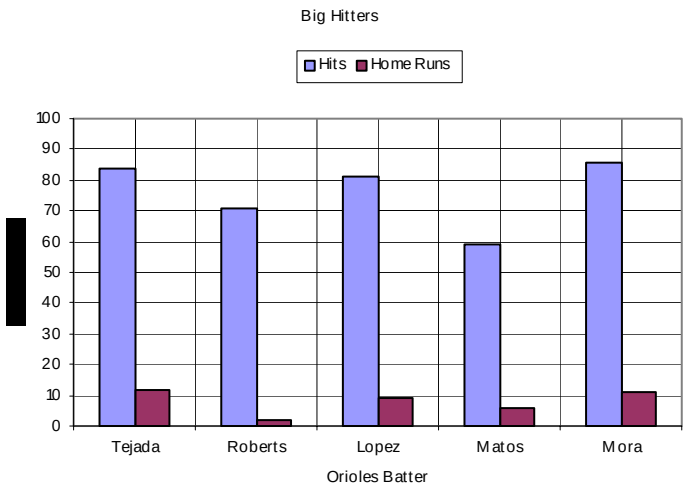
Rule $x - 5 = y$

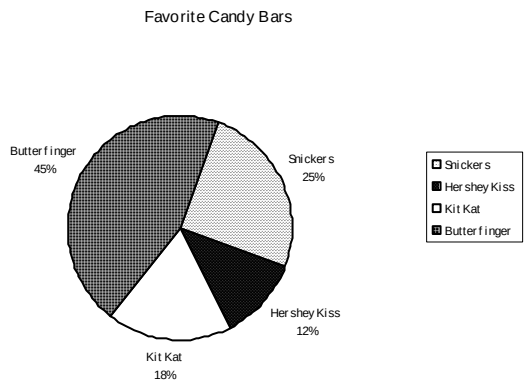

Watch Vincente Grow
70
60
50
40
30
20
10
0
1
2
3
4
5
Grade


Games Played
71
70
69
68
67
66
65
64
63
62
61
Jeter
A. Rodriguez
Matsui
Sheffield
Williams
New York Yankee Hitter


High & Low Temperatures in Degrees in Baltimore
High Temp.
Low Temp.
Temperature
100
90
80
70
60
50
40
30
20
10
0
6/25/2004
6/26/2004
6/27/2004
6/28/2004
6/29/2004
6/30/2004
Date


Swinging Bats
Mora
Matos
Lopez
Roberts
Tejada
0
10
20
30
40
50
60
70
80
90
100
Number of Hits


Big Hitters
Hits
Home Runs
100
90
80
70
60
50
40
30
20
10
0
Tejada
Roberts
Lopez
Matos
Mora
Orioles Batter


Favorite Candy Bars
Butterfinger
45%
Snickers
25%
Hershey Kiss
12%
Kit Kat
18%
Snickers
Hershey Kiss
Kit Kat
Butterfinger

GRAPHING A FUNCTION TABLE (SR #7)

# of quarters	# of gumballs
1	3
2	6
3	9
4	12
5	15
6	18
7	21
8	
9	
10	
11	
12	
13	
14	

RULE: _____

Brief Constructed Response (Lesson 3)

Student Resource #8

Part A

Question? Are the coordinate points (5,8) and (8,5) in the same place on the coordinate plane? Yes or No

_____

Part B

Use what you know about the coordinate plane to explain why your answer is correct. Use numbers, pictures, and/or words in your explanation.

_____

_____

_____

_____

_____

Reteaching
More function tables
(SR #9)

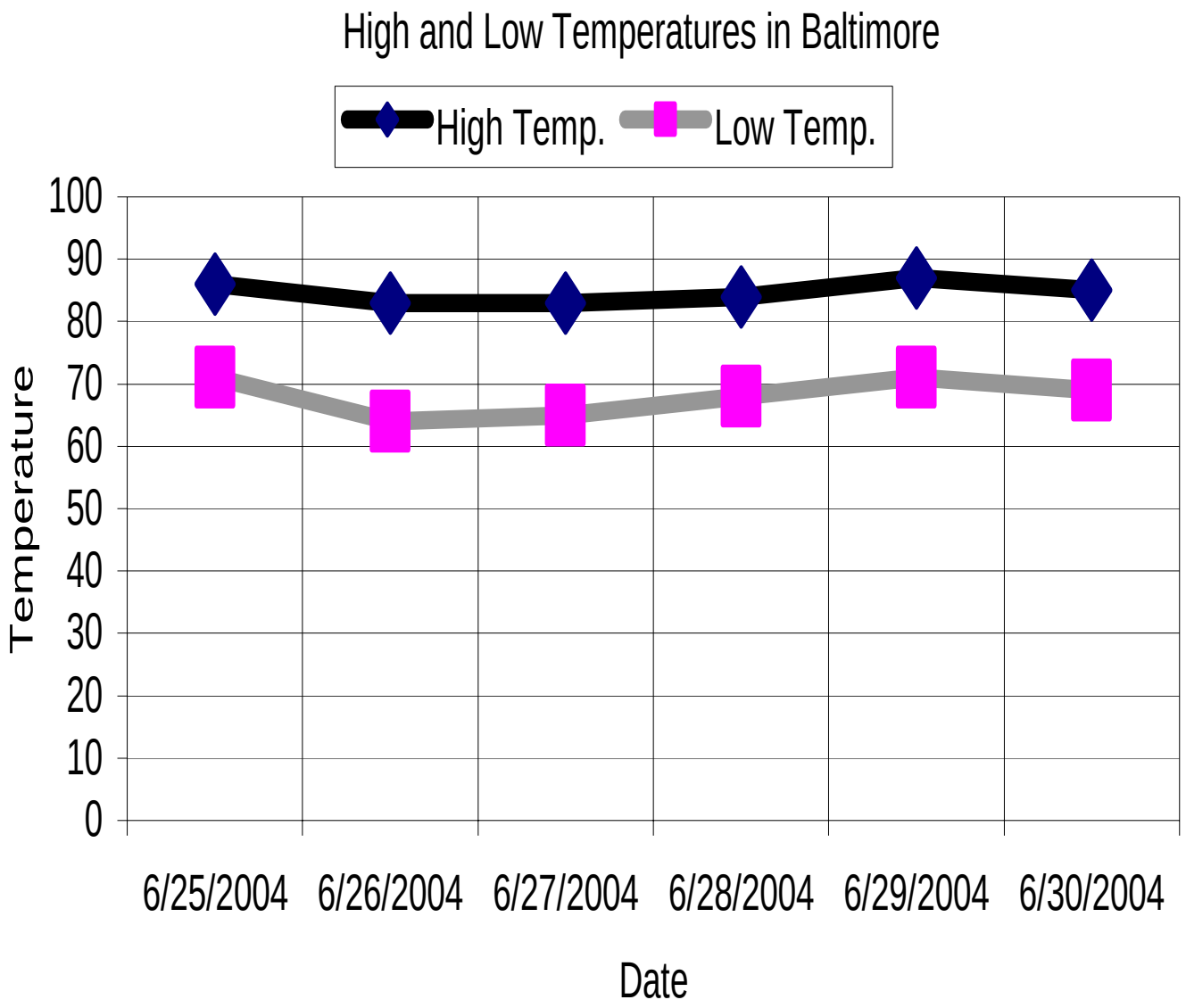
x	y
3	5
4	7
5	9
6	
7	
8	
9	
10	
11	

Rule_____

x	y
2	6
4	12
6	18
8	
10	
12	

Rule:_____

Teacher resource #7



Double line graph
(SR #11)

Savings Plan 1

Day	Daily Salary ($)	Total Earnings ($)
1	1	1
2	2	3
3	4	7
4	8	15
5	16	31
6	32	63
7	64	127
8	128	255
9	256	511

Savings Plan 2

Day	Daily Salary ($)	Total Earnings ($)
1	3	3
2	6	9
3	9	18
4	12	30
5	15	45
6	18	63
7	21	84
8	24	108
9	27	135

Summative Assessment

Student Resource #12

Polly's Pet Store just received a huge carton from the Fabulous Food Factory. Polly can't believe her eyes when she opens the carton. "I ordered 5 bags of Best Bones, and they sent 25!" she said. "I ordered 3 boxes of super Seed, and they sent 15 boxes. I ordered 10 buckets of Wonder Worms, and they sent 50 buckets! What's going on?" Polly ordered 20 tubs of Fantastic Flies. How many tubes do you think she got?

1. Complete the following function table to find the rule

# of items ordered(x)				
# of items received (y)				

Rule _____

Using the rule above, complete this function table and use it to make a line graph. Be sure to include all graph elements.

In (*x*)	Out (*y*)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Brief Constructed Response

Input (*x*)	2	5	12	25
Output (*y*)	12	30		

Part A

Question?

- Complete the Function Table
- Circle the correct rule

A. 3x=y B. x÷6=y C. 6x=y D. x+10=y

Part B

Use what you know about function tables to explain why your answer is correct. Use numbers, symbols, pictures, and/or words in your explanation.

_____

_____

_____

_____

_____

Summative Assessment (Answers)

Polly's Pet Store just received a huge carton from the Fabulous Food Factory. Polly can't believe her eyes when she opens the carton. "I ordered 5 bags of Best Bones, and they sent 25!" she said. "I ordered 3 boxes of super Seed, and they sent 15 boxes. I ordered 10 buckets of Wonder Worms, and they sent 50 buckets! What's going on?" Polly ordered 20 tubs of Fantastic Flies. How many tubes do you think she got?

2. Complete the following function table to find the rule

#of items ordered(x)	5	3	10	20
# of item received (y)	25	15	50	100

Rule $\underline{5x = y}$

Complete this function table and use it to make a line graph. Be sure to include all graph elements.

In (x)	Out (y)
1	5
2	10
3	15
4	20
5	25
6	30
7	35
8	40
9	45
10	50

11	55
12	60
13	65
14	70
15	75
16	80
17	85
18	90
19	95
20	100

MSA Mathematics BCR Rubric
Grades 3 through 8

2 The response demonstrates a complete understanding and analysis of a problem.

- Application of a reasonable strategy in the context of the problem is indicated.
- Explanation[1] of and/or justification[2] for the mathematical process(es) used to solve a problem are clear, developed, and logical.
- Connections and/or extensions made within mathematics or outside of mathematics are clear.
- Supportive information and/or numbers are provided as appropriate. [3]

The response demonstrates a minimal understanding and analysis of a problem.

- Partial application of a strategy in the context of the problem is indicated.
- Explanation[1] of and/or justification[2] for the mathematical process(es) used to solve a problem is partially developed, logically flawed, or missing.
- Connections and/or extensions made within mathematics or outside of mathematics are partial or overly general, or flawed.
- Supportive information and/or numbers may or may not be provided as appropriate. [3]

0 The response is completely incorrect, irrelevant to the problem, or missing. [4]

Notes:

[1] **Explanation** refers to students' ability to communicate **how** they arrived at the solution for an item using the language of mathematics.

[2] **Justification** refers to students' ability to support the reasoning used to solve a problem, or to demonstrate **why** the solution is correct using mathematical concepts and principles.

[3] Students need to complete rubric criteria for ***explanation, justification, connections*** and/or ***extensions*** as cued for in a given problem.

[4] Merely an exact copy or paraphrase of the problem will receive a score of "0".

MSA Brief Constructed Response "Kid Speak" Mathematics Rubric
Grades 1 through 8

Score	
2	**My answer shows I completely understood the problem and how to solve it:** • **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.**
1	**My answer shows I understood most of the problem and how to solve it:** • **I used a strategy to find a solution that was partly correct.** • **I used some math vocabulary and most of my reasons were correct to explain how I solved the problem. My explanation needed to be more complete, well organized or logical.** • **I partly applied what I know about math to solve the problem.** • **I tried to use numbers, words, symbols or pictures (or a combination of them) to show how I got my answer, but these may not have been completely correct.**
0	**My answer shows I didn't understand the problem and how to solve it:** • **I wasn't able to use a good strategy to solve the problem.** • **My strategy wasn't related to what was asked.** • **didn't apply what I know about math to solve the problem.** • **I left the answer blank.**

FUCTIONS AND GRAPHING OBSERVATIONAL CHECKLIST NAME	FOLLOW RULE	IDENTIFY RULE	TITLE	SCALE	X AXIS LABEL	Y AXIS LABLE	COORDINATE POINTS	TREND

MSA Extended Constructed Response "Kid Speak" Mathematics Rubric
Grades 4 through 8

Score	
3	**My answer shows I completely understood the problem and how I solved it:** • **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	**My answer shows I understood most of the problem and how I solved it:** • **I used a good strategy 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	**My answer shows I knew only a little about the problem and how I solved it:** • **I used only part of a good strategy 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	**My answer shows I didn't understand the problem and how I solved it:** • **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.**

Resources

- Algebra Thinking For Grades 3-4, McGraw-Hill Children's Publishing
- Algebra Thinking For Grades 5-6, McGraw-Hill Children's Publishing
- Groundworks, Algebra Puzzles and Problems Grade 4, Creative Publications
- Groundworks, Algebra Puzzles and Problems Grade 5, Creative Publications
- Navigating Through Algebra in Grades 3-5, National Council of Teachers of Mathematics
- The Super Source, Snap Cubes 3-4, Cuisenaire