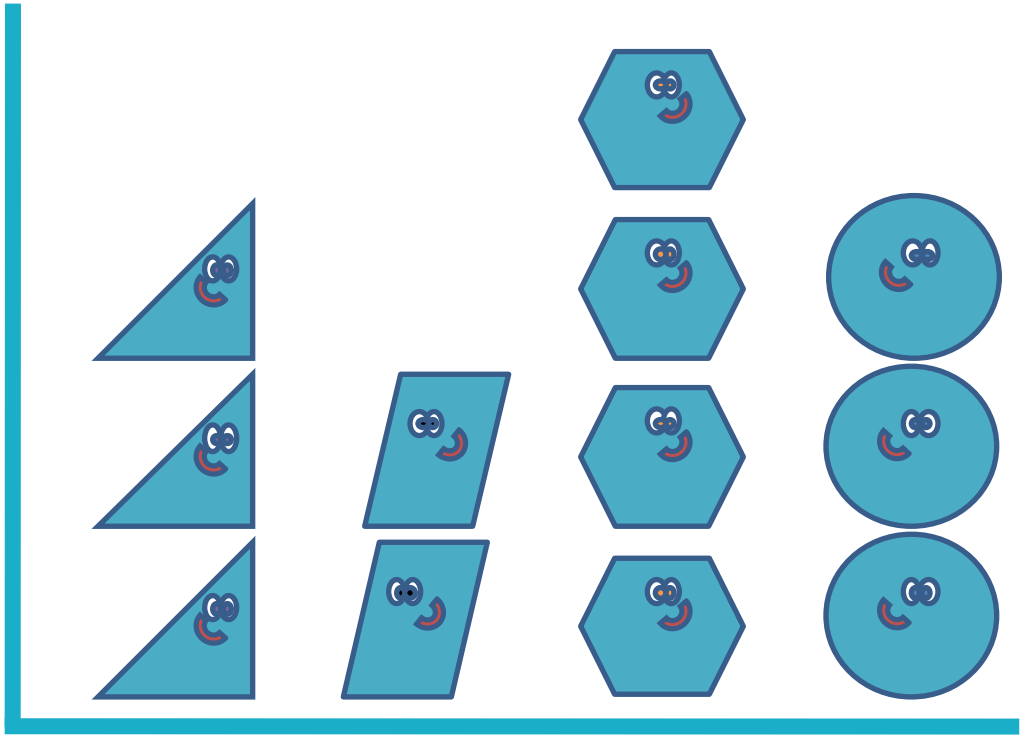
Greening Up with Graphing: Recycle, Reduce, & Reuse

Third Edition

Student Mathematician Journal



Student Mathematician _____

University of Connecticut

October 2010

Greening Up With Graphing: Recycle, Reduce, & Reuse

Third Edition

Student Mathematician Journal

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October 2010

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

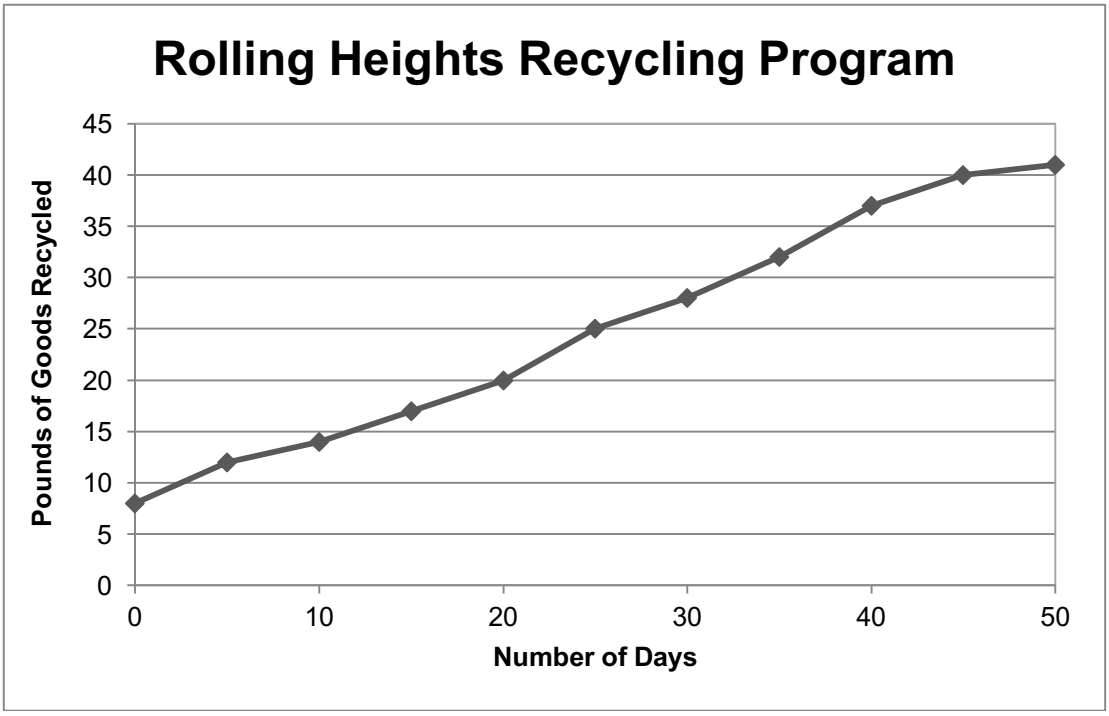
Babbage

Recycling in the News

Answering the Call for Recycling—The Cactus Chronicle

"Recycling is the right thing to do, and it isn't that hard," Tina Lee explained. Tina is a fourth grade student at Rolling Heights Elementary School in Southern California. She was so excited when her school began its recycling program because she knew it would help save the environment.

Students and staff thought it would be best to start in the classrooms. The school's goal was to recycle paper, aluminum, and plastic. At first, they were not sure how to keep the three items separate. Then, Tina thought of using colors to indicate which item went in which bin. Tina's friends helped by creating signs to tell other students which recyclable item went in which bin. A graph showing the change in recycling over 50 days is shown below.



By the end of the program most of the school's trash was being recycled, which meant the school was throwing out only a small amount of its waste. These students, teachers, and staff made a big difference in their school by starting the recycling program!

Discussion Questions

Babbage

1. Why do you think that some people do not recycle?

_____

_____

_____

2. What did you learn from the article that the graph did not tell you?

_____

_____

_____

3. What did you learn from the graph that the article did not tell you?

_____

_____

_____

4. What can be done to encourage people in your school to recycle more?

_____

_____

_____

Recycling in the News

Answering the Call for Recycling—The Cactus Chronicle

"Recycling is the right thing to do, and it isn't that hard," Tina Lee explained. Tina is a fourth grade student at Rolling Heights Elementary School in Southern California. She was so excited when her school began its recycling program because she knew it would help save the environment.

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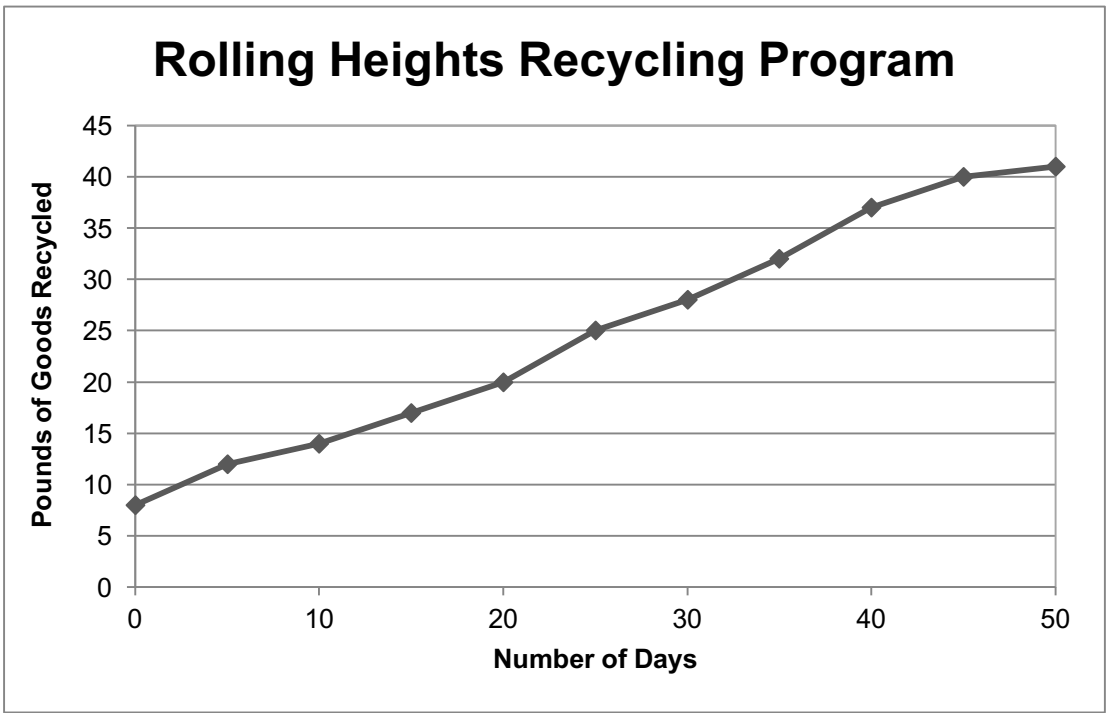


By the end of the program most of the school's trash was being recycled, which meant the school was throwing out only a small amount of its waste. These students, teachers, and staff made a big difference in their school by starting the recycling program!

Discussion Questions

Galileo & Falconer

1. What did you learn from the article that the graph did not tell you?

_____

_____

_____

2. What did you learn from the graph that the article did not tell you?

_____

_____

_____

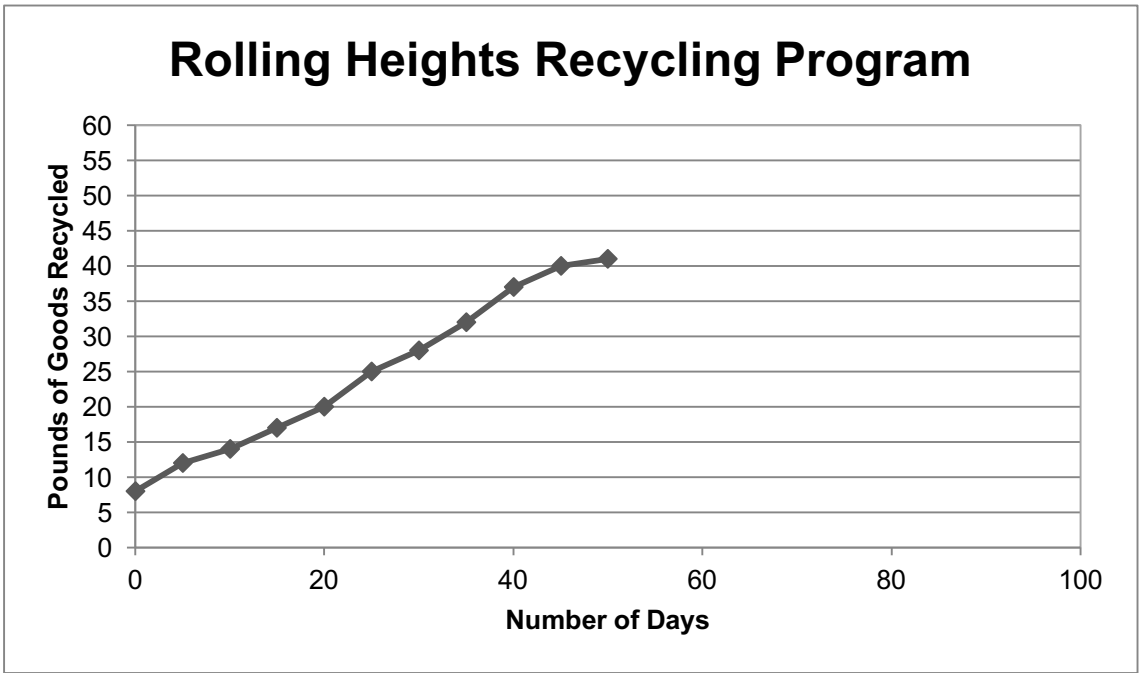
3. What can be done to encourage people in your school to recycle more?

_____

_____

_____

4. What do you think the graph would look like if the recycling program goes on for 100 days? Draw it below.

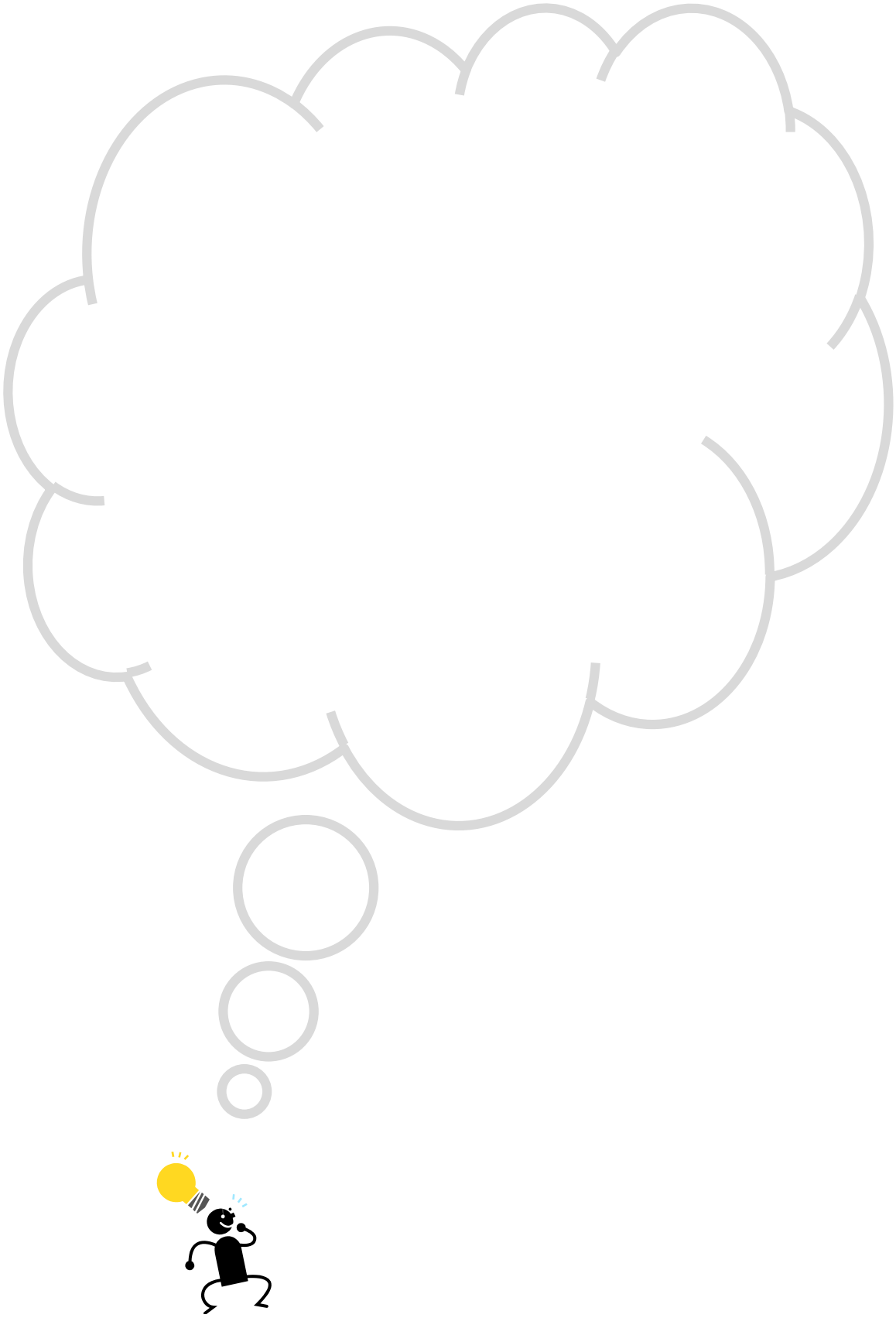


Explain your thinking.

_____

_____

_____



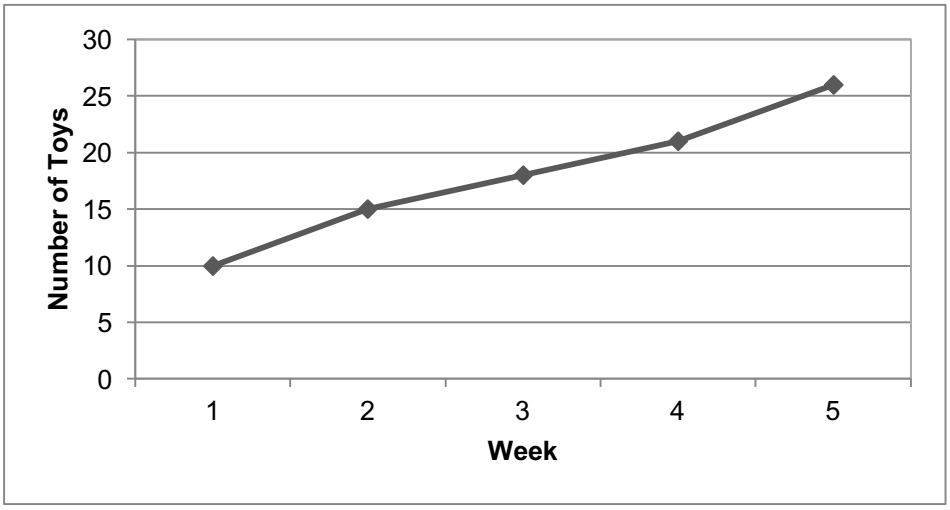
Name: _____ Date: _____

For a Good Cause: Collecting and Donating

Read the two stories below and decide which graph goes with each.

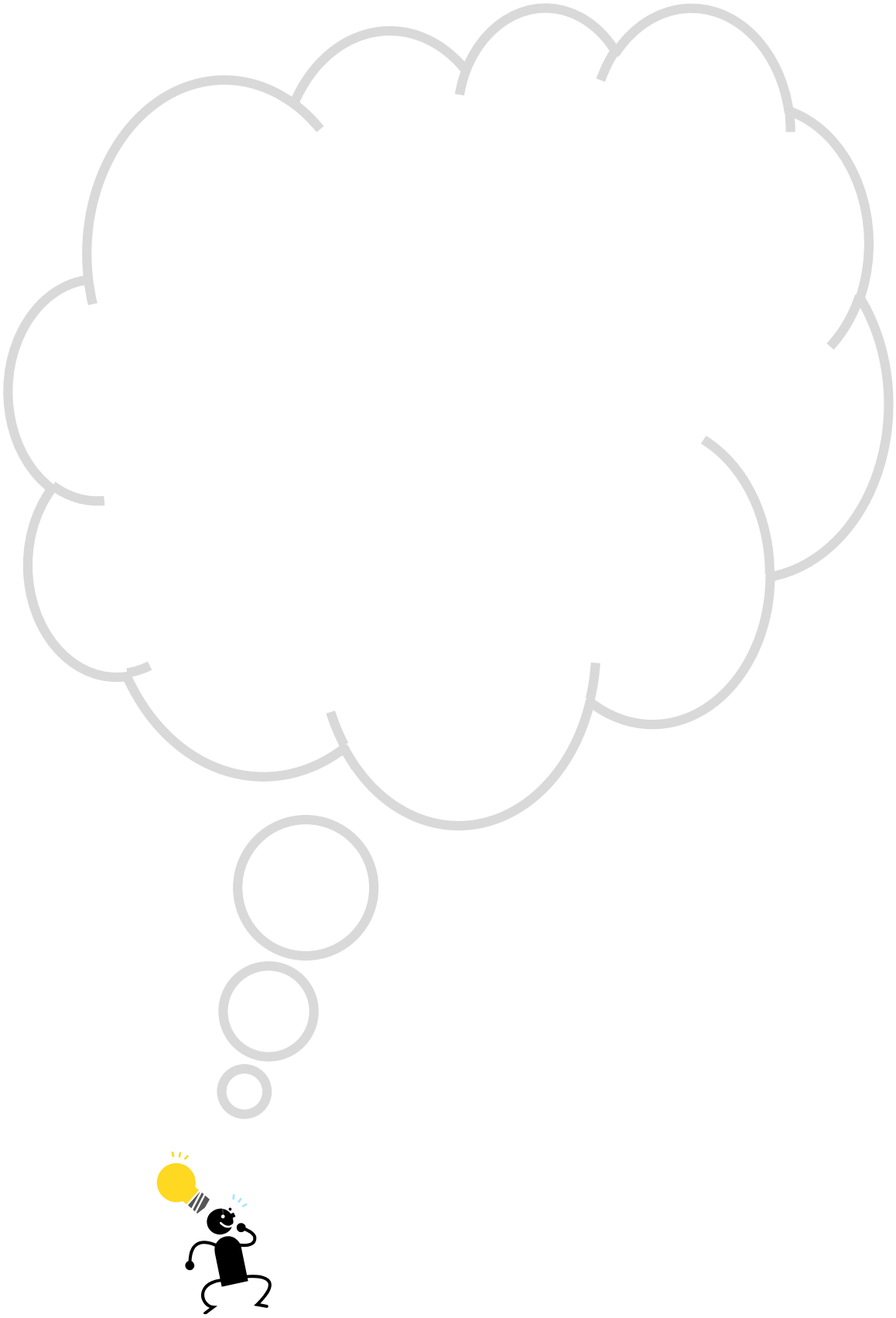
1. Lydia has 28 toys. She decides that there are many that she no longer plays with and gives some to a different charity each week. After 5 weeks, she only has 8 toys left.

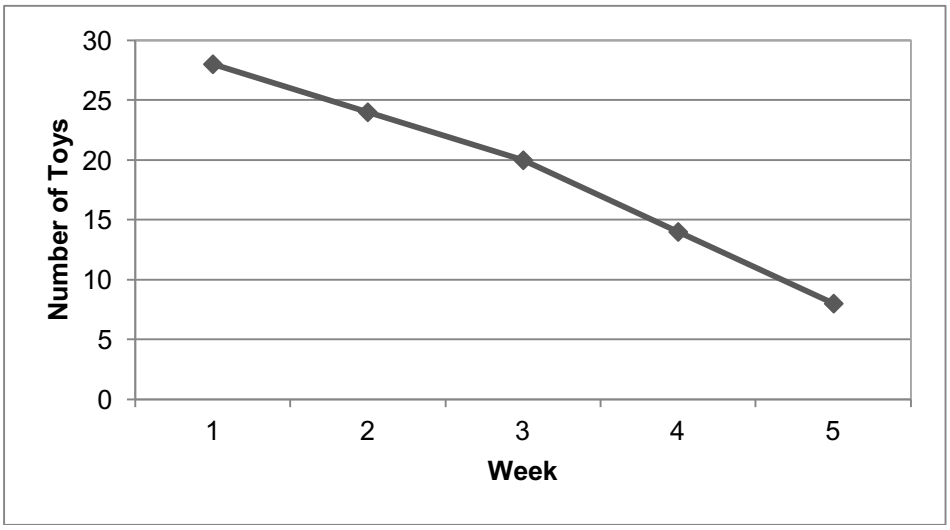
2. Antonio has 10 toys. He collects more toys from his friends each week. After 5 weeks, he has 26 toys.



Which story can be modeled by this graph? _____

What would a good title for this graph be? _____





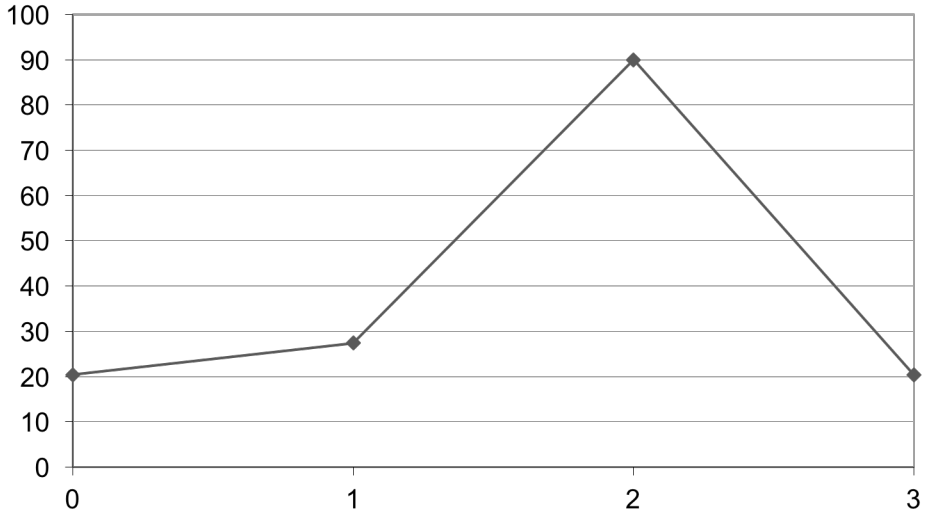
Which story can be modeled by this graph? _____

What would a good title for this graph be? _____

Name _____ Date _____

Student Mathematicians Think Deeply

Make up a story that could be modeled by the graph below.



What is a possible title for your graph? _____

Name: _____ Date: _____

Recycling Rules! (Part 1)

OUR QUESTION:

Can we increase how our school recycles _____
(item name)

by _____
(intervention chosen)

_____?

MY HYPOTHESIS:

I think we ( ) CAN ( ) CANNOT increase how much our school recycles this way BECAUSE

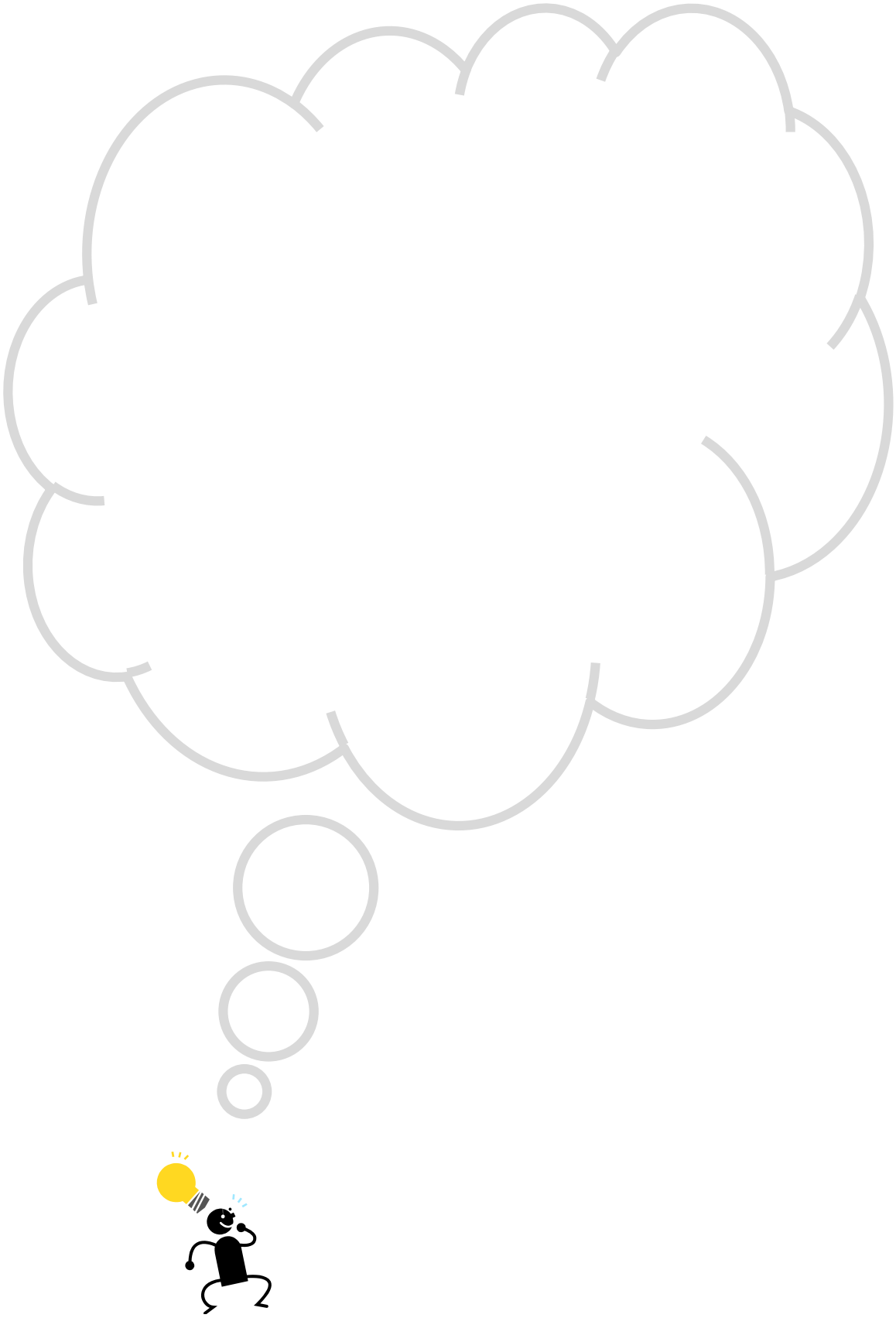
_____

_____.

State Capitals (Pre-Intervention)

State	Capital	State	Capital
1. Alabama		26. Montana	
2. Alaska		27. Nebraska	
3. Arizona		28. Nevada	
4. Arkansas		29. New Hampshire	
5. California		30. New Jersey	
6. Colorado		31. New Mexico	
7. Connecticut		32. New York	
8. Delaware		33. North Carolina	
9. Florida		34. North Dakota	
10. Georgia		35. Ohio	
11. Hawaii		36. Oklahoma	
12. Idaho		37. Oregon	
13. Illinois		38. Pennsylvania	
14. Indiana		39. Rhode Island	
15. Iowa		40. South Carolina	
16. Kansas		41. South Dakota	
17. Kentucky		42. Tennessee	
18. Louisiana		43. Texas	
19. Maine		44. Utah	
20. Maryland		45. Vermont	
21. Massachusetts		46. Virginia	
22. Michigan		47. Washington	
23. Minnesota		48. West Virginia	
24. Mississippi		49. Wisconsin	
25. Missouri		50. Wyoming	

Number of state capitals I knew before the intervention: _____



State Capitals (Post-Intervention)

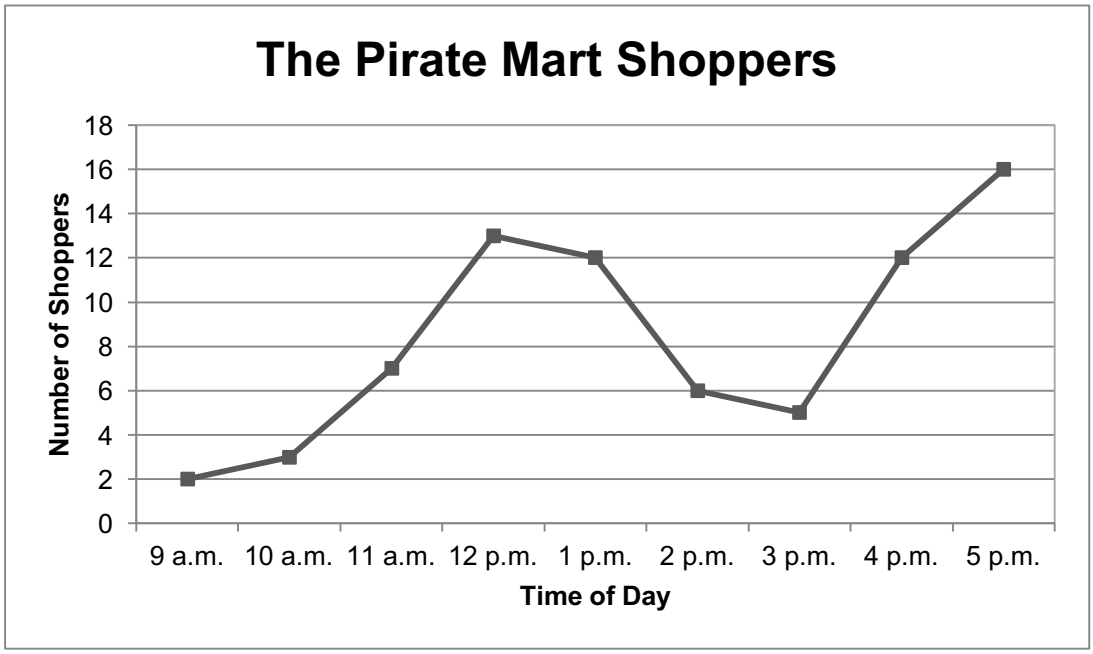
State	Capital	State	Capital
1. Alabama		26. Montana	
2. Alaska		27. Nebraska	
3. Arizona		28. Nevada	
4. Arkansas		29. New Hampshire	
5. California		30. New Jersey	
6. Colorado		31. New Mexico	
7. Connecticut		32. New York	
8. Delaware		33. North Carolina	
9. Florida		34. North Dakota	
10. Georgia		35. Ohio	
11. Hawaii		36. Oklahoma	
12. Idaho		37. Oregon	
13. Illinois		38. Pennsylvania	
14. Indiana		39. Rhode Island	
15. Iowa		40. South Carolina	
16. Kansas		41. South Dakota	
17. Kentucky		42. Tennessee	
18. Louisiana		43. Texas	
19. Maine		44. Utah	
20. Maryland		45. Vermont	
21. Massachusetts		46. Virginia	
22. Michigan		47. Washington	
23. Minnesota		48. West Virginia	
24. Mississippi		49. Wisconsin	
25. Missouri		50. Wyoming	

Number of state capitals I knew after the intervention: _____

Name: _____ Date: _____

The Pirate Mart

Jack opened a store that sold pirate clothes, parrots, and treasure chests. He wanted to see when his customers came to the store, so he created this graph.



1. At what time are the most people shopping at Pirates Mart?

_____

2. When are the fewest people shopping?

_____

3. What happens around lunchtime? Why?

_____

_____

4. Jack is thinking about changing when the store's hours. Do you recommend opening earlier or staying open later? Why? (Use the graph to support your suggestion.)

_____

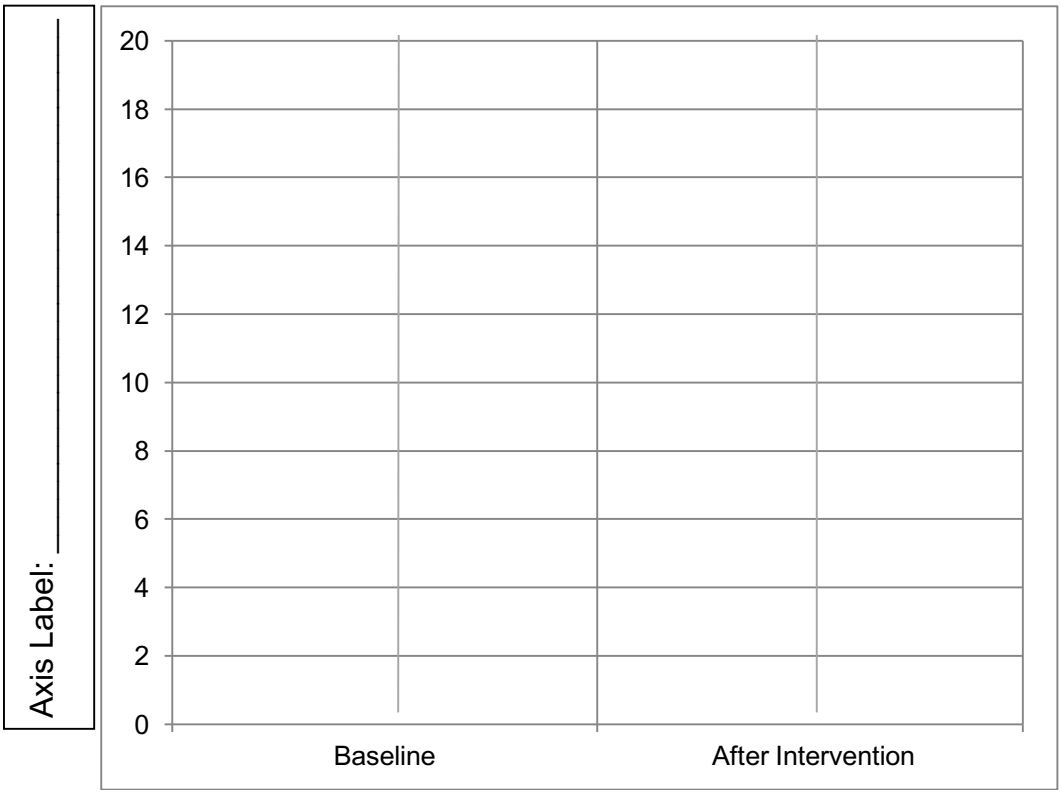
_____

_____

Name: _____ Date: _____

Graph It!

Title: _____



Name: _____ Date: _____

Recycling Rules! (Part 2)

My Data Table

	Collection Total
Day 1 (Baseline)	
Day 2 (Baseline)	
Day 3 (Baseline)	
Day 4	
Day 5	
Day 6	
Day 7	
Day 8	

Check Up #1

Name: _____ Date: _____

1. Jenna and Josh sold 4 cups of lemonade the first day of their lemonade stand. They wanted to sell more lemonade. What intervention could Josh and Jenna use to increase their lemonade sales?

_____

_____

_____

_____

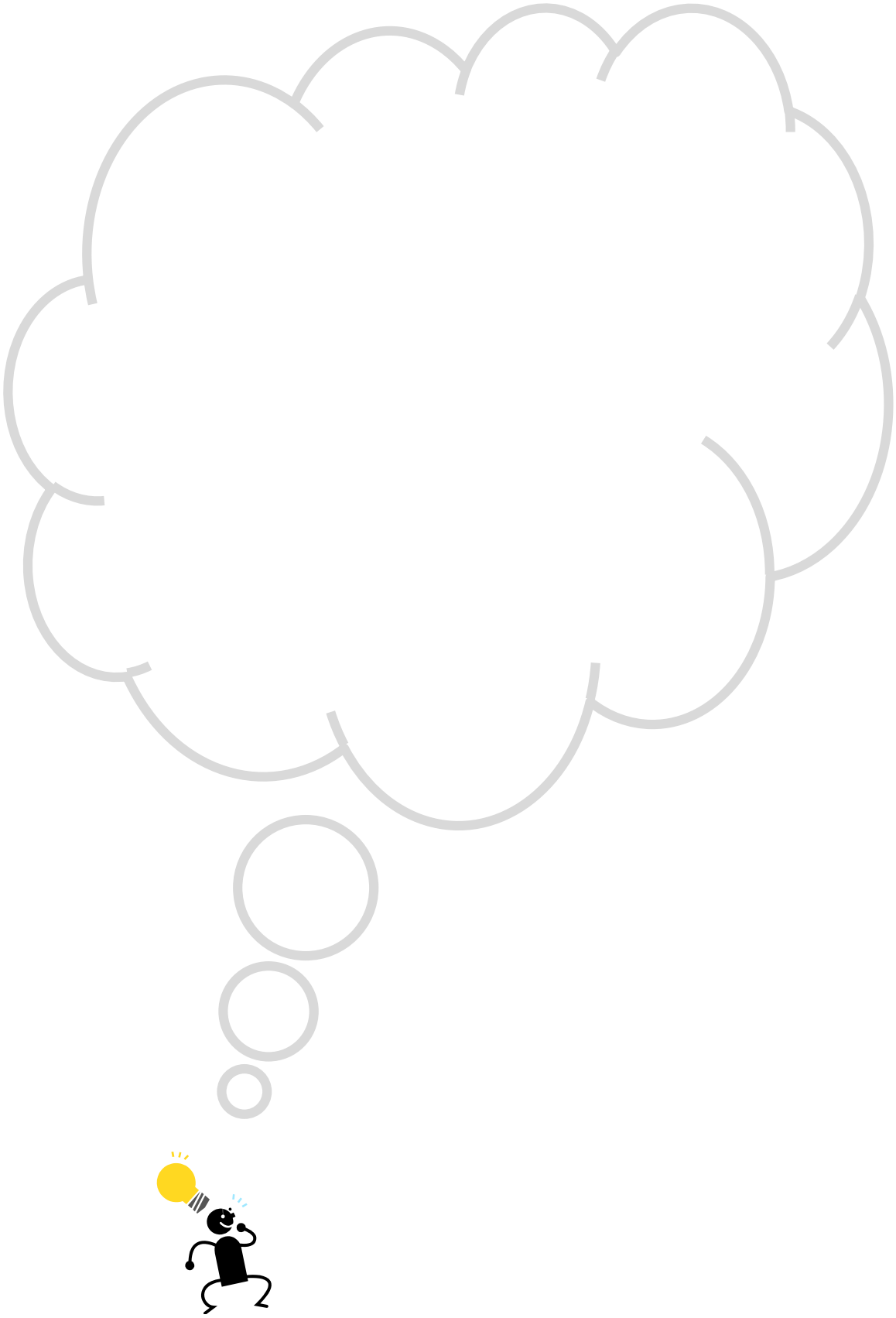
2. What do you think will happen if Josh and Jenna use the intervention? Write your hypothesis below.

_____

_____

_____

_____

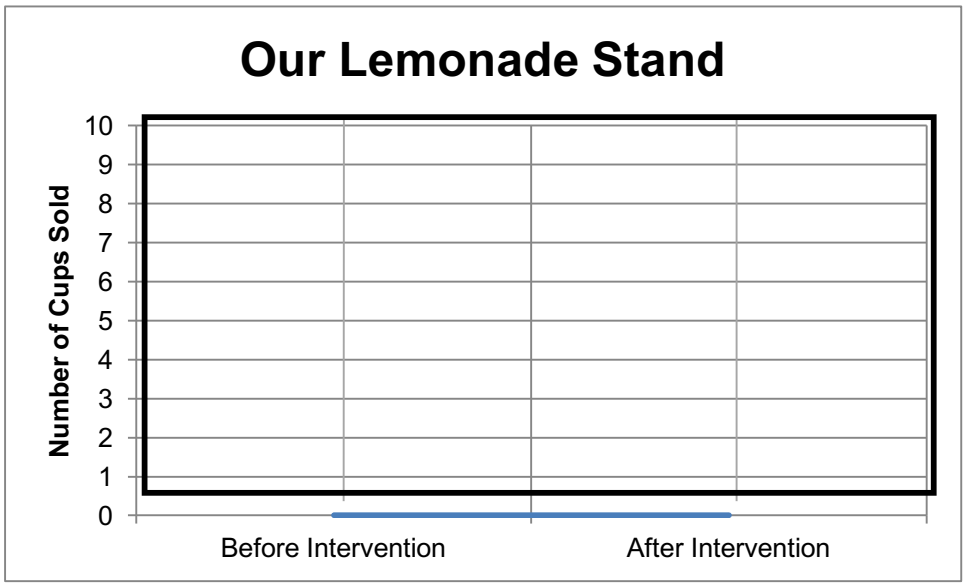


3. Flip a coin 10 times. Each time the coin lands on heads, a cup of lemonade is sold. Count the number of heads and record this number below for "Cups of Lemonade Sold After the Intervention."

   Cups of Lemonade Sold Before the Intervention: 4

   Cups of Lemonade Sold After the Intervention: _____

4. Make two points on the graph to show the number of cups before and after the intervention. Connect the points with a line.



5. Did the intervention work? How do you know?

_____

_____

_____

_____

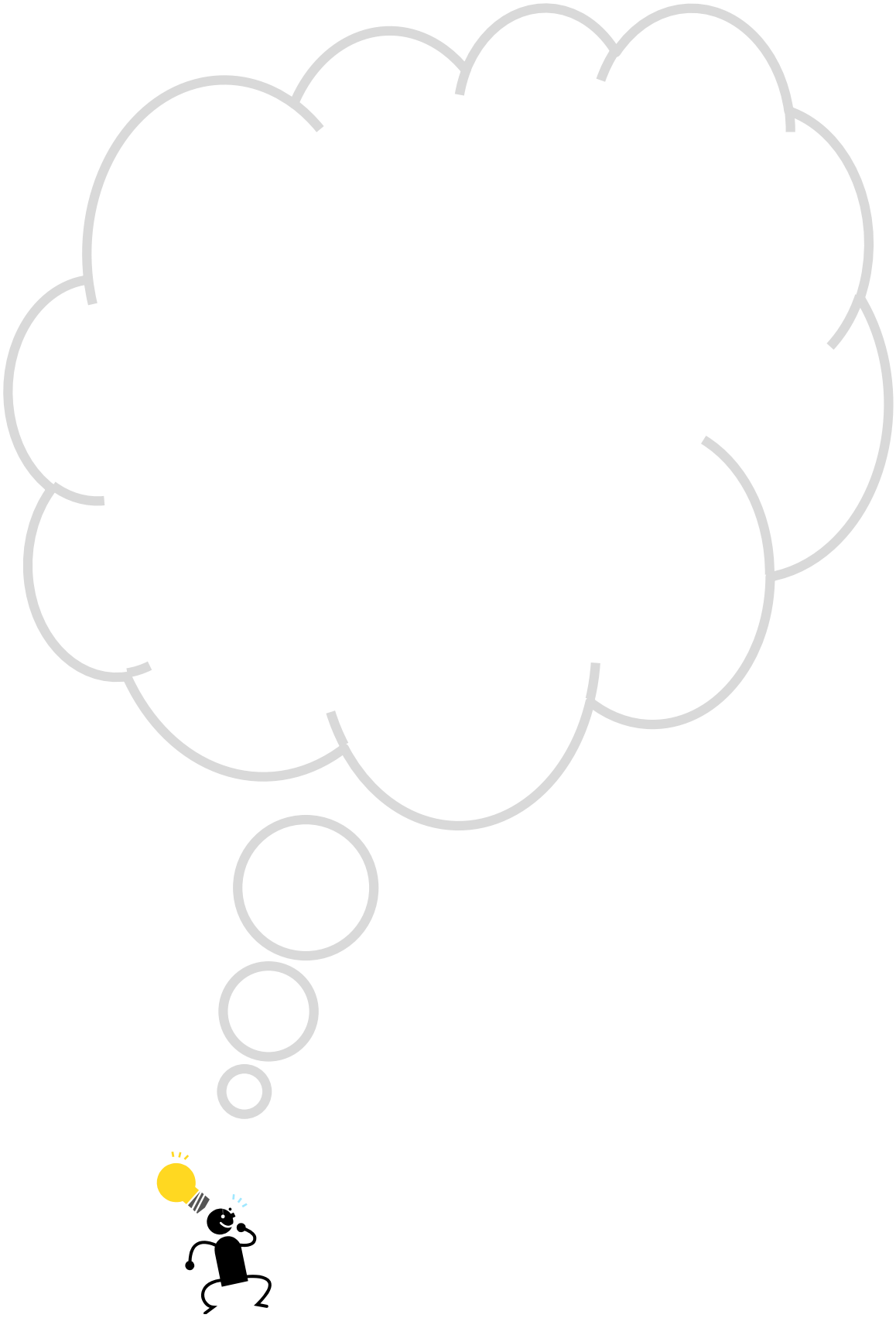
Babbage

Name: _____ Date: _____

Put Me With My Four-Legged Friends!

Cut out the animals on the next page. Glue or tape each animal into the table by category.

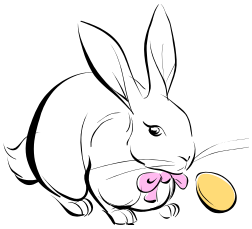
No Legs	Two Legs	Four Legs	More than Four Legs



Animals to Sort

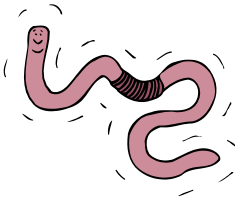
Babbage

COW



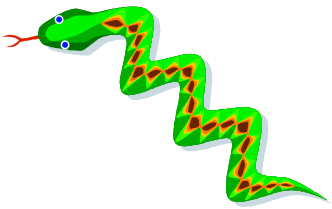
RABBIT

TIGER



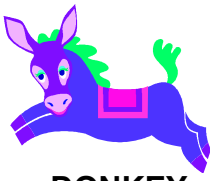
WORM

CHICKEN



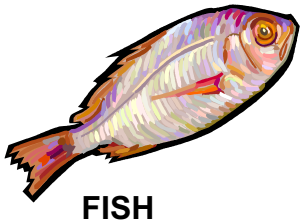
SNAKE

SHEEP



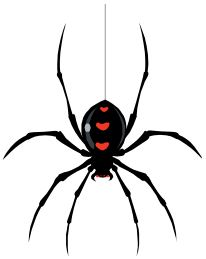
DONKEY

SEAHORSE



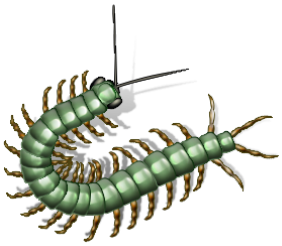
FISH

DOVE



SPIDER

OWL



CENTIPEDE

KANGAROO

Babbage

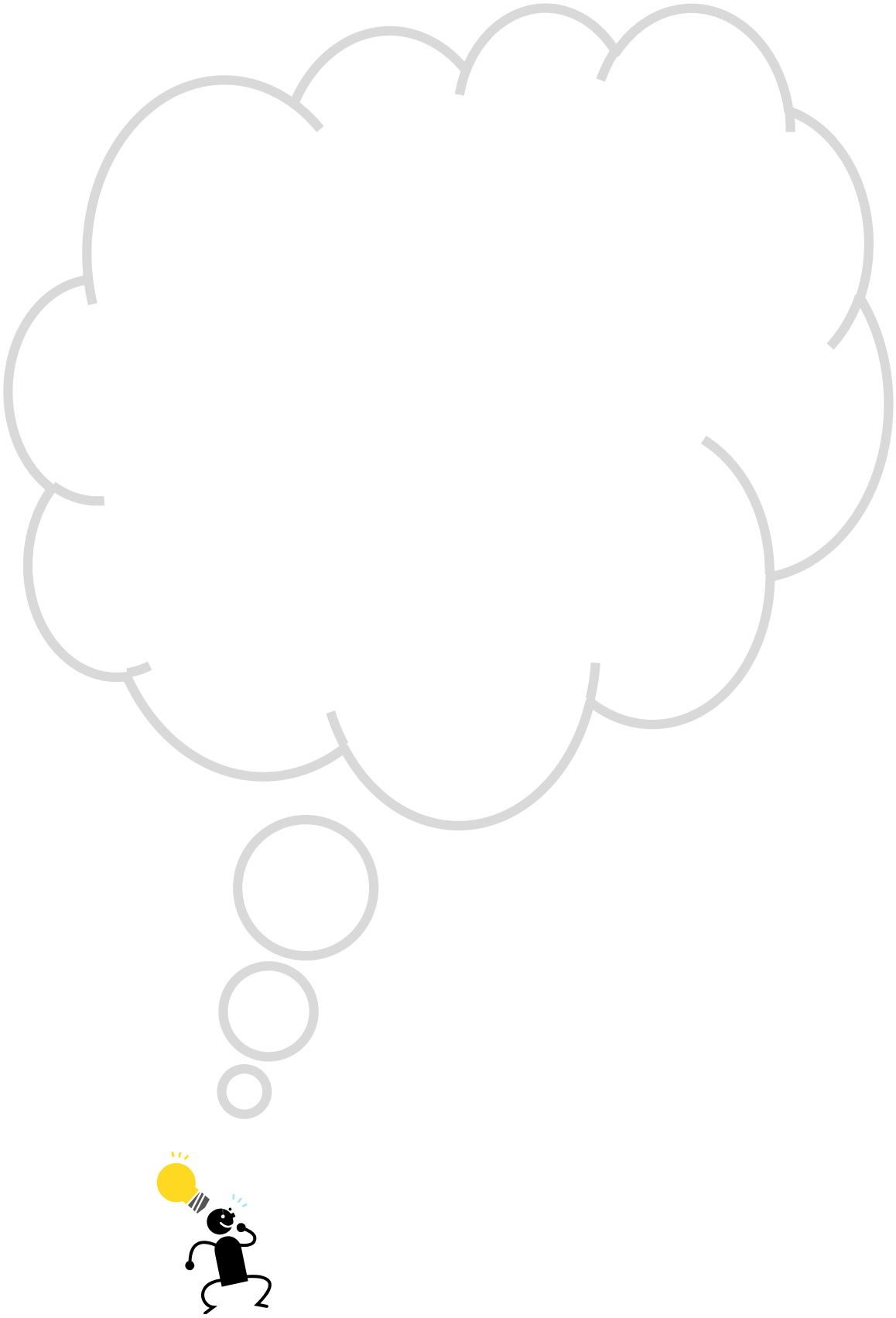
Questions

1. List a different animal that could fit in the “Four Legs” category.

_____

2. Sort the same animals into the categories below. Write the name of the animal under the category that describes it.

Animals that Walk	Animals that Slither	Animals that Swim



Galileo & Falconer

Name: _____ Date: _____

Put Me With My Four-Legged Friends!

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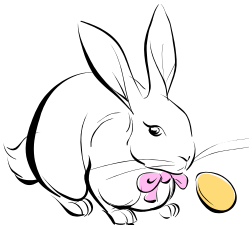
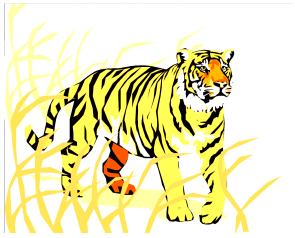
Animals to Sort

Galileo & Falconer

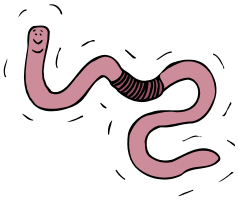
COW



RABBIT

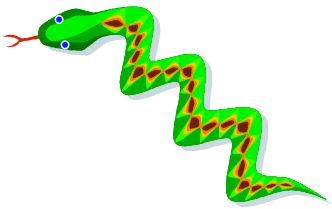


TIGER



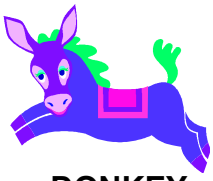
WORM

CHICKEN



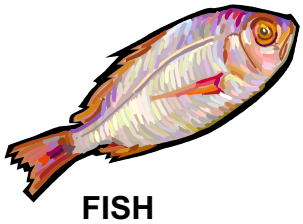
SNAKE

SHEEP



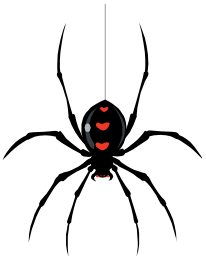
DONKEY

SEAHORSE



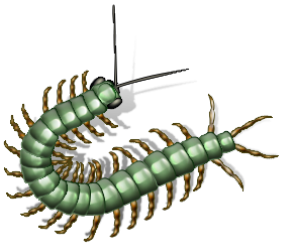
FISH

DOVE



SPIDER

OWL



CENTIPEDE

KANGAROO

Questions

Galileo & Falconer

1. List one other animal that could fit in the “Four Legs” category.

_____

2. What is another way you could sort the animals besides by the number of legs?

_____

_____

If you sort the animals the way you described, how many different categories would you need? Explain your thinking.

_____

_____

_____

_____

In your proposed categories, where would you place a zebra?

_____

What about a dolphin?

_____

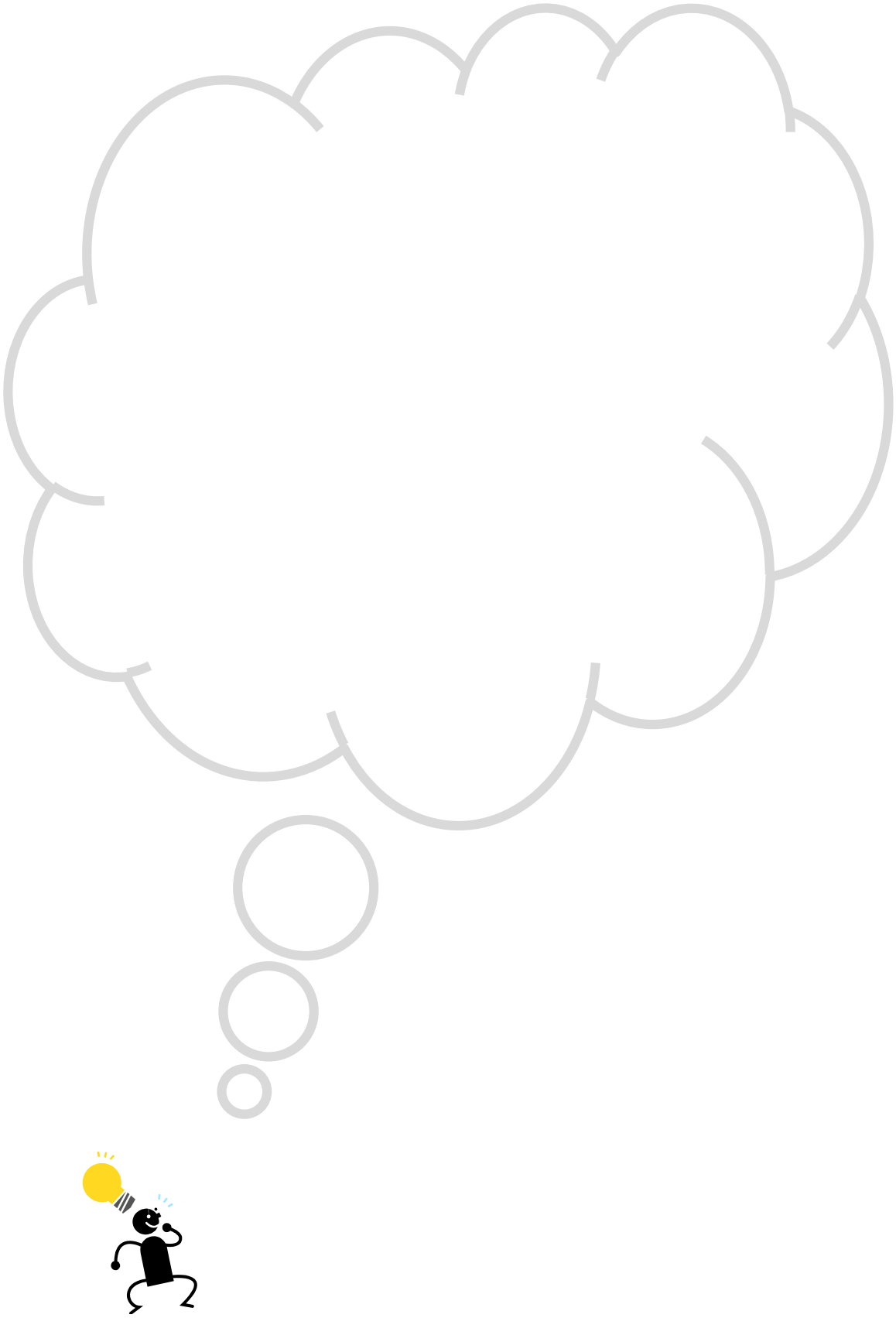
3. Explain how animals might be sorted in a zoo.

_____

_____

_____

_____

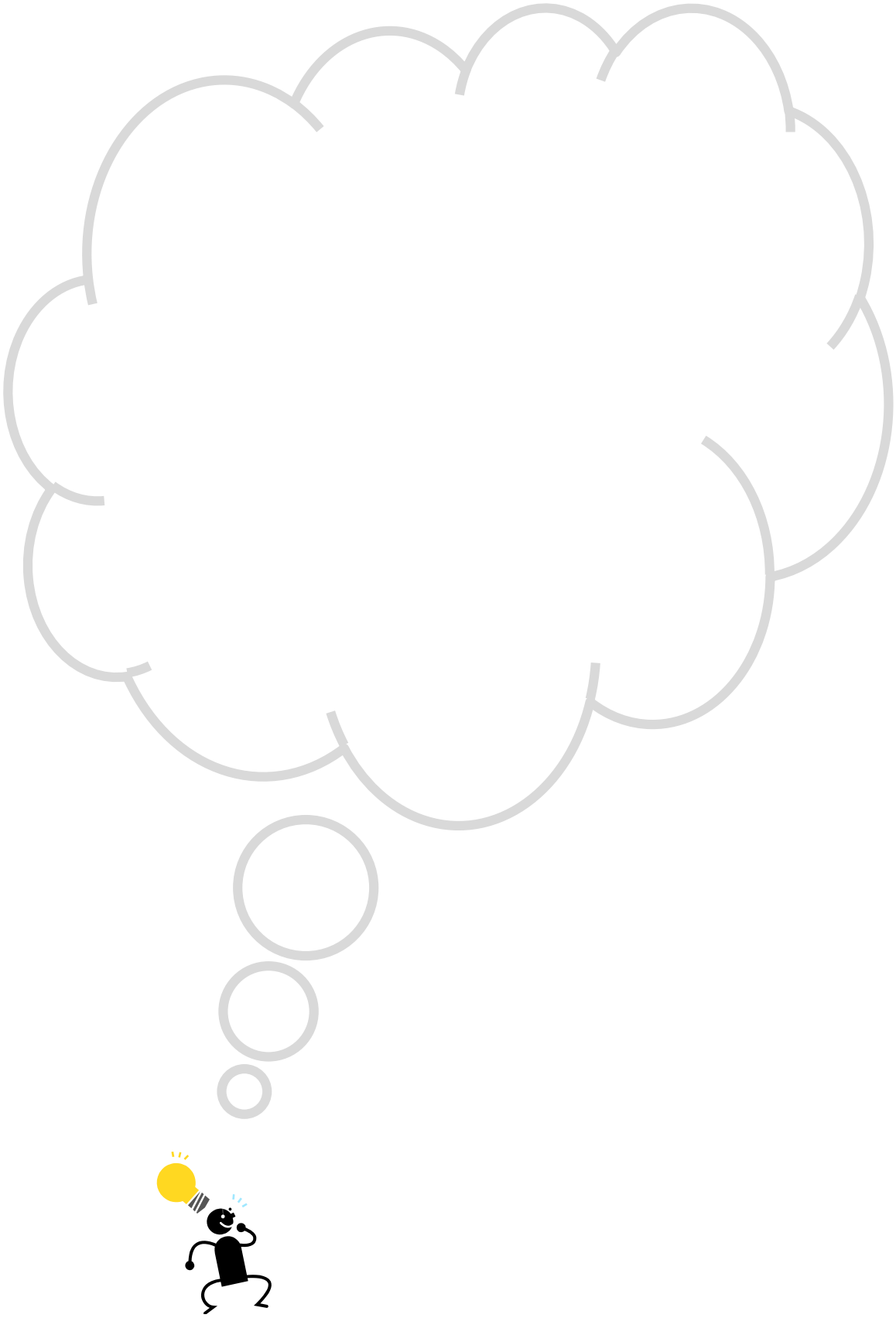


Fair-Sharer: _____ Date _____

Fair Share Data

Directions: Fill in the data table by tracing each shape in the first column. Then, write how many of that shape each person has in the second column. In the third column, write how many of that shape were left over. In the fourth column, write how many of that shape your group had in all including the leftovers.
How many students are in your group (including you)? _____

Shape (Picture or Name)	When your group fair shared, how many of that specific shape did you get?	How many of that specific shape were **left over**?	How many of that specific shape did your group have in **total**?



Fair Share Data (continued)

Shape (Picture or Name)	When your group fair shared, how many of that specific shape did you get?	How many of that specific shape were **left over**?	How many of that specific shape did your group have in **total**?

Fly Catcher: _____ Date: _____

Fair Sharing Frogs

Frogs like to be fair. Help the frogs in these riddles fair share their flies!

FAIR SHARING FROGS RIDDLE 1
On a log, there sit 3 frogs
And 18 flies in the air
How many flies should each frog catch,
If each one gets its fair share?

My Work:

Each frog gets _____ flies. There are _____ flies remaining in the air.

FAIR SHARING FROGS RIDDLE 2
Buzzing around are 15 flies
And 4 frogs playing a game,
How many flies does each frog catch,
If each one has the same?

My Work:

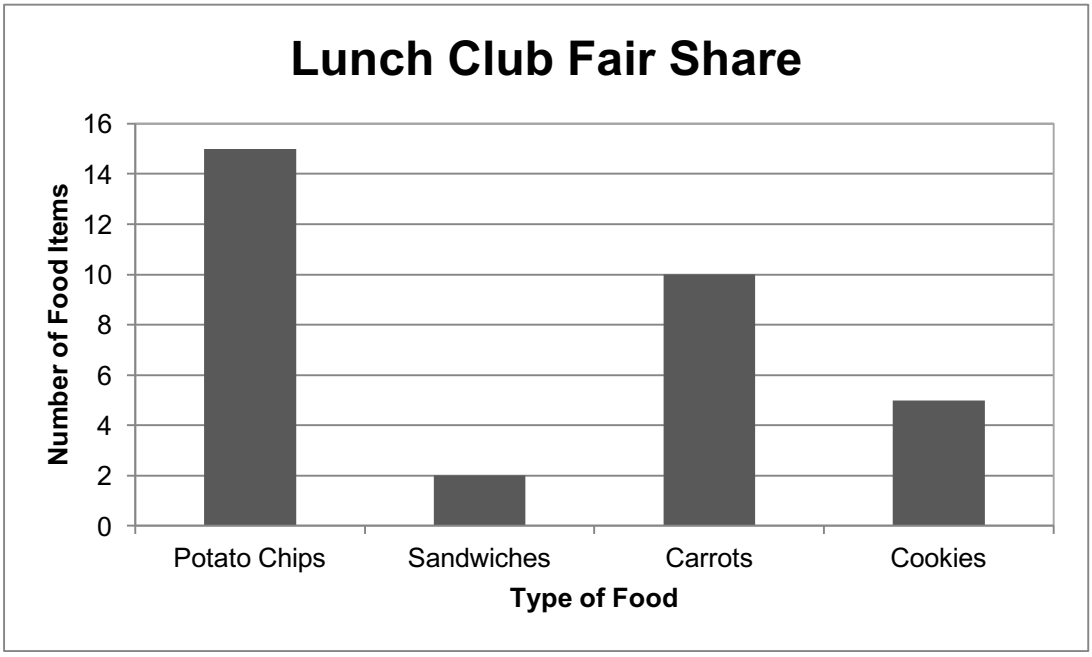
Each frog gets _____ flies. There are _____ flies remaining in the air.

Babbage & Galileo

Name: _____ Date: _____

Fair Share Lunches

Two students formed the Lunch Club to fair share their lunches. This is the graph that illustrates how many of each type of food to be shared. You may want to draw a picture to help you answer some of the questions.



1. How many total potato chips are there? _____

   If the 2 students fair shared the chips, how many would they each get?

   _____

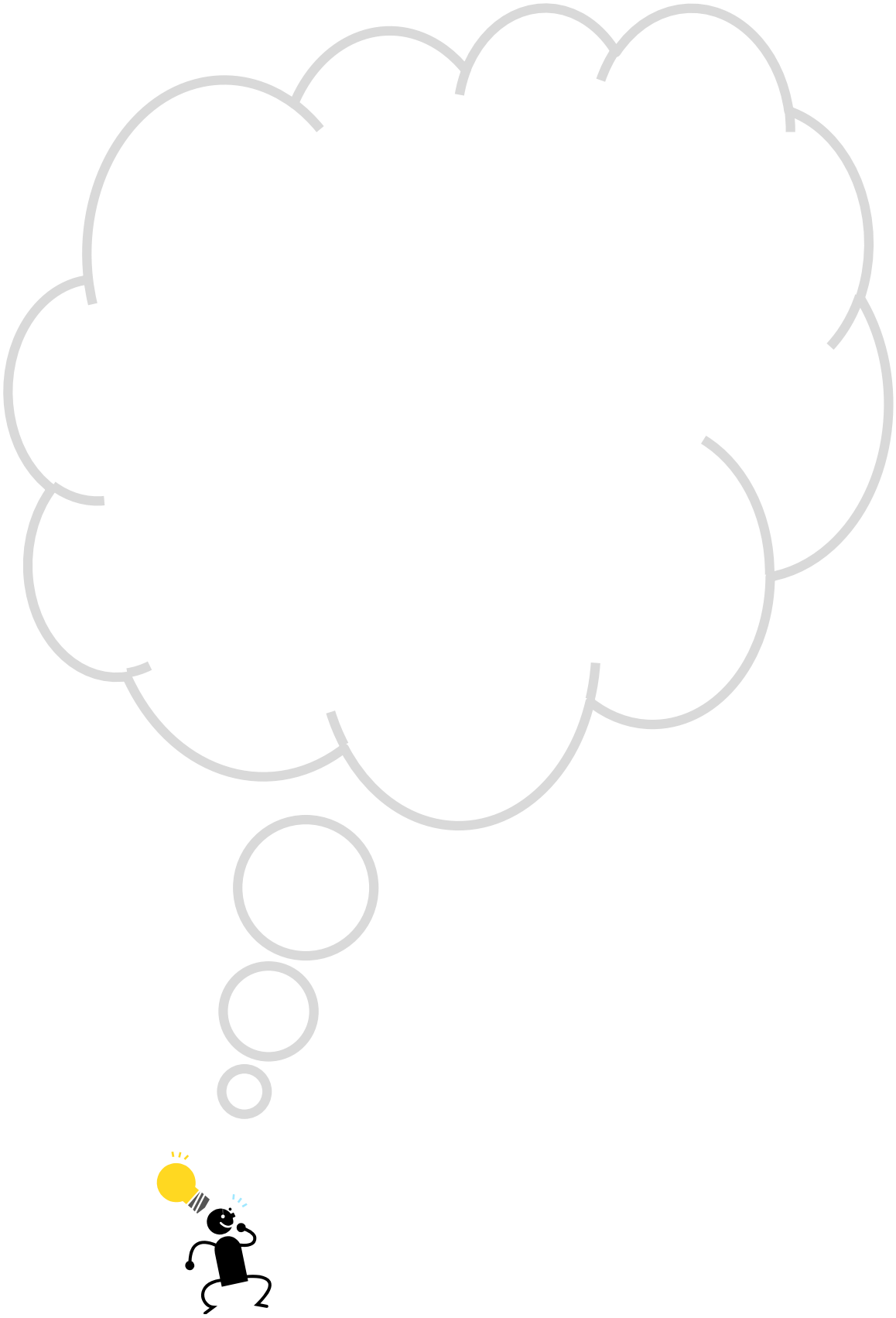
   How many would be left? _____

2. How many total sandwiches are there? _____

   If the 2 students fair shared the sandwiches, how many would they each get?

   _____

   How many would be left? _____



3. How many total carrots are there? _____

   If the 2 students fair shared the carrots, how many would they each get?

   _____

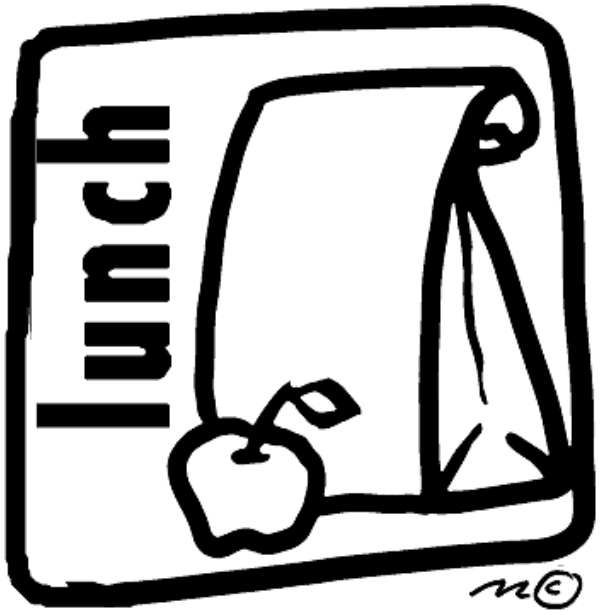
   How many would be left? _____

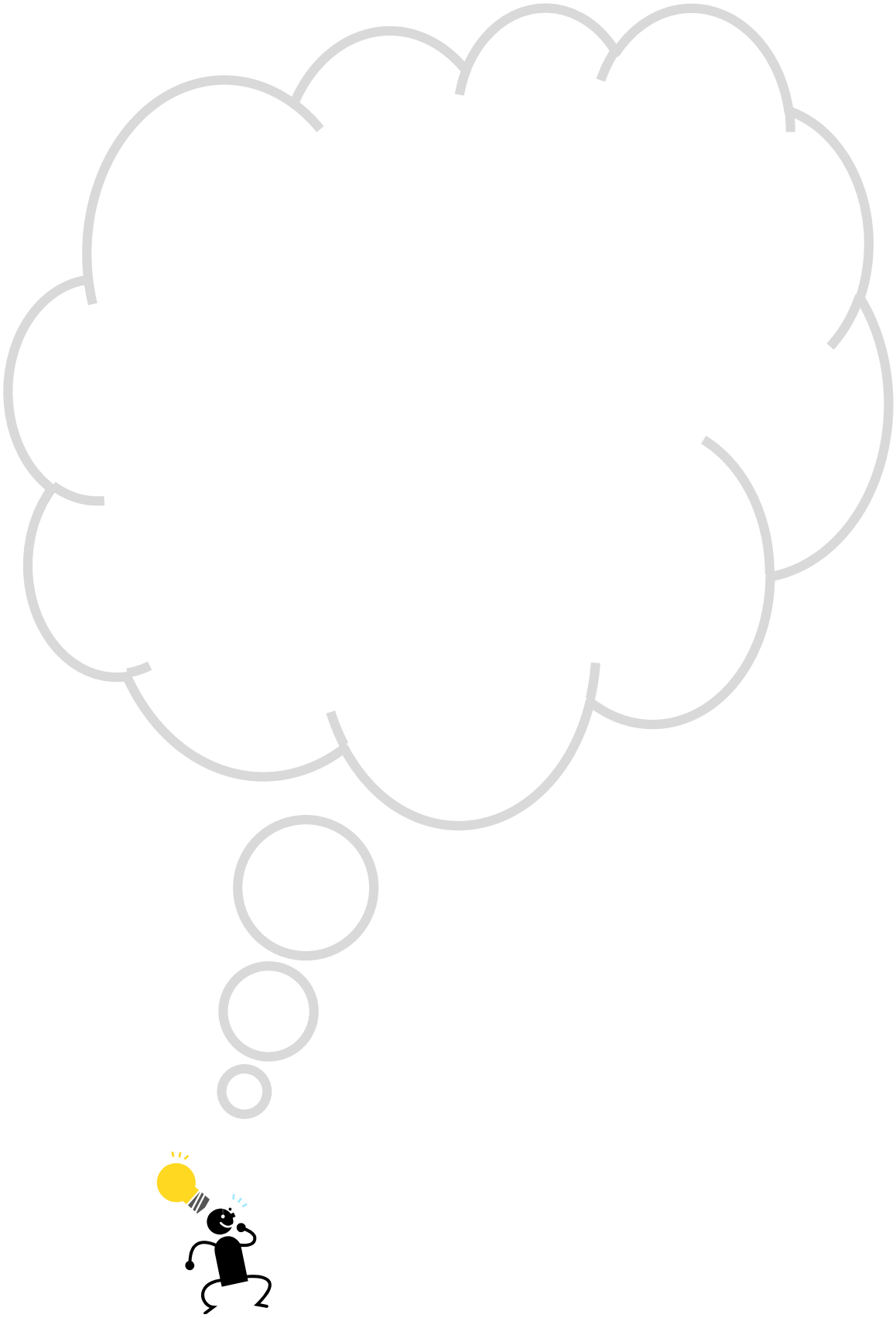
4. How many total cookies are there? _____

   If the 2 students fair shared the cookies, how many would they each get?

   _____

   How many would be left? _____



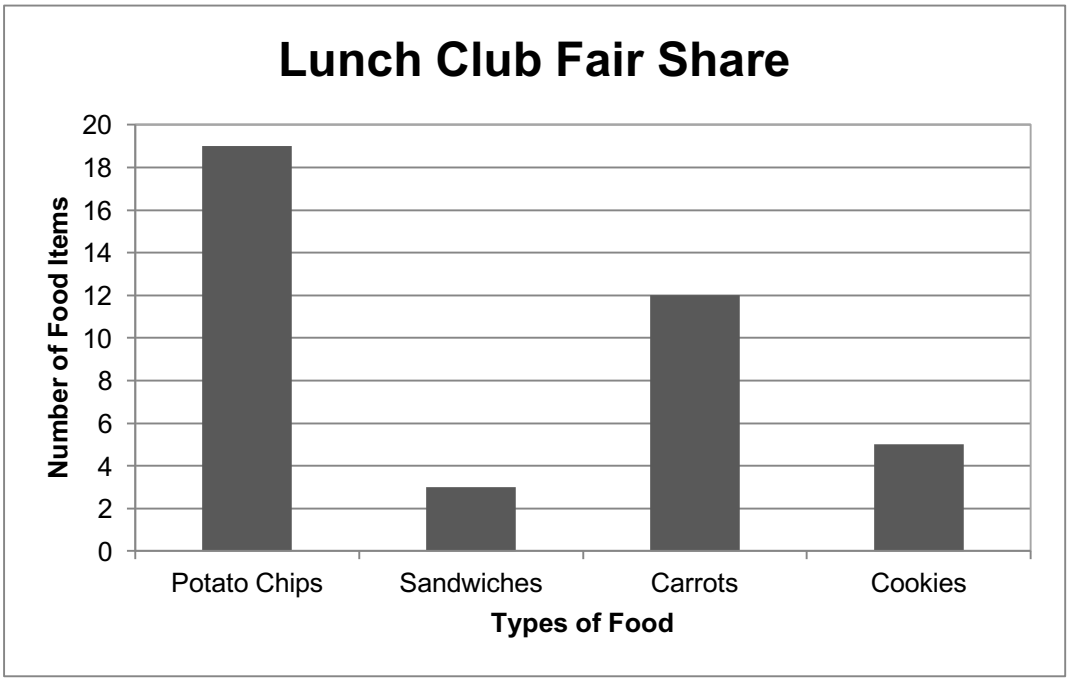


Falconer

Name: _____ Date: _____

Fair Share Lunches

Three students formed the Lunch Club to fair share their lunches. This is the graph that illustrates how many of each type of food is to be shared.



1. Complete the table using the data from the bar graph.

Type of Food	Total Number of Food Item	With 3 students fair sharing, how many will each get?	Number of Leftovers (Remainders)
Potato Chips			
Sandwiches			
Carrots			
Cookies			

2. What is the biggest number of leftovers possible? Why?

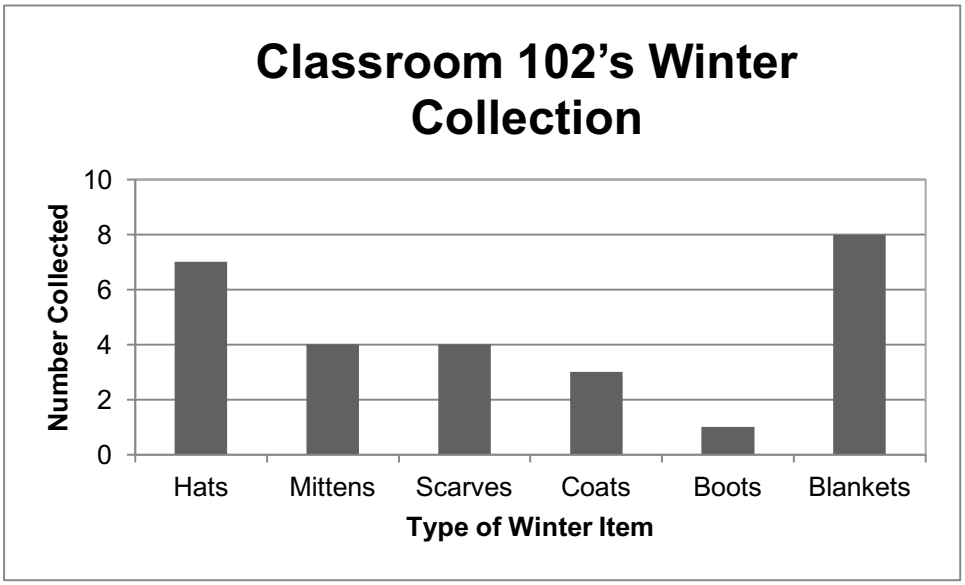
_____

_____

Babbage

Bar Graph Analyst: _____

Write About It!



Write a newspaper article that could go with the bar graph above.

_____

_____

_____

_____

_____

_____

_____

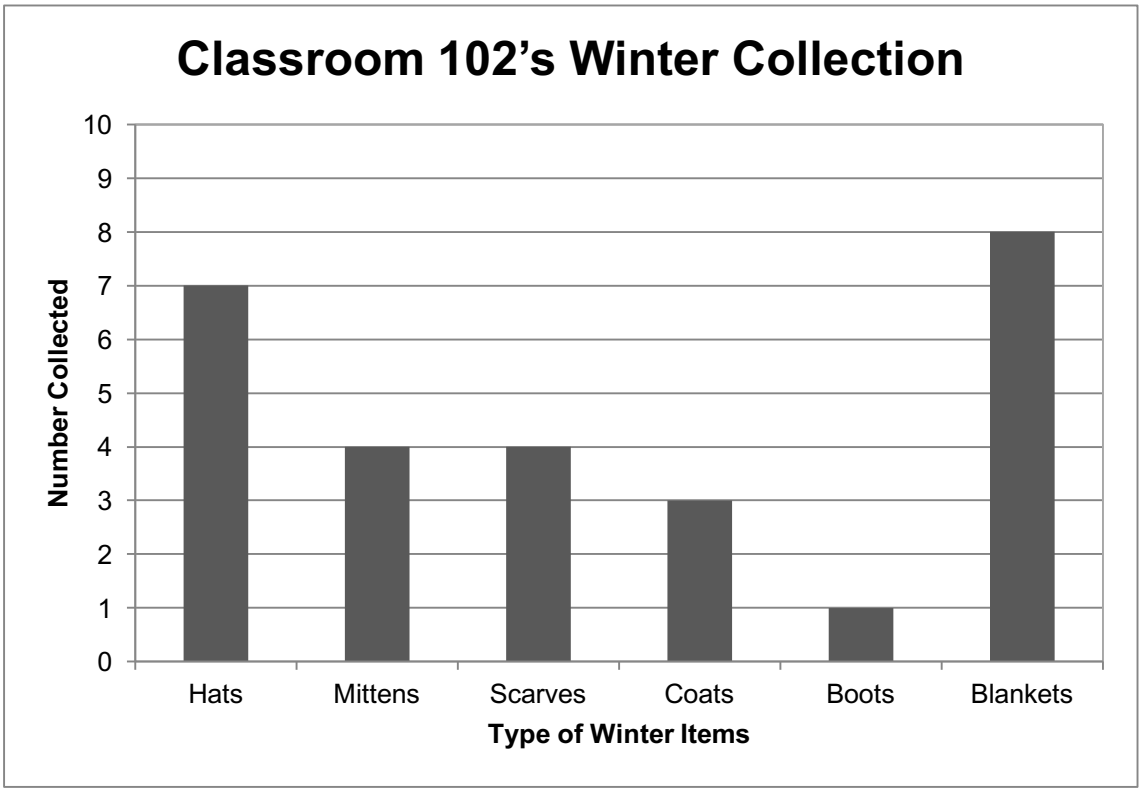
_____

_____

Galileo & Falconer

Bar Graph Analyst: _____

Reaching Our Goal!



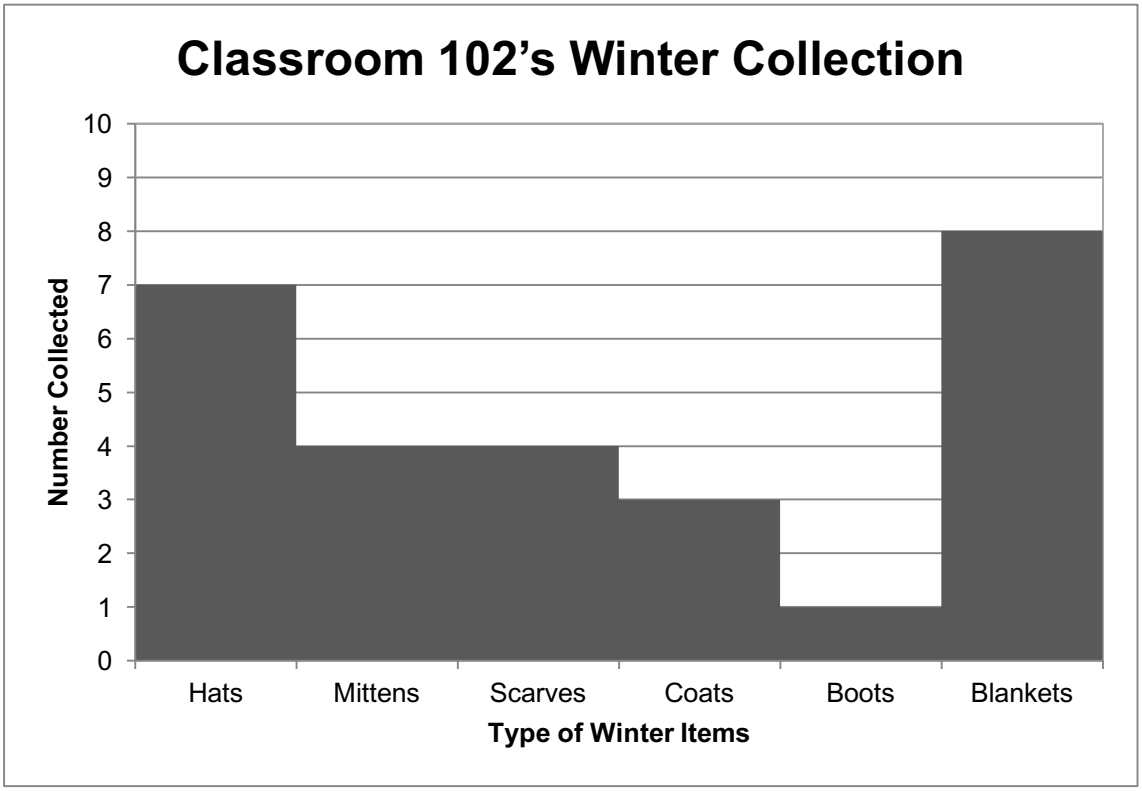
Students in classroom 102 collected the items listed in the bar graph to donate to a local shelter. Their goal is to have 10 of each item before bringing the items to the shelter.

Create a poster to inform other students which items are still needed. Provide a table or graph to show how many *more* of each is needed to reach the goal.

Name: _____ Date: _____

A Bar Graph Debate

Some math experts say that it is okay to have no spaces between the bars in a bar graph. Other people think that the bars in a bar graph should always have spaces in between. Below is a picture of the same graph, Classroom 102's Winter Collection, with no spaces.



Which of the two graphs do you like best (the one with the bars touching or not touching)? Explain why.

_____

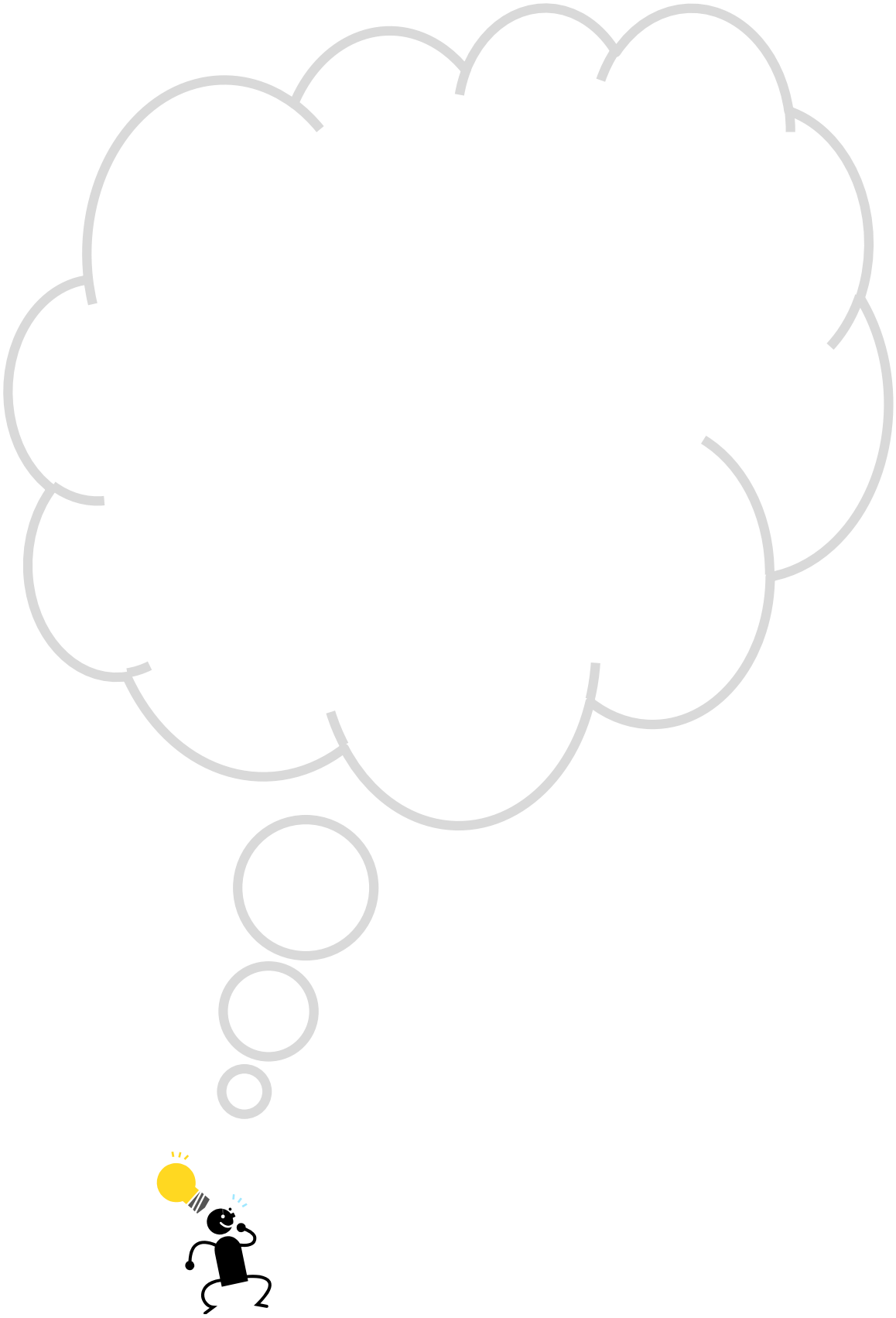
_____

_____

_____

_____

_____

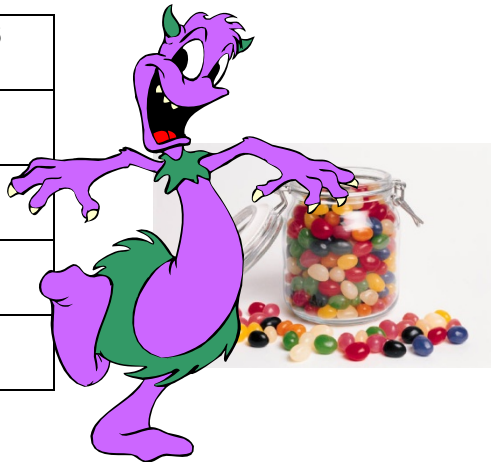


Jellybean Grapher: _____

Giants Love Jellybeans!

Jackie the Joyful Giant just loves jellybeans. One day, she decides to sort her pile of 39 jellybeans by color. She records her information in a table.

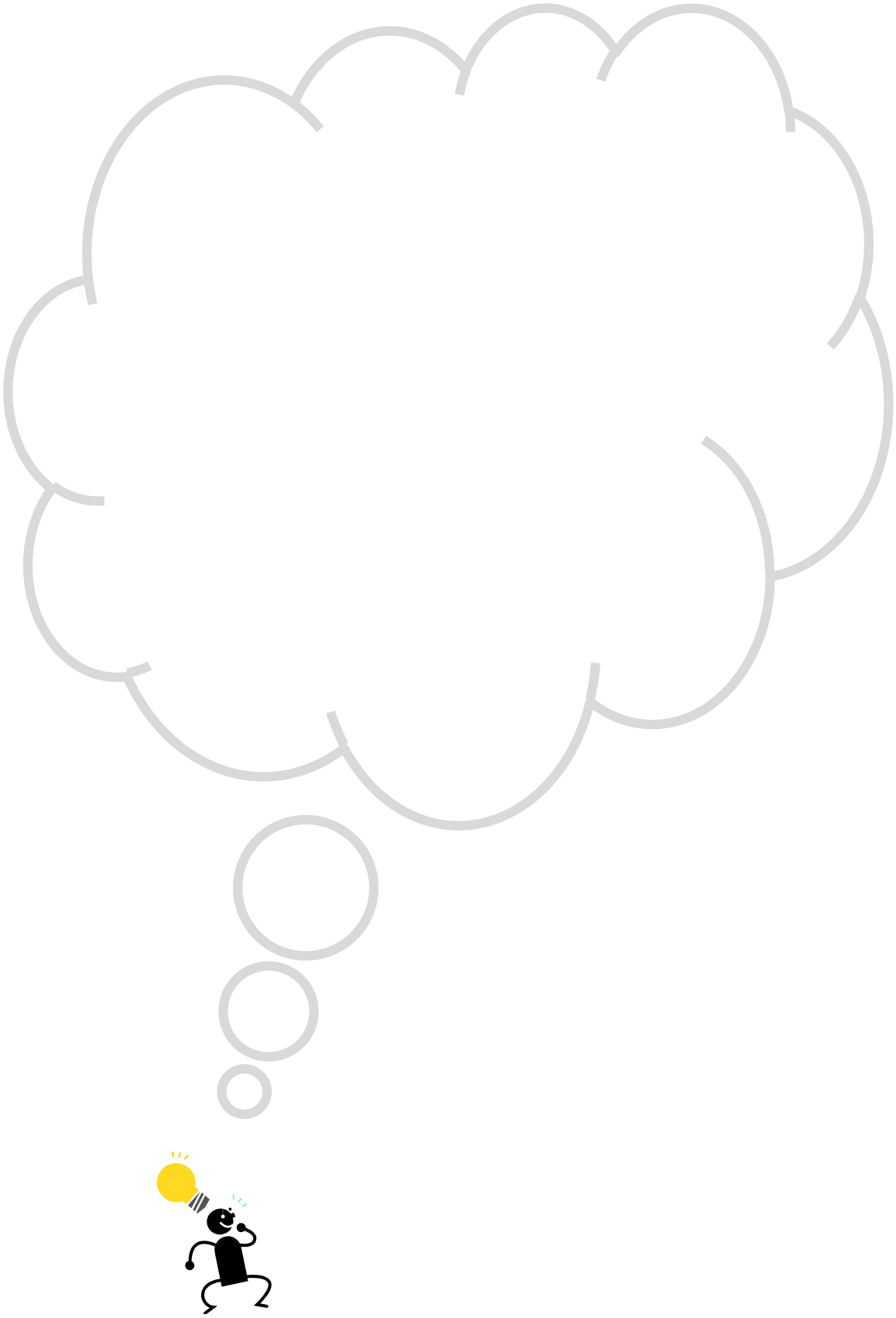
COLOR	NUMBER OF JELLYBEANS
RED	9
GREEN	12
PURPLE	8
ORANGE	



Jackie is so excited about making a bar graph of the data that she spills a jar of ink on the paper and can no longer see how many orange jellybeans she had. She is very upset because she already ate the jellybeans!!

1. Help Jackie figure out how many orange jellybeans she had. Show your work so she can tell how you got your answer.

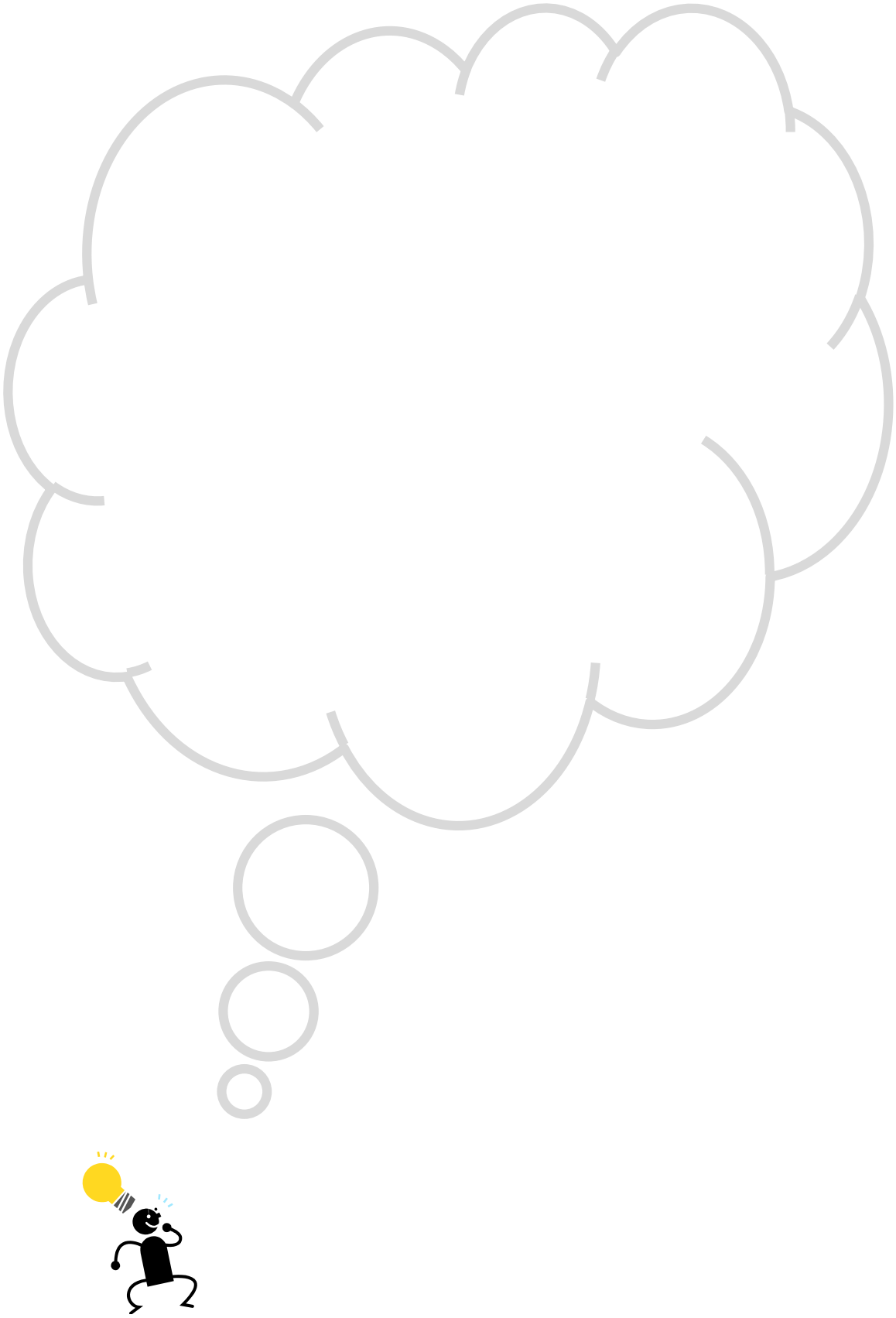
2. On a piece of graph paper, make a graph of the jellybean data.



Name: _____ Date: _____

Keeping Track: Data on _____

Category	Tally	Frequency



Name: _____ Date: _____

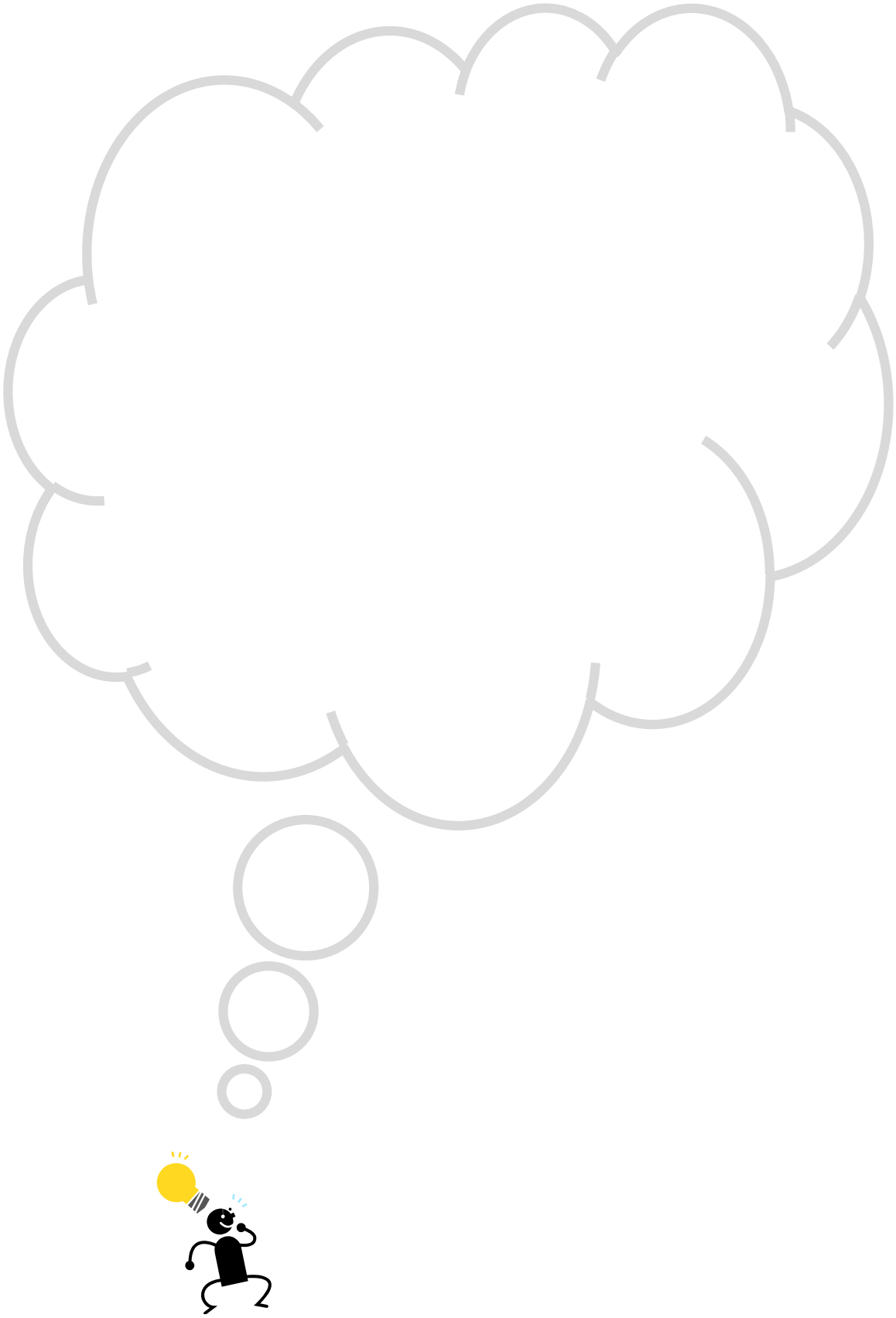
Keeping Track: Data on _____ (Alternative Version)

Category	Weight

Name: _____ Date: _____

Our Goals

Category	Goal

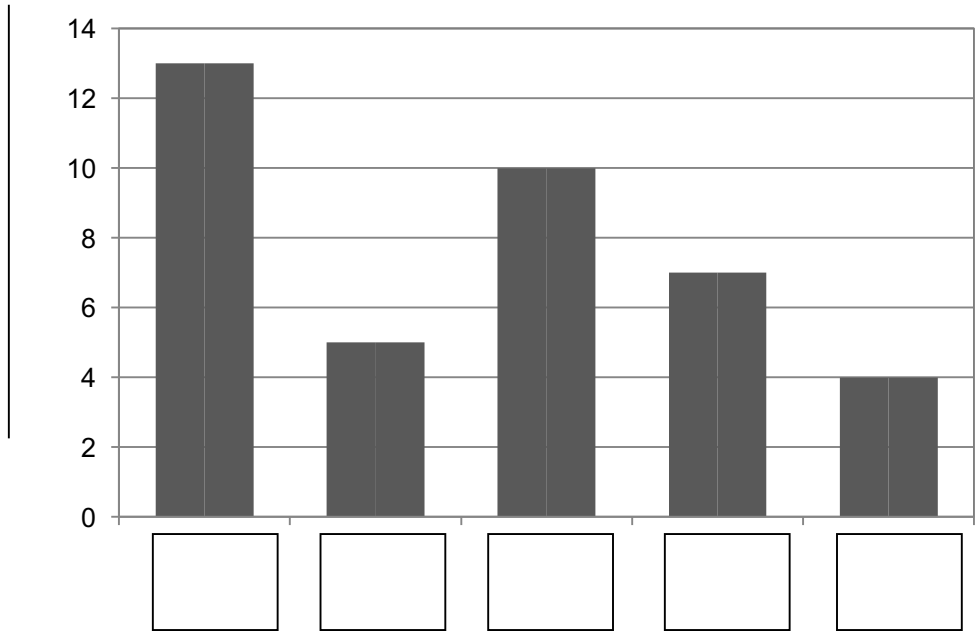


Name_____ Date: _____

Crawly Creatures

Read this carefully: Mr. Vito's class collected bugs to keep in their classroom. They collected ladybugs, flies, ants, caterpillars, and beetles. They made a graph of their collection.

Bug Collection

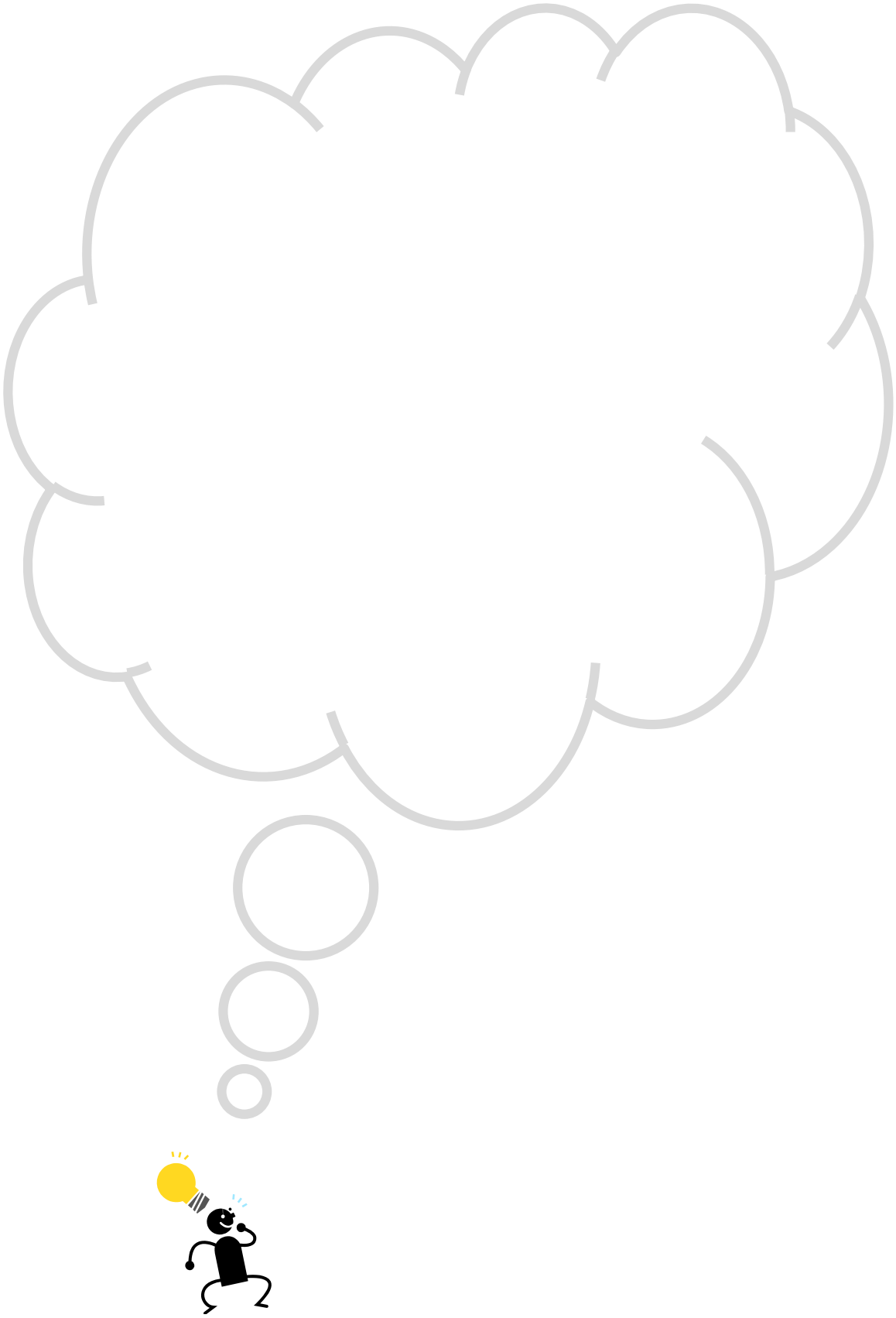


_____

Unfortunately, Mr. Vito forgot to label the graph. Here is what the students remember:

1. The flies were the hardest to catch.
2. They caught twice as many ladybugs as caterpillars.
3. They found more ants than any other bug.

Place the bug name where it belongs on the graph and label the axes.



Name: _____ Date: _____

Student Mathematicians Practice

1. 427 - 20 =

2. 28
   - 19

3. 45 + 25 =

4. Who counted the most pencils?

Student	Pencils Counted
Jenny	12
Chan	28
Keisha	14
Scott	29

A. Jenny
B. Chan
C. Keisha
D. Scott

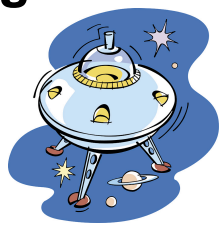
5. Which amount of money is greatest?

   A. 3 quarters
   B. 7 dimes
   C. 16 nickels
   D. 74 pennies

Babbage & Galileo

Name_____ Date:_____

Flying Phenomena



One summer camp counselor challenged all the campers to keep track of all the flying objects they saw. Your task is to create a graph of their findings. **Don't forget to label all axes and give the graph a title!**

Graph Title:

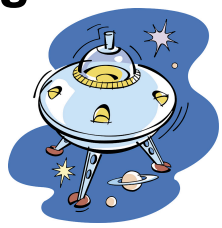
Shooting Stars	UFOs	Hot Air Balloons	Kites	Airplanes

1. The campers reported 12 kite sightings.
2. They saw 4 fewer shooting stars than kites.
3. They observed twice as many airplanes as shooting stars.
4. Carlos and Eva were the only ones who thought they saw UFOs. Carlos thought his looked yellow, and Eva thought hers was more purple-ish.
5. The campers saw twice as many hot air balloons as UFOs.

Falconer

Name_____ Date:_____

Flying Phenomena

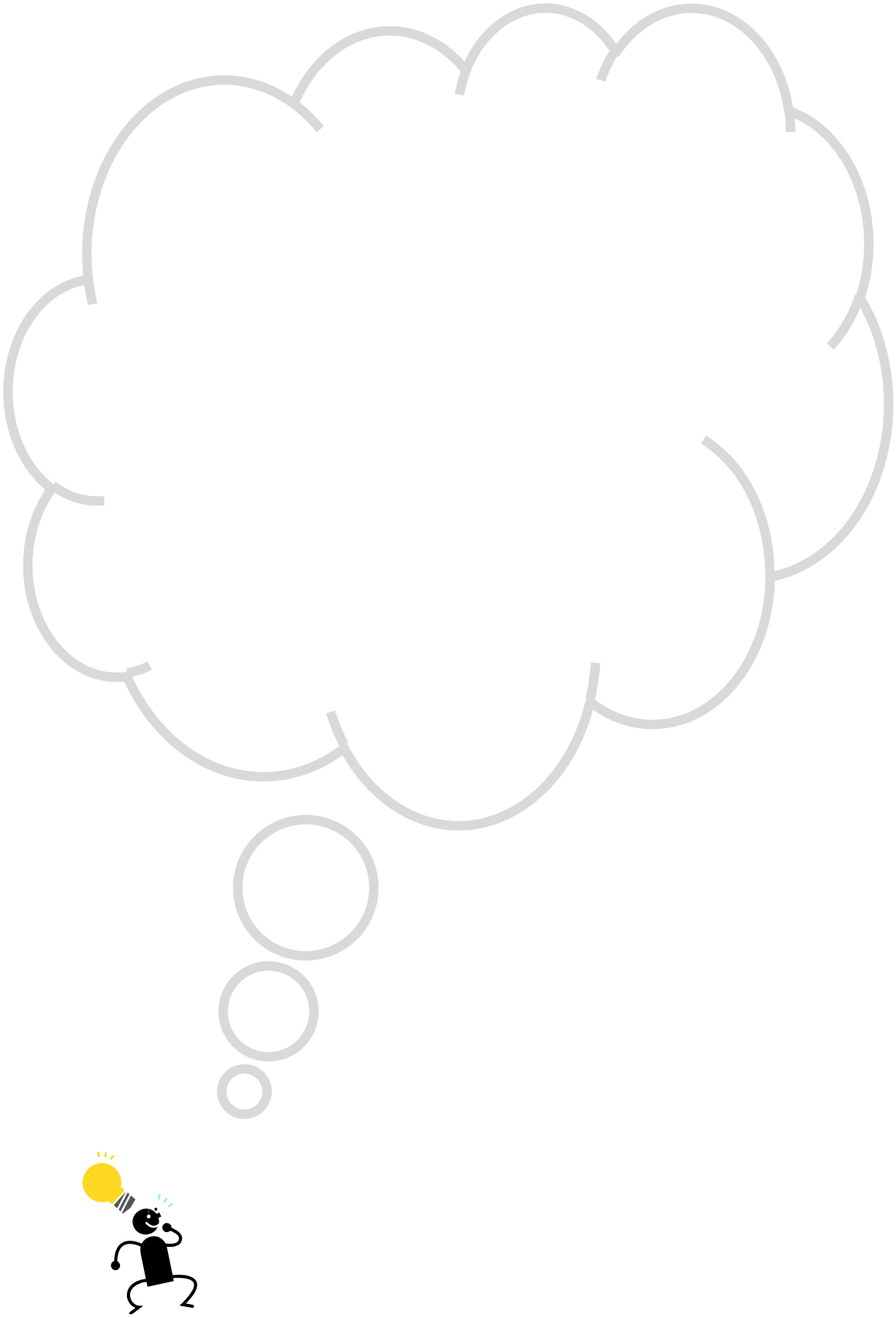


One summer camp counselor challenged all the campers to keep track of all the flying objects they saw. Your task is to create a graph of their findings. **Don't forget to label all axes and give the graph a title!**

Graph Title:

	Shooting Stars		UFOs		Hot Air Balloons		Kites		Airplanes

Read all the clues first and then create the graph. The campers observed twice as many airplanes as shooting stars. They saw 4 fewer shooting stars than kites. The campers reported 12 kite sightings. Carlos and Eva each observed a UFO. Carlos thought his looked yellow, and Eva thought hers was more purple-ish. For every 4 airplanes sighted, the students saw 1 hot air balloon.



Name: _____ Date: _____

Student Mathematicians Practice

1. 512 + 73 + 4 =

2. 625
   - 207

3. 4,376 - 2,062 =

4. The closest estimate of 712 + 424 is _____.

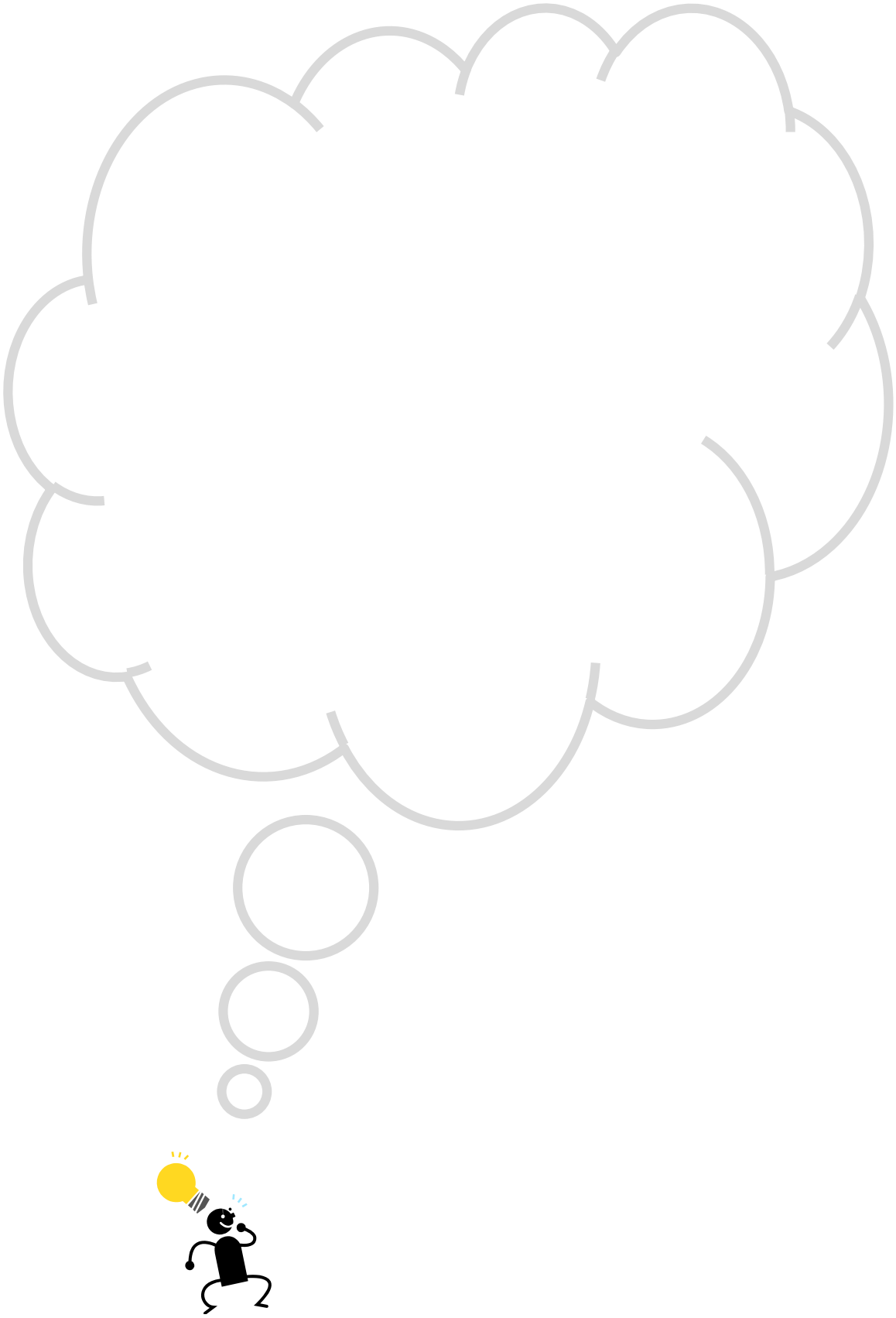
   A. 11
   B. 110
   C. 1,100
   D. 11,000

5. The closest estimate of 67¢ - 39¢ is _____.

   A. 10¢
   B. 20¢
   C. 30¢
   D. 40¢

6. Three children brought in pictures of trees. Bob brought 6, Michelle brought 12, and Kelly brought the rest. To find out how many pictures Kelly brought, what else do you need to know?

   A. The total number of children in Kelly's group
   B. The total number of trees in the pictures
   C. The total number of children who brought pictures
   D. The total number of pictures brought



Name: _____ Date: _____

Create Your Own Adventure Guide

You get to write your own work sheet! Your job is to give clues to help one of your classmates create the graph you planned.

1. Pick a topic. (You may want to use your favorite sport or activity. You could even use your favorite foods or toys.)

   _____

   _____

2. Think of 5 examples or pieces of your topic. (If you choose baseball, you could use bats, balls, cleats, mitts, caps.)

   _____

   _____

3. Record how many of each item you will use in your clues. Keep your numbers below 20. (You could use 5 bats, 4 balls, 6 cleats, 8 mitts, and 2 caps.) THIS IS YOUR ANSWER KEY!

   _____

   _____

4. Create your clues. Start by giving the actual number of one item. Then give the next item based on the first item. Keep going until you have five clues. (There were 5 bats. They had one less ball than bat…)

   _____

   _____

   _____

5. Record your story and clues on the worksheet.

I created this worksheet:_____

I completed this worksheet:_____

Create Your Own Adventure

Story:_____

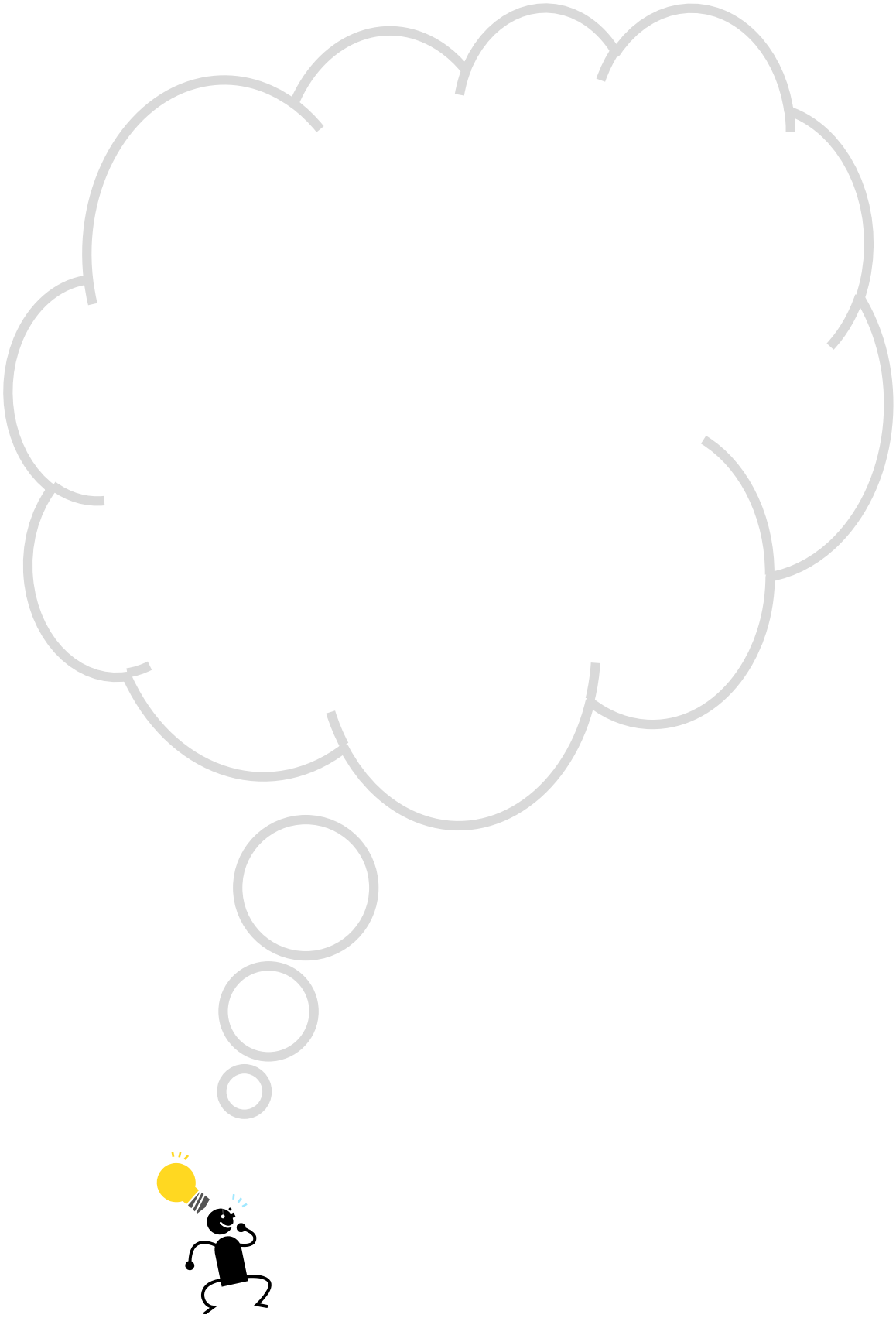
_____

Graph

Graph Title:

Clues

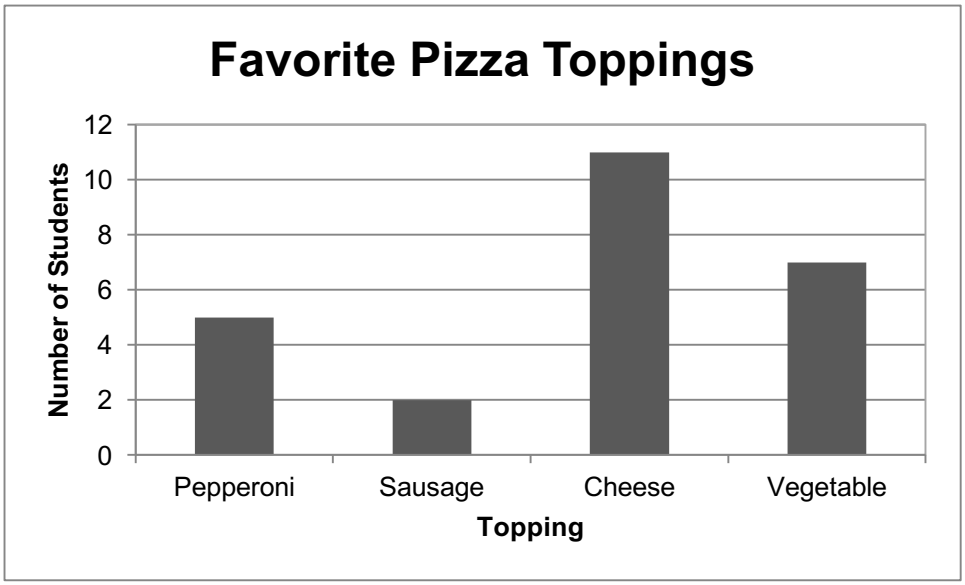
1. _____
2. _____
3. _____
4. _____
5. _____



Name: _____ Date: _____

Check Up #2

Students were asked the question, “What is your favorite pizza topping?” They were asked to choose from pepperoni, sausage, cheese, or vegetable. A graph of the data is below.



1. What pizza topping is most popular in this class? Explain your thinking.

_____

_____

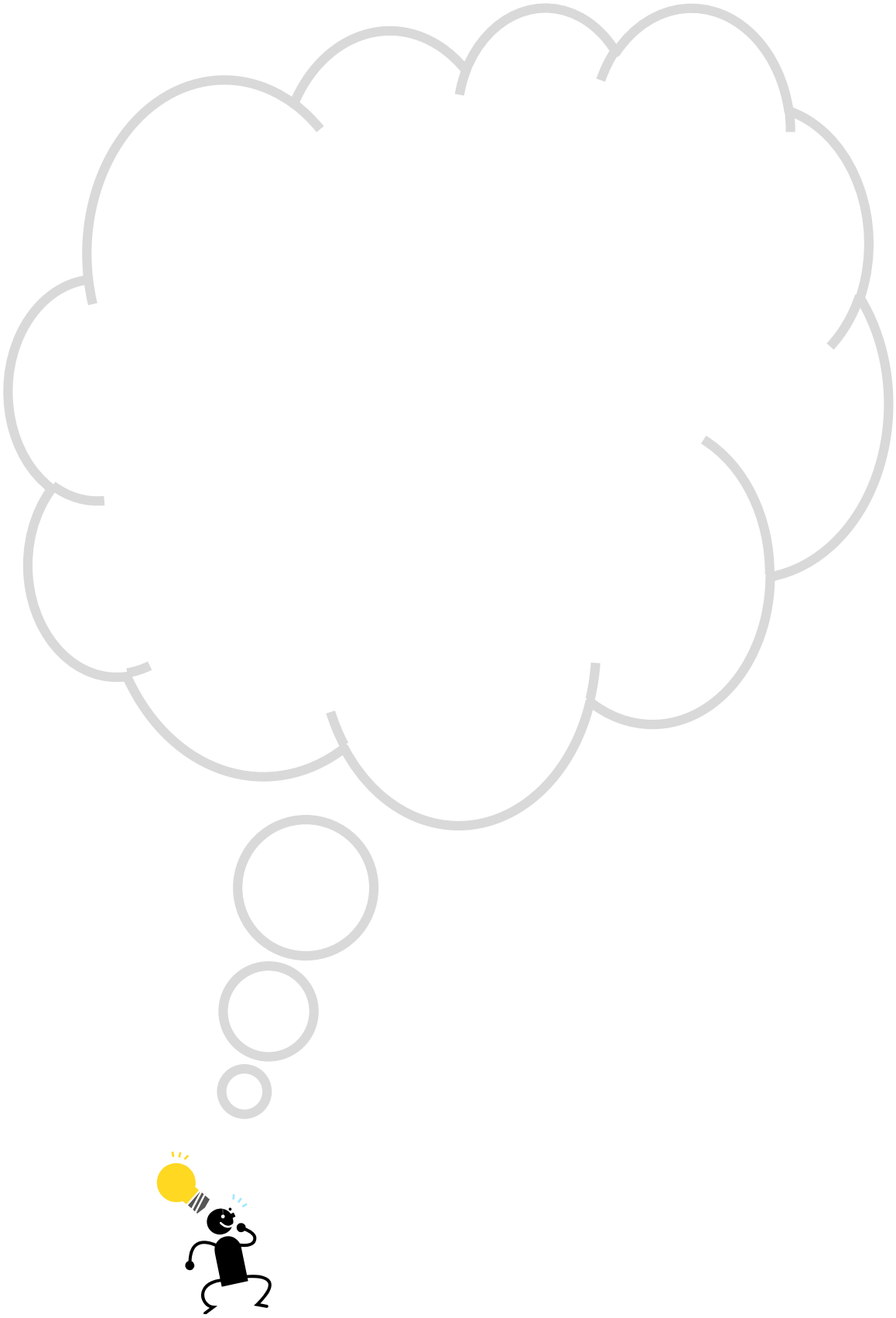
_____

2. What is the least popular pizza topping? Explain your thinking.

_____

_____

_____



3. Do more people in this class like pepperoni pizza or vegetable pizza? Explain your thinking.

_____

_____

_____

_____

_____

4. How would the bar graph change if pepperoni and sausage were combined into a MEAT category?

_____

_____

_____

_____

_____

5. Use the information from the bar graph to complete the table.

Pizza Topping	**Number of People (Frequency)**
Pepperoni	
Sausage	
Cheese	
Vegetable	

How many students in total answered the survey question? _____

6. 724
- 402

7. 312 + 34 + 5 =

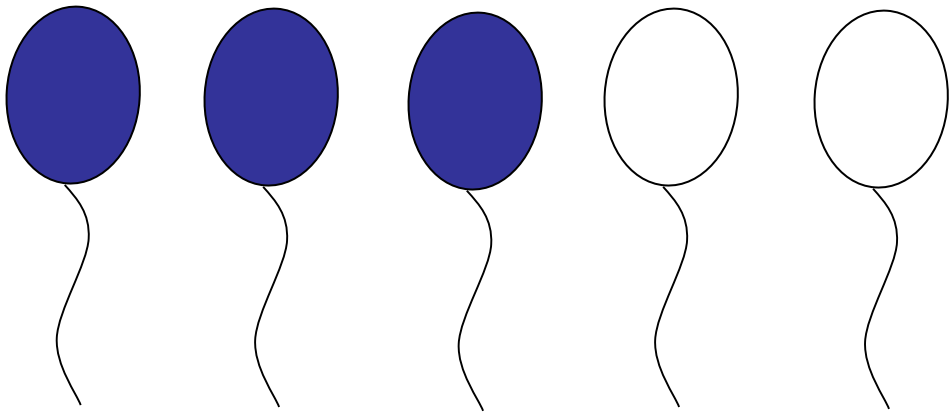
8. 417 - 10 =

9. 857
+ 36

10. 3,050 + 249 =

11. 60
-16

12. What fraction of balloons is shaded?



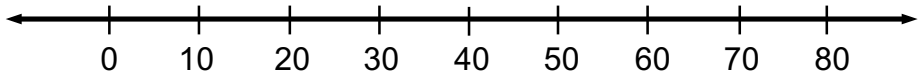
A. 1/2
B. 1/3
C. 2/5
D. 3/5

Name: _____ Date: _____

Navigating Number Lines

1. Make a point on the number line below for each of the following numbers:

   15, 48, 35, 60, 76, 3



Explain how you decided where to put the point for the number 76.

_____

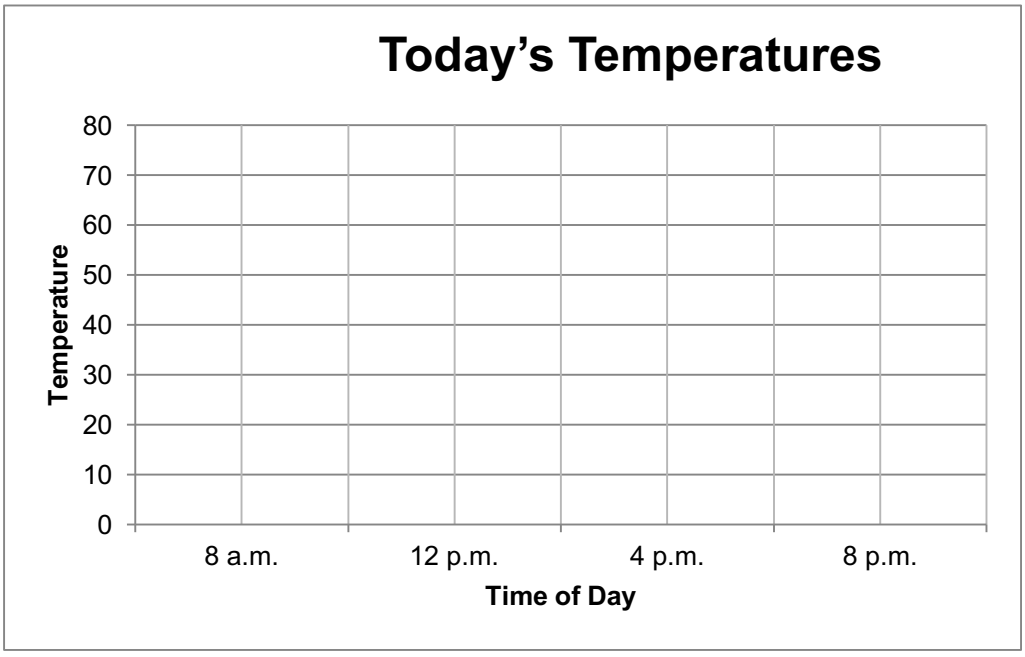
_____

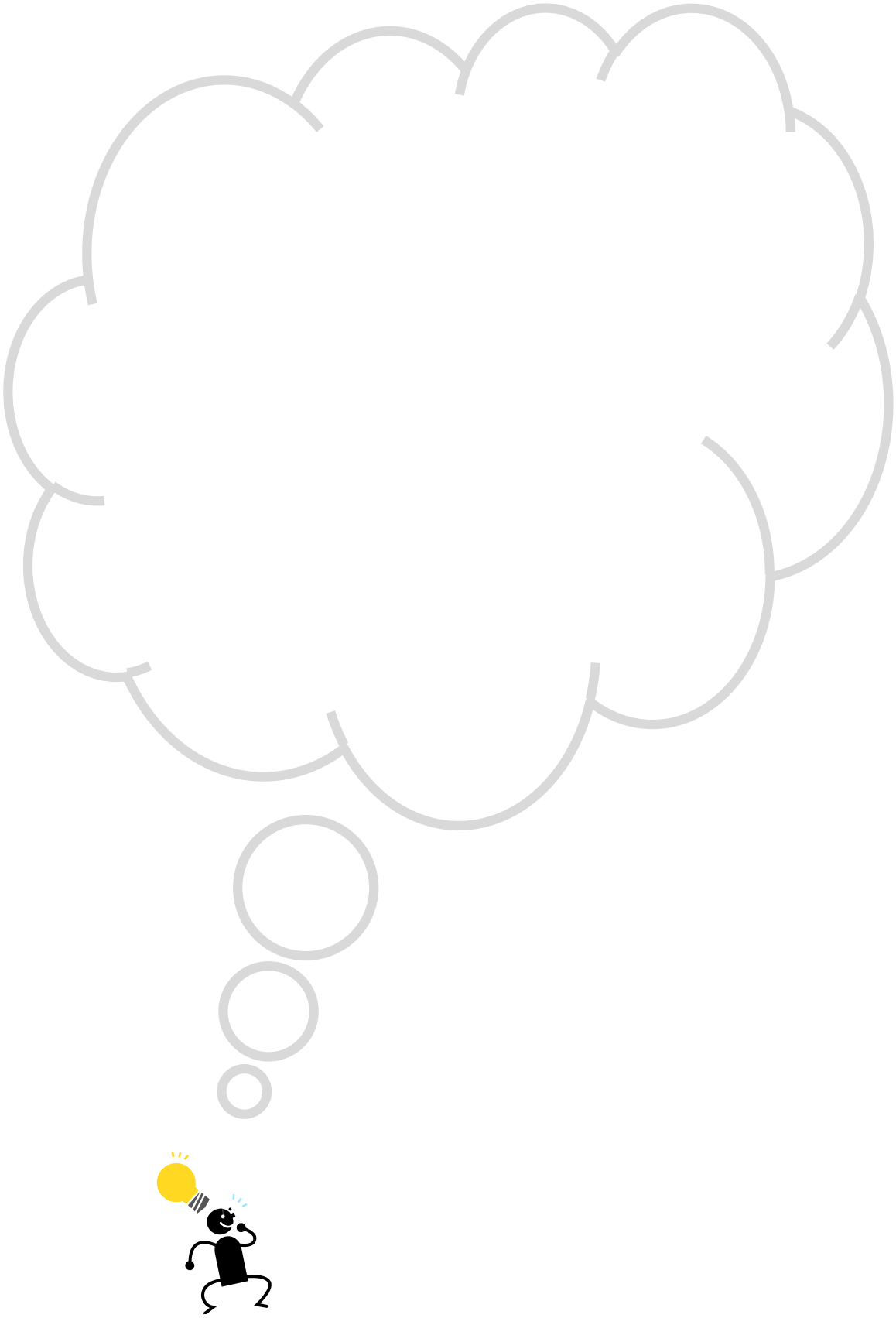
_____

2. Shelly kept track of the temperature at different times of the day. She recorded her data in a table.

8 a.m.	12 p.m.	4 p.m.	8 p.m.
56°F	65°F	69°F	61°F

Make a point on the graph below to show each temperature.





Name: _____ Date: _____

Weather Data Across the United States

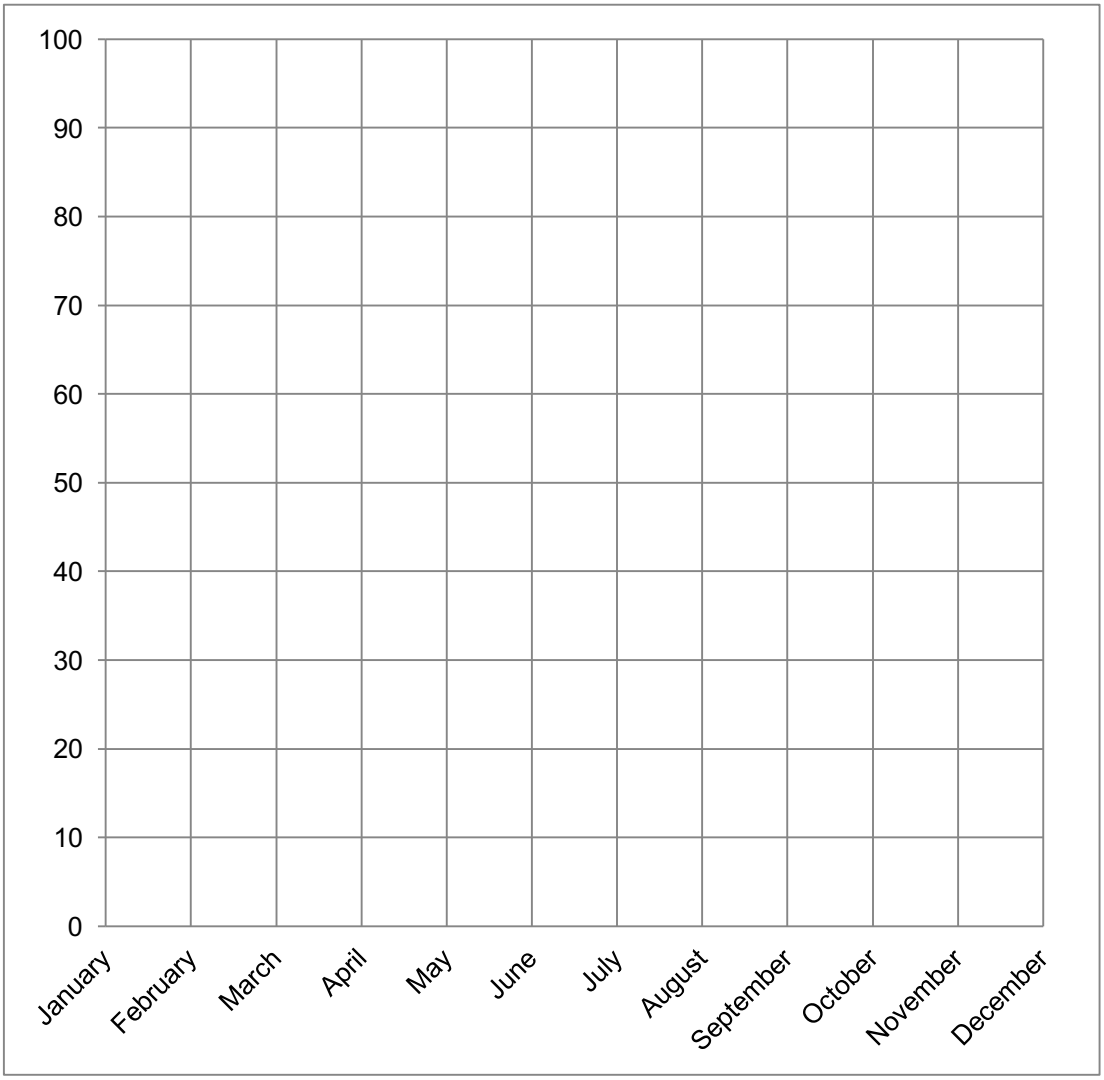
Phoenix, AZ - Average Daily Temperature by Month (°F)											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
54	58	62	70	79	88	93	91	86	75	62	54

Washington, DC - Average Daily Temperature by Month (°F)											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
36	38	46	57	66	75	79	78	71	60	49	39

Retrieved June 17, 2009 from http://www.weatherbase.com

Babbage & Galileo

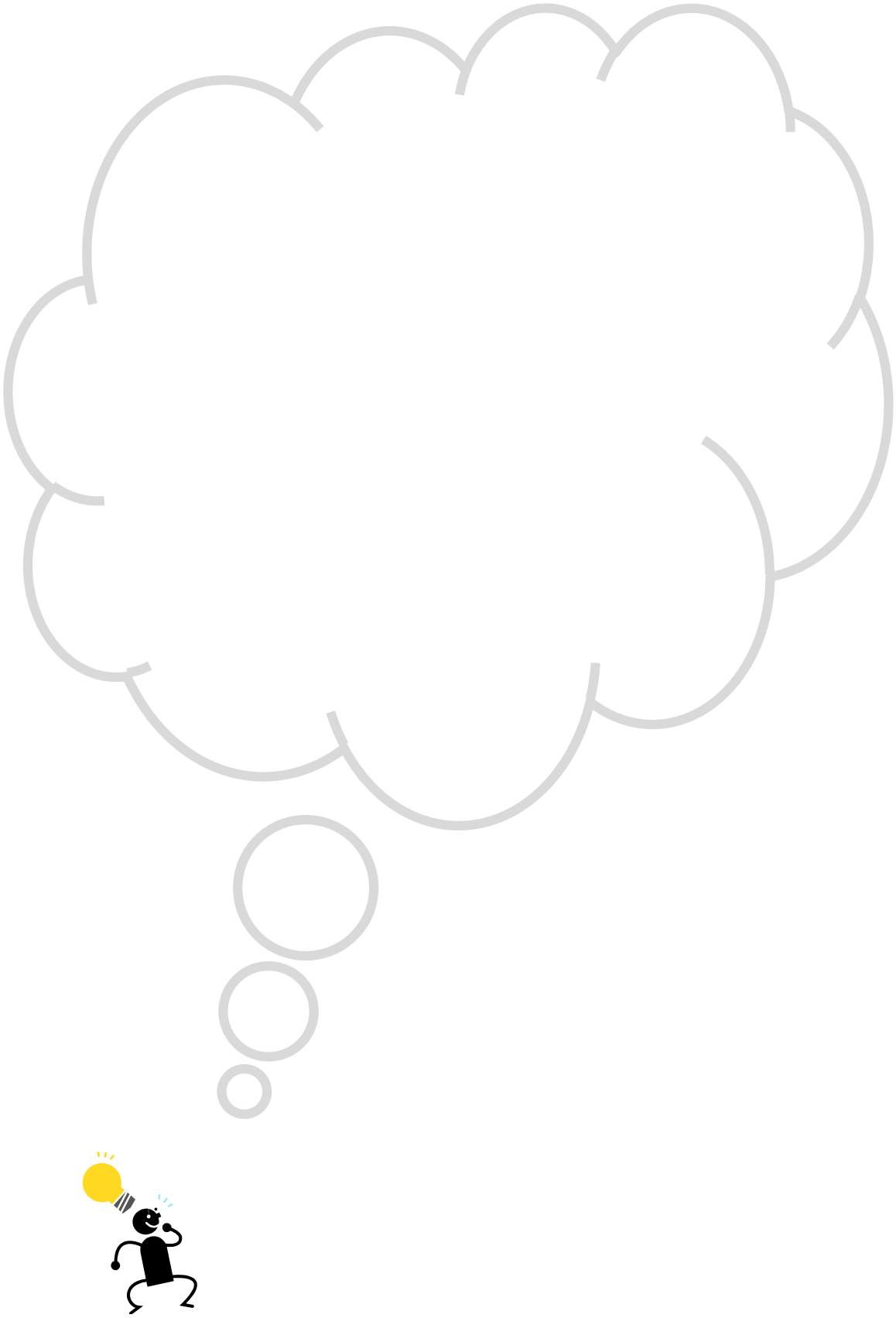
Title: _____



COLOR KEY
Phoenix, AZ
Washington, DC

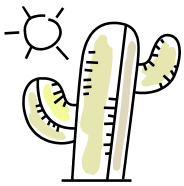
Directions:

1. Select two different colored pencils or crayons.
2. Graph the data for Phoenix, AZ by making a point for each month. Connect the points.
3. Graph the data for Washington, DC in a different color.
4. Complete the COLOR KEY by making a colored mark next to each place to match the color on the graph.



Babbage & Galileo

Questions



1. Which place is warmer, Phoenix, AZ or Washington, DC? _____

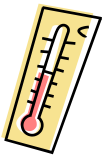
   Explain how you can tell by looking at your graph.

_____

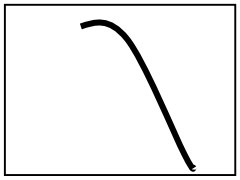
_____

_____

_____



2. If you saw part of a temperature graph like the picture below, would you think it was getting WARMER or COLDER? Explain your thinking.



_____

_____

_____

_____

Falconer

Name: _____ Date: _____

Weather Data Across the United States

Orlando, FL - Average Daily Temperature by Month (°F)											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
61	62	67	72	78	81	83	83	81	75	67	62

Phoenix, AZ - Average Daily Temperature by Month (°F)											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
54	58	62	70	79	88	93	91	86	75	62	54

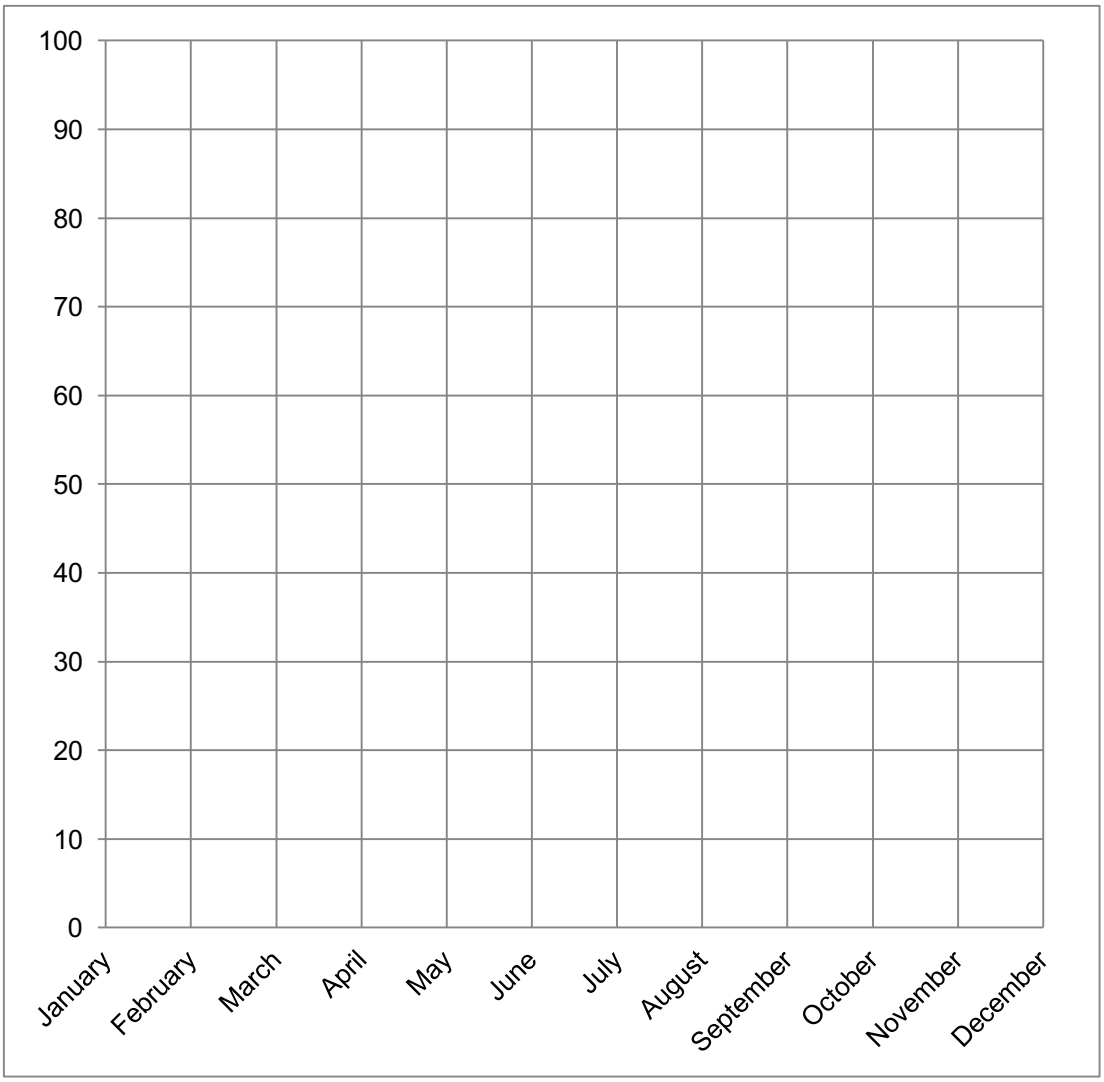
Washington, DC - Average Daily Temperature by Month (°F)											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
36	38	46	57	66	75	79	78	71	60	49	39

Storrs, CT - Average Daily Temperature by Month (°F)											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
26	26	33	44	55	64	69	68	60	50	39	30

Retrieved June 17, 2009 from http://www.weatherbase.com

Falconer

Title: _____



COLOR KEY
Orlando, FL
Phoenix, AZ
Washington, DC
Storrs, CT

Directions:

1. Select four different colored pencils or crayons.
2. Graph the data for Orlando, FL by making a point for each month. Connect the points.
3. Graph the data for the other three places, using a different color for each.
4. Complete the COLOR KEY by making a colored mark next to each place to match the color on the graph.

Questions

Falconer

1. Describe the graph for Storrs, CT. What does the shape tell you?

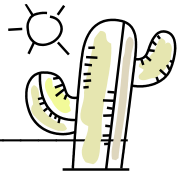
_____

_____

_____

_____

2. What is the MAXIMUM temperature for Phoenix, AZ?_____



How can you tell where the maximum is by looking at your graph?

_____

_____

_____

_____

3. How can you tell by looking at a graph that it is getting colder?

_____

_____

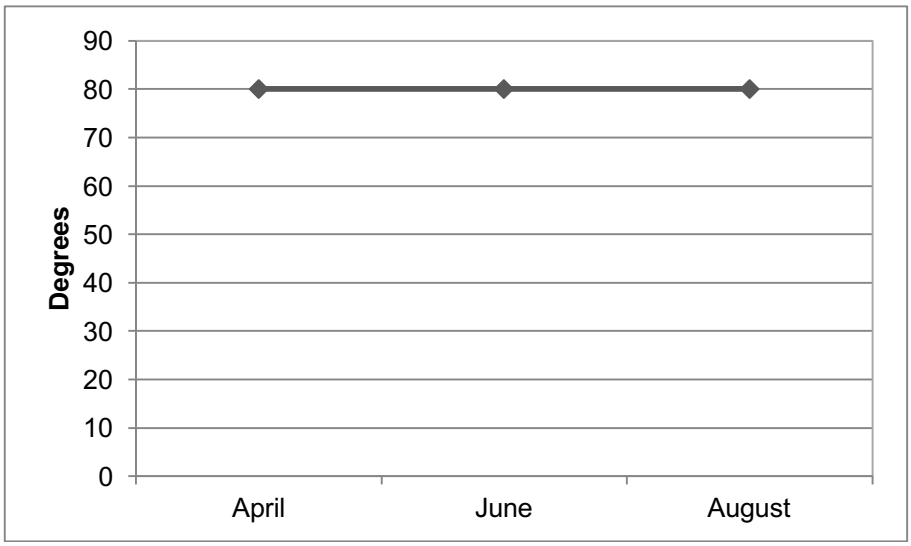
_____

_____

Name: _____ Date: _____

Student Mathematicians Think Deeply

Average Monthly Temperature for Mathematicians' Island



1. Explain why the temperature graph for Mathematicians' Island is a straight, horizontal line.

_____

_____

_____

2. If the average monthly temperature on Mathematicians' Island is 75°F in May and 85°F in July, what would the graph look like from April to August? (You can make these two points on the graph above to help you.)

_____

_____

_____

Babbage

Name_____ Date: _____

Bake Sale

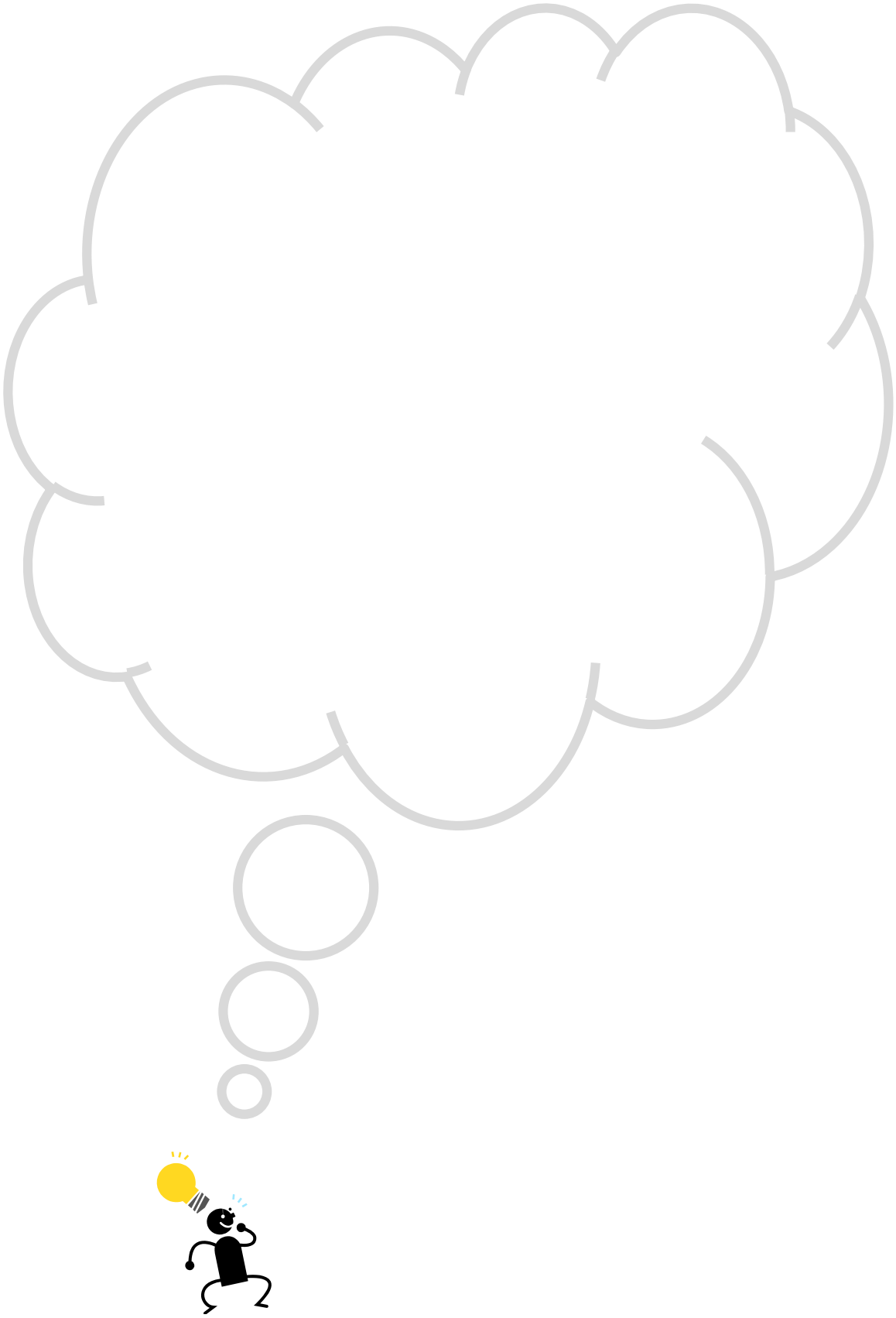
The Cool School held a Bake Sale to raise money for their field trip. Here is their cookie data:

Days	Number of Cookies Purchased
Monday	5
Tuesday	20
Wednesday	15
Thursday	10
Friday	25

Create a line graph with the cookie data. Don't forget a title!

Title _____

Number of Items Sold										
	Monday		Tuesday		Wednesday		Thursday		Friday	
	Days of the Week									



Babbage

Answer the following questions using the data from the graph. If needed, show your work under the question.

1. On what day did they sell the most cookies? _____

2. How many more cookies did the sell on Friday than on Tuesday?

_____

3. Cookies cost $1 a piece. How much money did the students raise on Monday?

_____

4. How much did they raise for the entire week? _____

Galileo

Name_____ Date: _____

Bake Sale

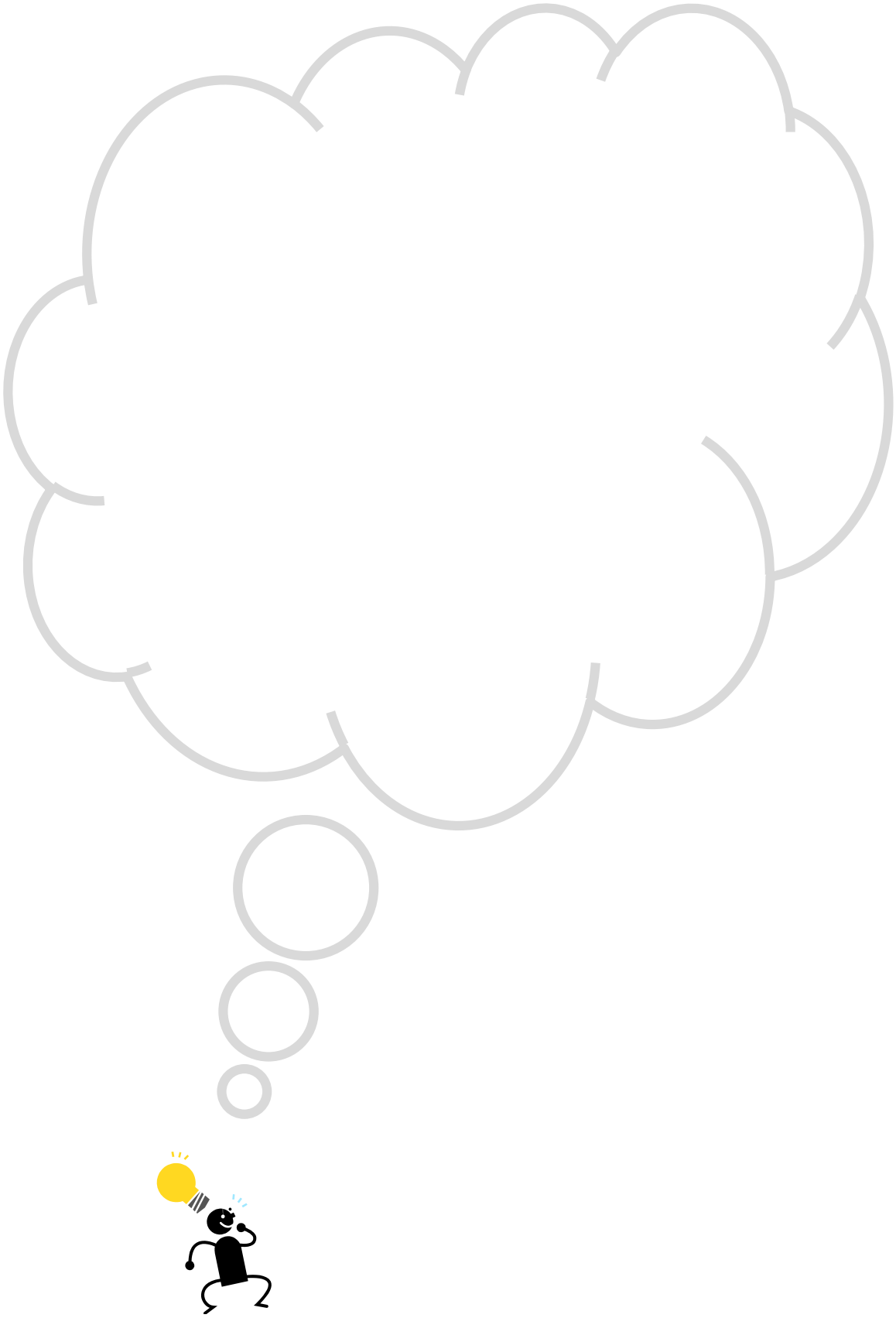
The Cool School held a Bake Sale to raise money for their field trip. Here is their cookie data:

Days	Number of Cookies Purchased
Monday	5
Tuesday	20
Wednesday	12
Thursday	14
Friday	32

Create a line graph with the cookie data. Don't forget a title!

Title _____

Number of Items Sold										
	Monday		Tuesday		Wednesday		Thursday		Friday	
	Days of the Week									



Galileo

Answer the following questions using the data from the graph. If needed, show your work under the question.

1. On what day did they sell the most brownies? _____

2. Brownies cost $0.50 a piece, how much money did the students raise on Friday?

   _____

3. How much did they raise for the entire week? _____

4. How much more would they have made if they would have charged $1 for each brownie and the same amount of people purchased brownies?

   _____

Falconer

Name_____ Date: _____

Bake Sale

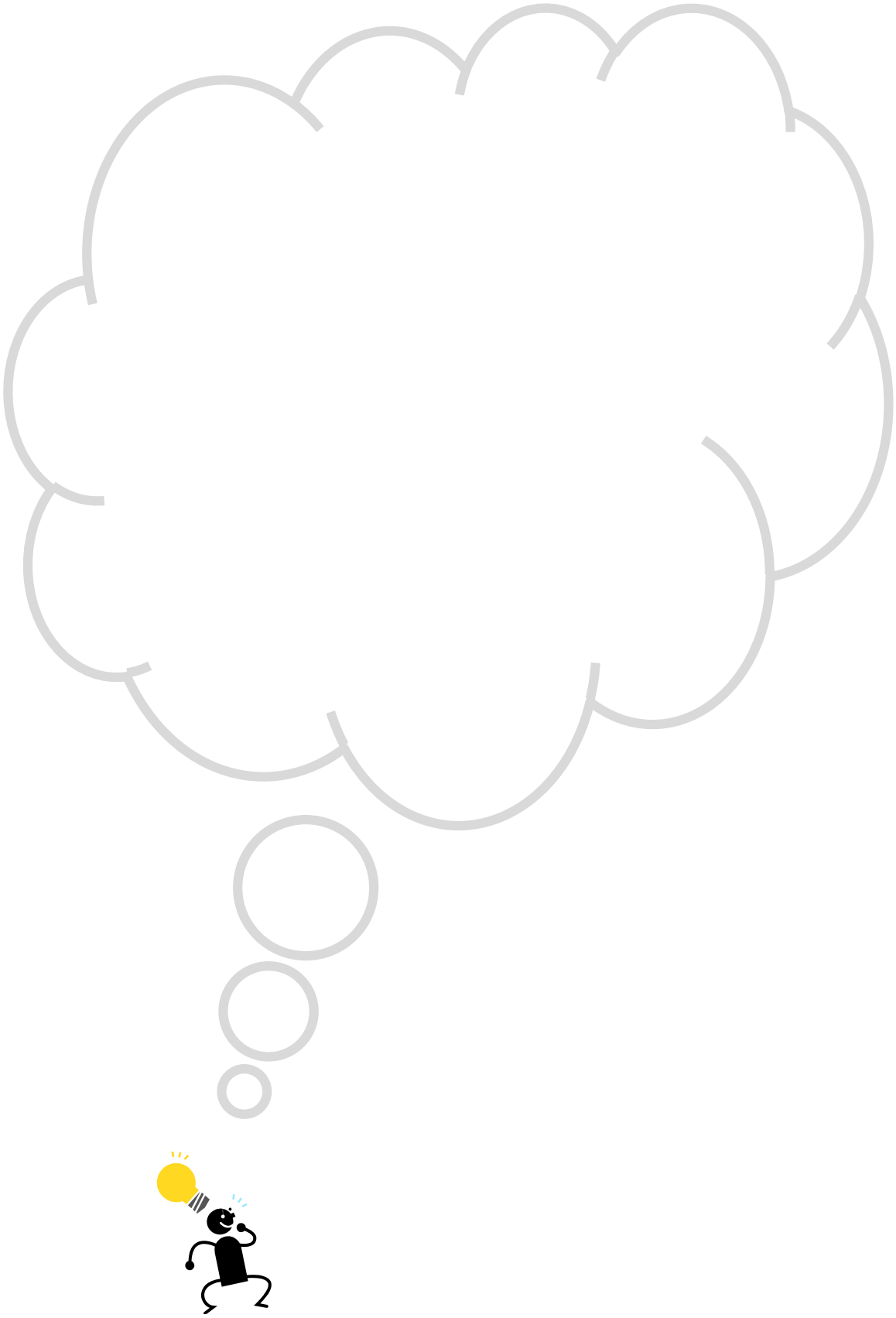
The Cool School held a Bake Sale to raise money for their field trip. Here is their cookie data:

Days	Number of Cookies Purchased
Monday	4
Tuesday	11
Wednesday	12
Thursday	18
Friday	5

Create a line graph with the cookie data. Don't forget a title!

Title _____

Number of Items Sold										
	Monday		Tuesday		Wednesday		Thursday		Friday	
	Days of the Week									



Falconer

Answer the following questions using the data from the graph. If needed, show your work under the question.

1. On what day did they sell the most cupcakes? _____

2. Cupcakes cost $0.75 a piece, how much money did the students raise on Thursday? (Hint: Calculate how much 4 cupcakes cost and use that to help you.)

   _____

3. How much did they raise for the entire week? _____

4. How much more would they have made if they would have charged $1.75 for each cupcake and the same amount of people purchased brownies?

   _____

5. Why do you think they did not charge $1.75 for each cupcake? Should they have charged $1.75?

_____

_____

_____

Bake Sale Group Questions

1. Did the students reach their goal of raising $100 for their field trip? (Use the totals from the brownies, cookies, and cupcakes.)

_____

_____

_____

2. If the students could only have a bake sale for one day, which day of the week should they choose?

_____

_____

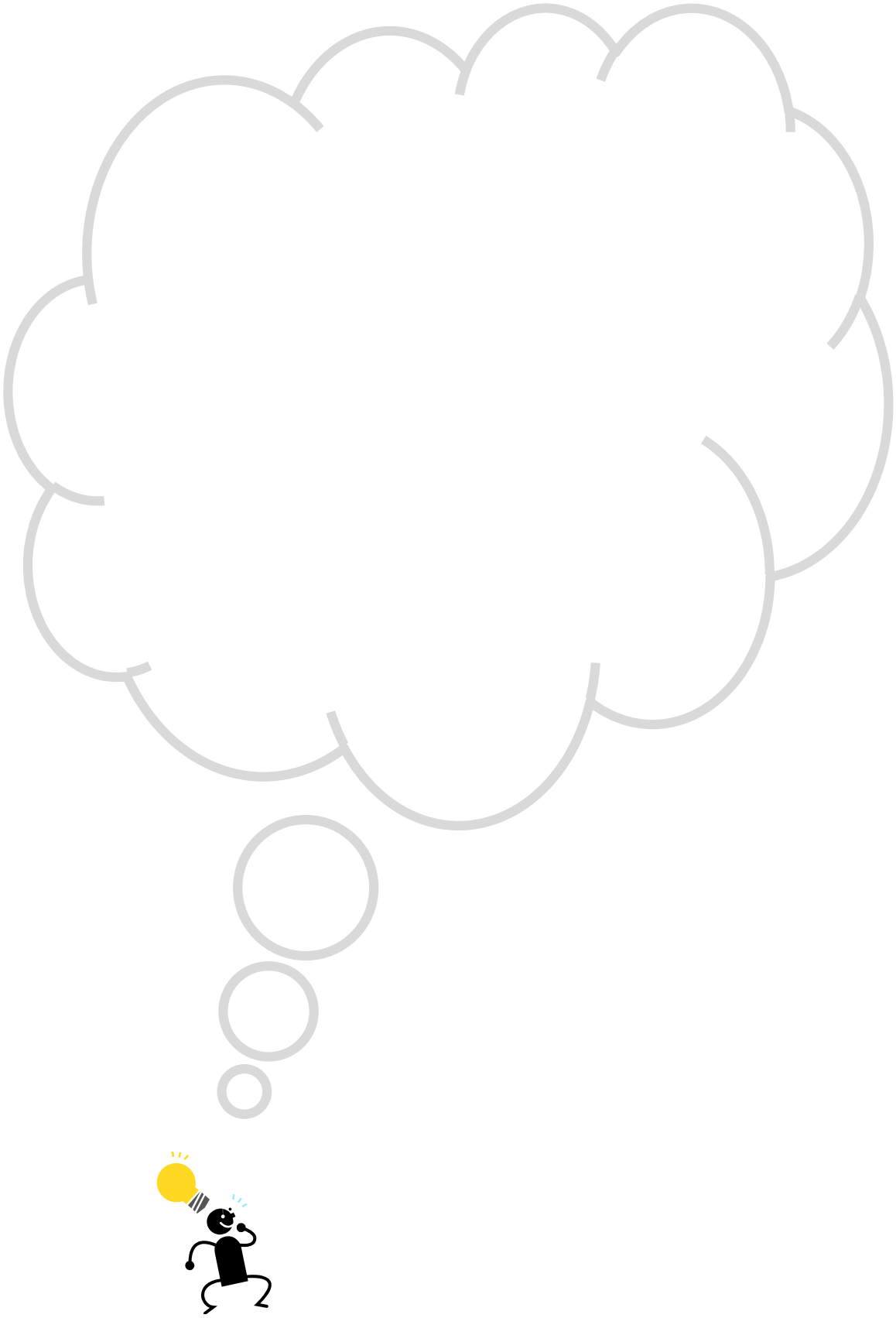
_____

3. Which baked good raised the most money? Is that also the best seller?

_____

_____

_____



Name: _____ Date: _____

Student Mathematicians Practice

1. Which number has the digit 9 in the thousands' place?

   A. 34,396 B. 58,942

   C. 69,248 D. 95,561

2. James noticed that his magazine was missing pages numbered 138 through 156. How many of the missing pages end with a 2?

   A. 1 B. 2

   C. 4 D. 18

3. Connor's class is learning about different kinds of trees. So far, they have studied 4 out of 15 different kinds. How many more kinds do they still have to study?

   A. 1 B. 10

   C. 11 D. 19

4. Macy read that the largest full-grown tree is about 43 feet tall and the smallest is about 4 feet tall. To find out how many feet taller the largest tree is than the smallest, Macy could do which of the following?

   A. multiply 43 by 4 B. divide 43 by 4

   C. add 4 and 43 D. subtract 4 from 43

5. 4,794 - 32 =

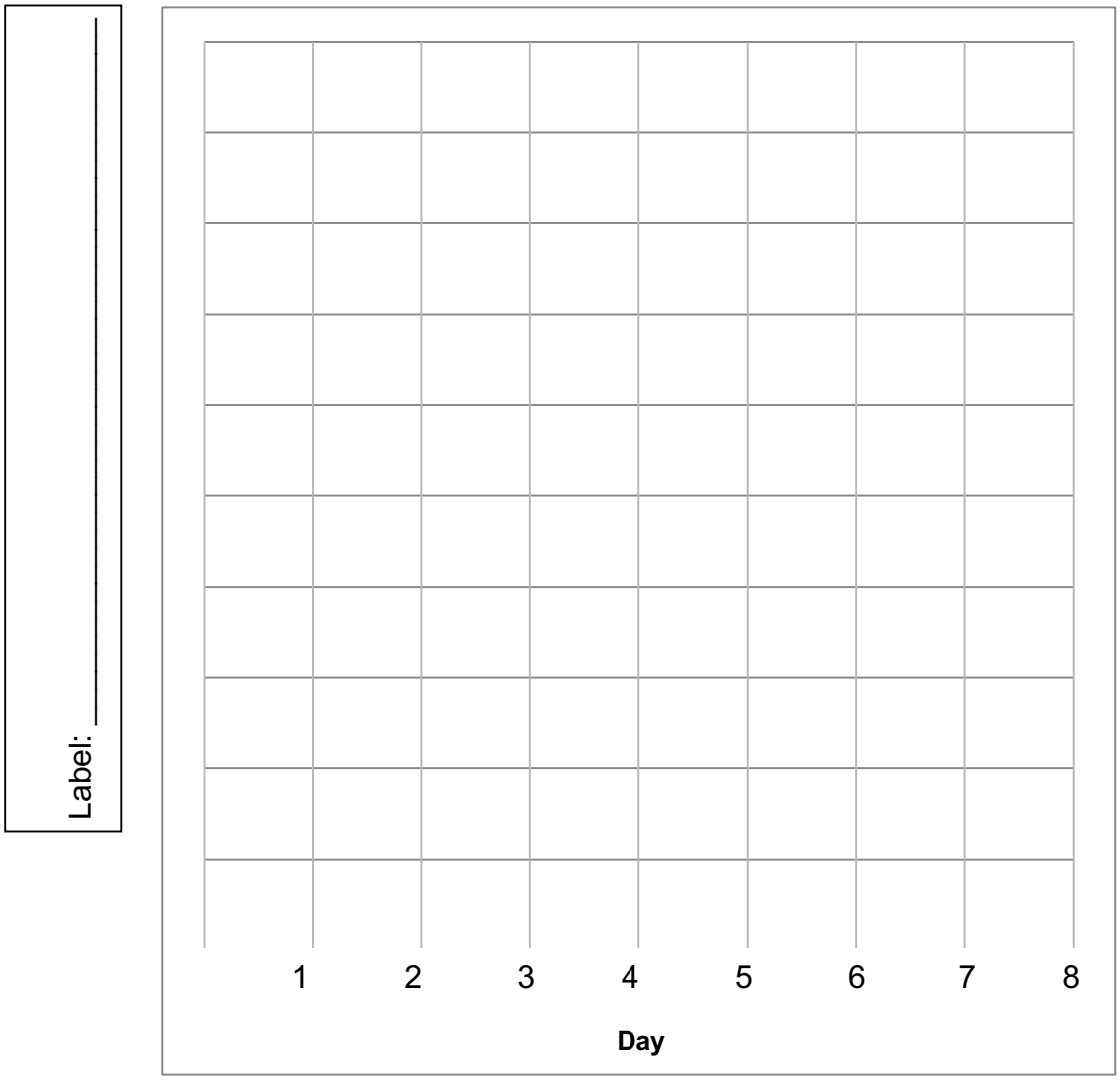
6. 512 + 74 + 3 =

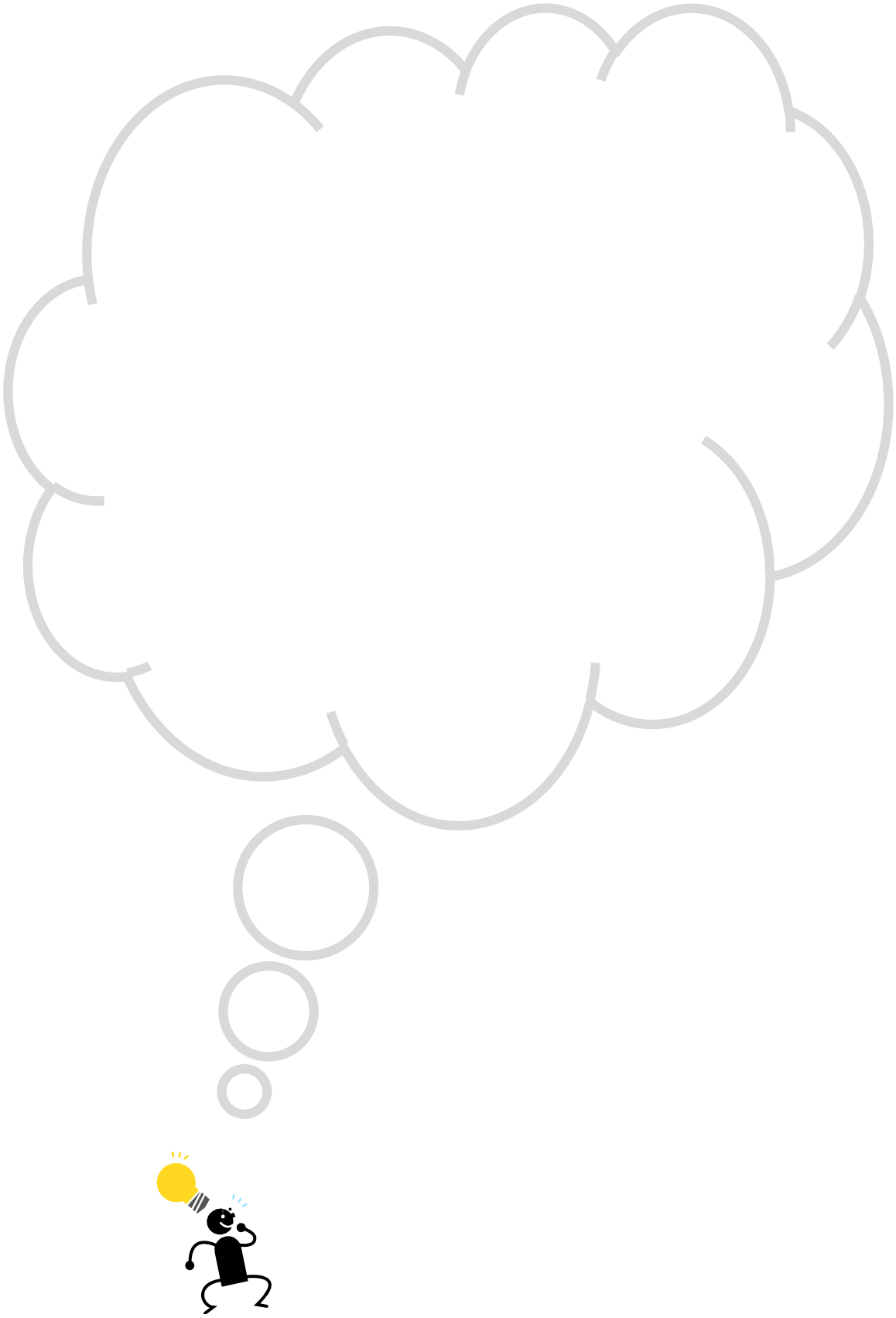
7. 90
   - 18

Name: _____ Date: _____

Did It Work?
Line Graph

Title: _____





Name: _____ Date: _____

Student Mathematicians Think Back: Analyzing Our Graph

1. How can we tell from the line graph whether or not our intervention worked?

2. How would you change the intervention if you were to do it again?

Name: _____ Date: _____

Understanding Line Graphs

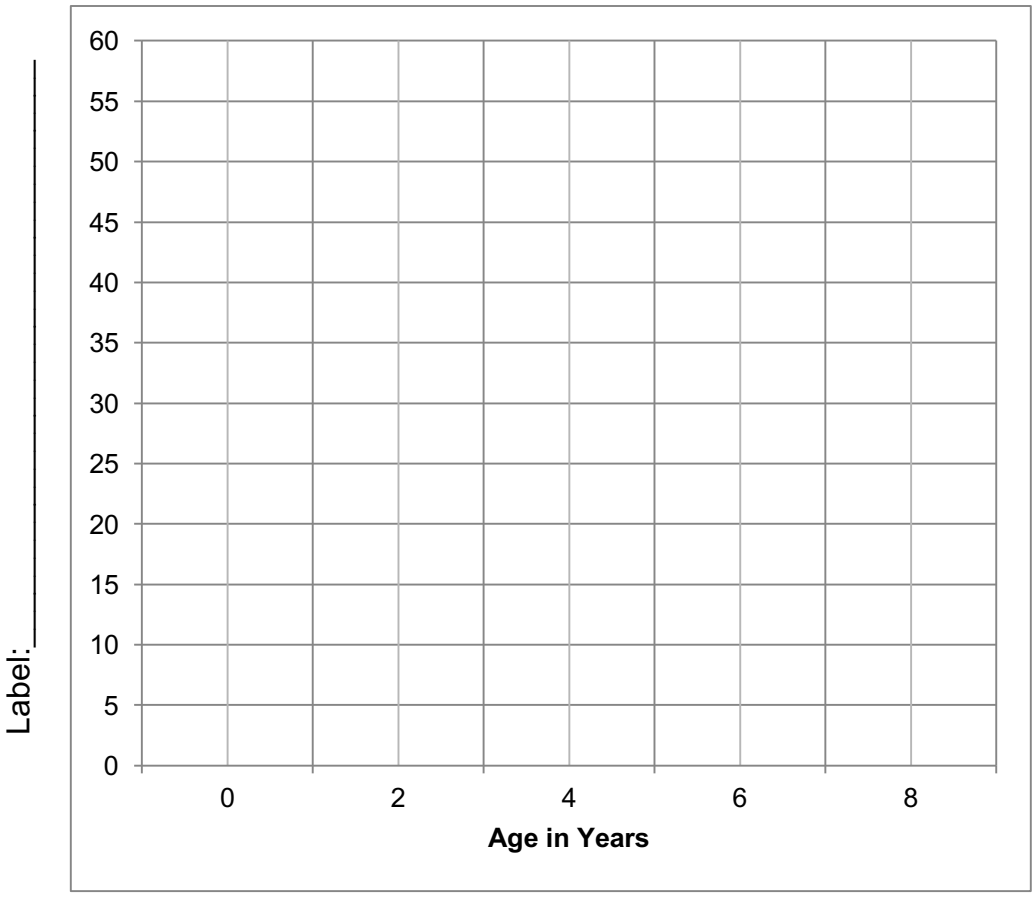
1. Below is the average height of boys from birth to age 8. Make a line graph to display the data. Be sure to fill in the missing title and label.

Average Height of Boys

Age (years)	Height (inches)
Birth (0)	30
2	36
4	42
6	47
8	51

http://www.babybag.com/articles/htwt_av.htm

Title: _____



2. What happens to the average height of boys over time? Would it continue to increase if the graph went to age 39?

_____

_____

_____

_____

Name: _____ Date: _____

Read the following story. Create a line graph to show how the height of Nate, the gnome, changes throughout the story.

A Gnome's Wish

Nate, the gnome, was playing all alone on a tree stump outside his house. He watched all of his gnome friends as they climbed the bigger trees. You see, Nate was really short, even for a gnome. He was only **10 inches** tall! As Nate was playing, he noticed a brightly colored mushroom. He remembered a story his grandfather had told him. His grandfather had told him that if he found such a mushroom, he could make a wish.

Nate decided to wish that he were as tall as his gnome friends. Just like that, Nate grew to be **24 inches** tall. Nate was happy. He went and played in the trees with his friends. When he got home for dinner that night, his mom was really angry. She asked, "What happened to my little gnome?" Nate explained the story about the mushroom to Mother Gnome. She told him to return to his old height at once.

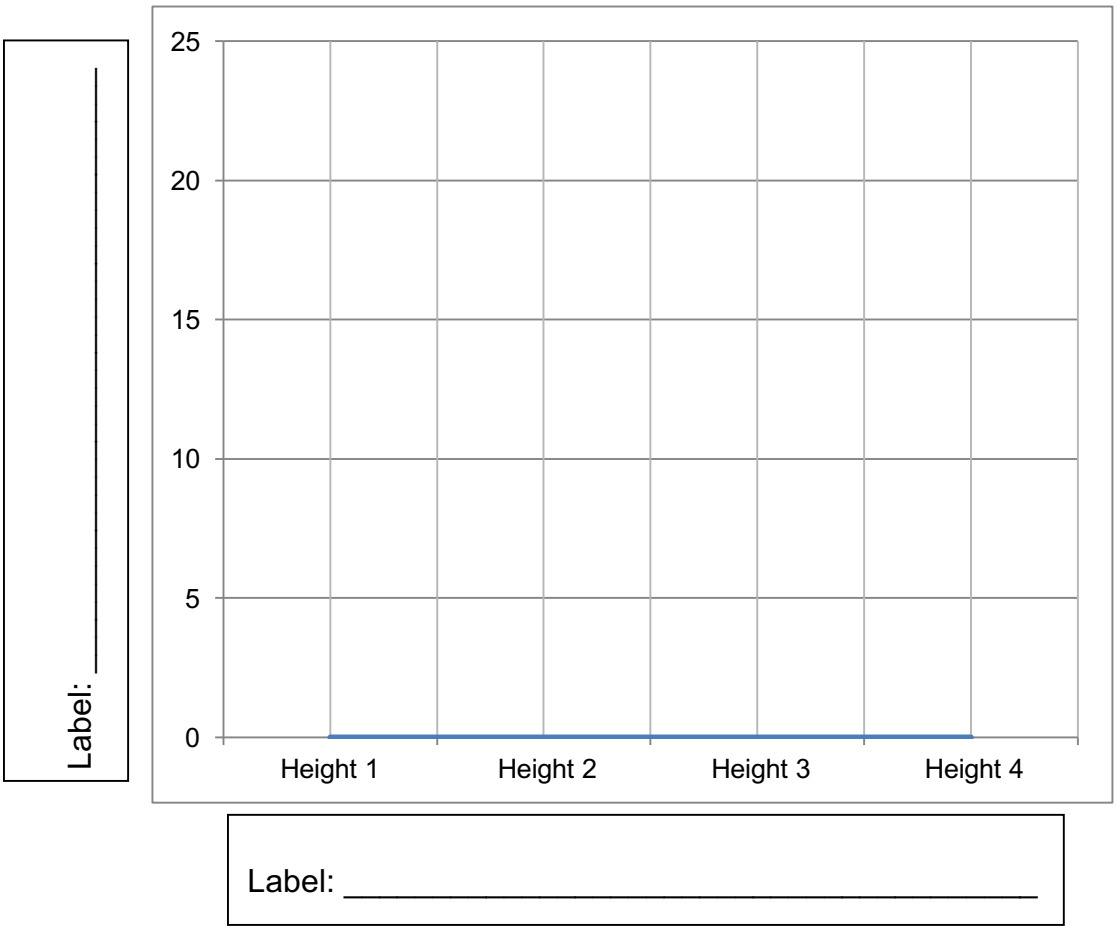
Nate returned to the mushroom the next morning. He hoped that he could make another wish. Nate said, "Oh, please magic mushroom, make me short once again. My mom is really angry." In a flash, Nate shrunk to **4 inches.** Nate looked around. The grass seemed a lot taller than before. "Oh no," sobbed Nate, "this is not my right height."

Nate thought for a while. Then, he said, "Magic mushroom, please make me the same height I was yesterday morning." Instantly, Nate grew to be **10 inches** once again. He returned home to a smiling Mother Gnome and a plate of cookies!

Name: _____ Date: _____

A Gnome's Wish: Line Graph

Title: _____



When did Nate grow? _____

How can you tell by looking at the graph?

_____

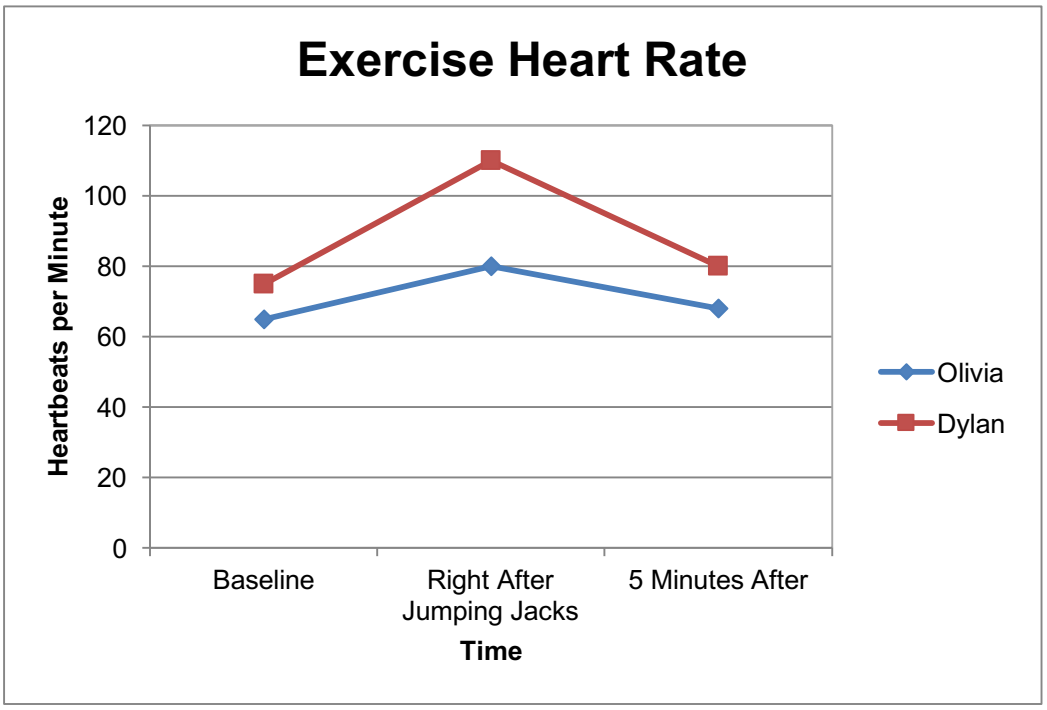
_____

_____

Name_____ Date: _____

Exciting Exercise

Dylan and Olivia wanted to see the effect of jumping jacks on their heart rate. They took their resting heart rate for their baseline. A resting heart rate can be taken when you are sitting down and relaxed. Then they did 60 jumping jacks and immediately took their heart rate again. After 5 minutes, they took their heart rate again.



Collect your own data and add to the graph. (Hint: You could count how many times your heart beats in 30 seconds and then double it.)

Baseline: _____ beats per minute

Right After Jumping Jacks: _____ beats per minute

Five Minutes After:_____ beats per minute

Whose heart rate increased the most right after the jumping jacks?
How do you know?

_____

_____

_____

Compare your data with Olivia and Dylan's. Discuss all of the data points as well as the overall trends.

_____

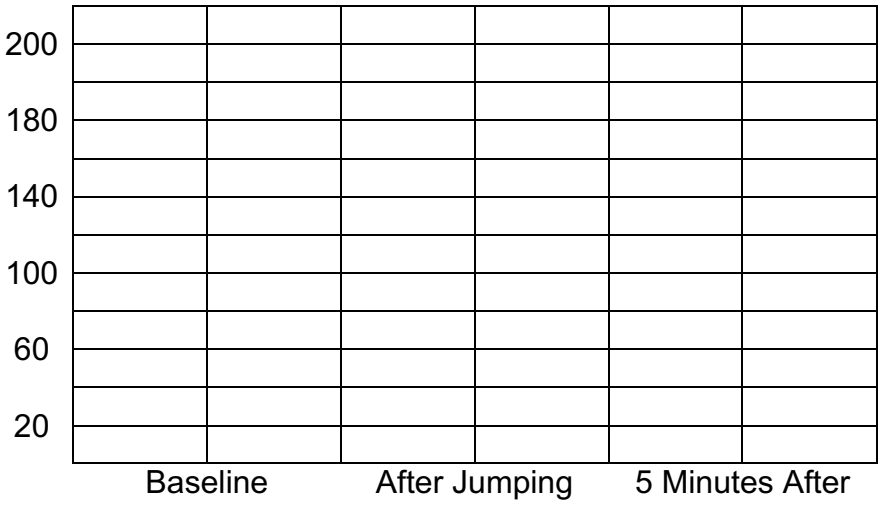
_____

_____

_____

_____

Jelly, the alien, was very out of shape. What would a graph of his heart rate look like? (Make a hypothesis.) Explain your thinking.



_____

_____

_____

Name: _____ Date: _____

Student Mathematicians Practice

1. Which amount of money is the least in value?

   A. 1 quarter

   B. 2 dimes

   C. 6 nickels

   D. 32 pennies

2. What is the best estimate for the length of a baseball bat?

   A. 1 foot

   B. 3 feet

   C. 14 inches

   D. 24 centimeters

3. Kari and Luke were making cupcakes for their classes. Kari made 28 cupcakes, and Luke made 34 cupcakes. How many more cupcakes did Luke make than Kari?

   A. 6

   B. 14

   C. 29

   D. 62

4. $\begin{array}{r} 786 \\ +73 \\ \hline \end{array}$

Reusing in the News

Reuse Invention Convention

Columbia Elementary held its first ever Reuse Invention Convention on November 3rd.

The event was held to give students an opportunity to be creative and to save the environment. The students first collected 2-liter pop bottles. Then they were given supplies such as construction paper, glue, pipe cleaners, and paper clips. Each student had a half hour to come up with the most creative invention that reused the soda bottle. A group of students from all different grade levels at the school organized the drive with their teacher, Mrs. Jones.

According to students, the Reuse Invention Convention was a complete success. Jade, one of the third graders involved in the convention, was very pleased with the turnout. She said, “We had many students and families donate pop bottles and supplies. It was so much fun to think of the different ways to reuse!”

Student Donations

2	3	4	5	6	7	8	9	10	11	12
☺	☺		☺	☺	☺	☺	☺	☺		☺
☺			☺	☺	☺	☺	☺	☺		
			☺	☺	☺	☺	☺			
				☺	☺	☺	☺			
					☺	☺	☺			
					☺	☺				
					☺					
					☺					

Number of 2-Liter Soda Bottles

The graph is called a **line plot.** It shows the number of soda bottles that each student in the class gave to this drive. **Each smiley face is one student**, so, for example, two students gave two bottles and one student gave three bottles.

Students are not only helping their fellow town members but are learning about ways to reduce at the same time. Mrs. Jones said, “The students are really learning a valuable lesson in reusing materials. Too often, bottles are just thrown away, which helps to contribute to the amount of waste in our town. This is a great solution that will help reduce waste and increase creativity.”

Discussion Questions:

1. How many students gave five bottles?

   _____

2. Exactly six students gave the same number of bottles. How many did they give?

   _____

3. What is the mode in this line plot?

   _____

4. What is the median in this line plot?

   _____

5. What do you think it means to reuse?

   _____

6. Write a question that you could answer using this graph.

   _____

7. What is the answer to your question?

   _____

Advanced (Optional):

8. How many bottles were donated all together?

   _____

Name_____ Date: _____

Our Class's Reuse Invention Convention

Think of as many different ways as you can to reuse the can.
You may draw them or write them out.

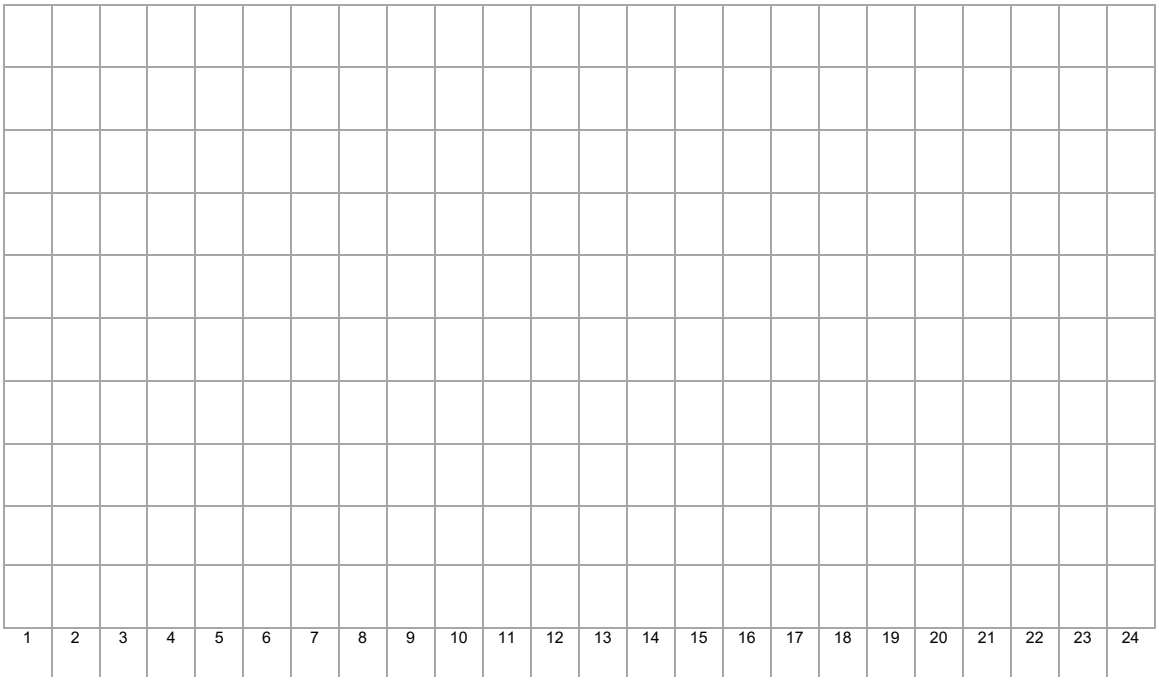
1.	2.	3.	4.	5.	6.
7.	8.	9.	10.	11.	12.
13.	14.	15.	16.	17.	18.
19.	20.	21.	22.	23.	24.

How many reuse ideas did you have? _____
Circle the idea you like the most.

Name_____ Date: _____

Our Class's Reuse Invention Convention Line Plot

Let one X stand for one student.



1. What is the mode of these data? _____
2. What is the median of these data? _____
3. Write a question that you could answer using this graph.

   _____

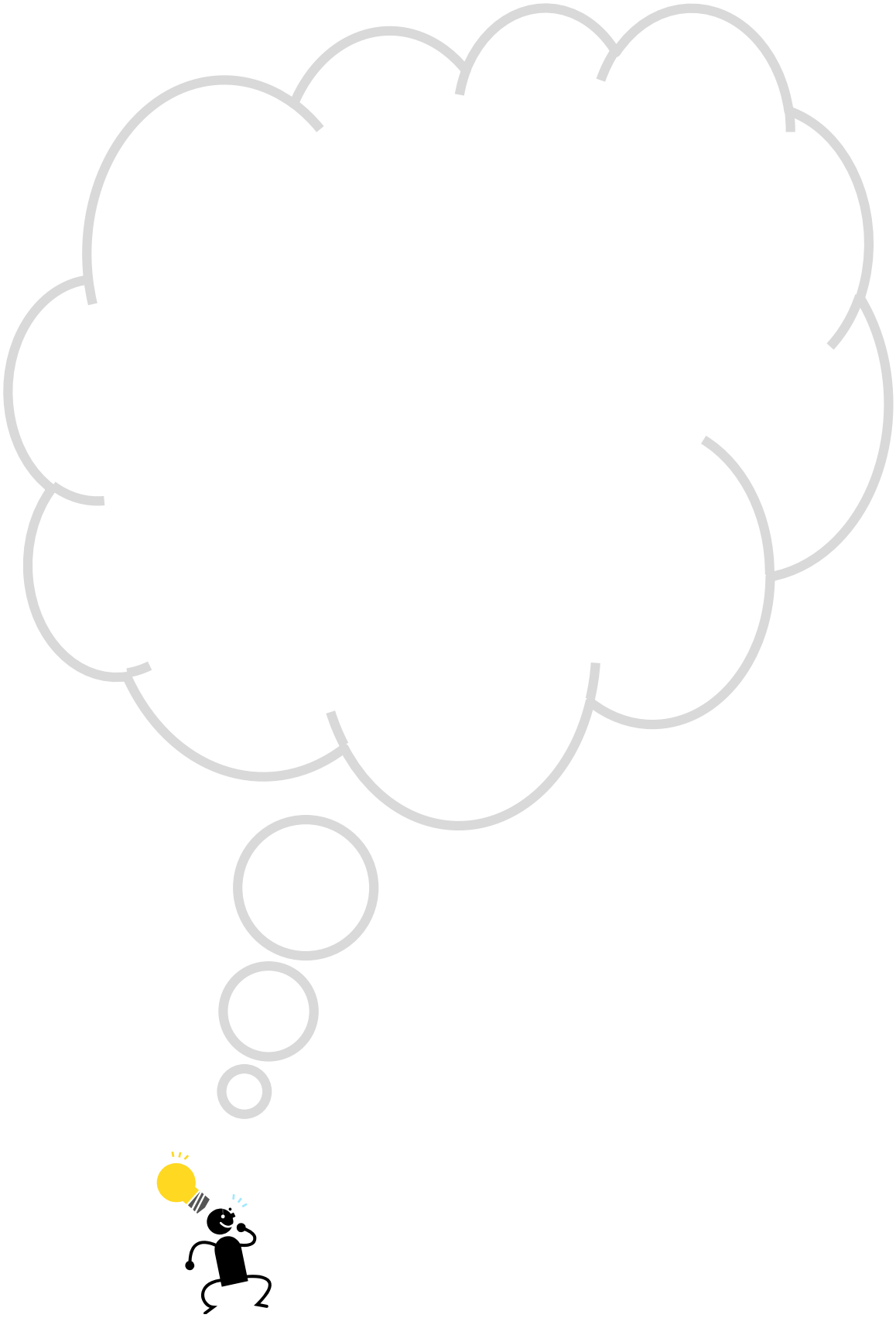
4. What is the answer to your question?

   _____

5. Describe how the line plot would change if students were given 10 minutes instead of 5.

   _____

   _____



Babbage

Name_____ Date: _____

Miniature Golf Adventure on Hole 17

Mrs. Juno's class went golfing on the last day of school. Mrs. Juno wanted to know how well her students did on Hole 17, so she created this line plot. Each X stands for one student.

					X	
		X		X	X	
		X		X	X	
	X	X		X	X	
	X	X	X	X	X	
X	X	X	X	X	X	X
1	2	3	4	5	6	7

Number of Strokes Taken

1. What is the mode of this data? _____
2. What is the median of this data? _____
3. What is the minimum number of strokes taken? _____
4. What is the maximum number of strokes taken? _____
5. How many students took 4 strokes? _____
6. How many total students are in the class? _____

Galileo

Name_____ Date: _____

Miniature Golf Adventure on Hole 17

Mrs. Juno's class went golfing on the last day of school. Mrs. Juno wanted to know how well her students did on hole 17, so she created this line plot. Each X stands for one student.

					X	
		X		X	X	
		X		X	X	
	X	X		X	X	
	X	X	X	X	X	
X	X	X	X	X	X	X
1	2	3	4	5	6	7

Number of Strokes Taken

1. What is the mode of this data? _____
2. What is the median of this data? _____
3. What is the minimum number of strokes taken? _____
4. What is the maximum number of strokes taken? _____
5. How many students took 4 or more strokes? _____
6. How many more students took 6 strokes than took 2 strokes? _____

Falconer

Name_____ Date: _____

Miniature Golf Adventure on Hole 17

Mrs. Juno's class went golfing on the last day of school. Mrs. Juno wanted to know how well her students did on hole 17, so she created this line plot. Each X stands for one student.

					X	
		X		X	X	
		X		X	X	
	X	X		X	X	
	X	X	X	X	X	
X	X	X	X	X	X	X
1	2	3	4	5	6	7

Number of Strokes Taken

1. What is the mode of this data? _____
2. What is the median of this data? _____
3. What is the minimum number of strokes taken? _____
4. What is the maximum number of strokes taken? _____
5. How many strokes did the whole class take? _____
6. Kiesha took 2 strokes on all 18 holes. What was her final score? _____

Ways of Knowing Survey

Interviewing

Observing

Surveying

If you wanted to know students' FIVE favorite foods in our cafeteria, what "Ways of Knowing" would you use? Put a check mark under "YES" or "NO."

If you wanted to know students' FIVE favorite foods in our cafeteria, what "Ways of Knowing" would you use? Put a check mark under "YES" or "NO."

Would you…	Yes (Pros)	No (Cons)
1. Ask a teacher?		
2. Ask four of your friends?		
3. Watch a class eat in the cafeteria?		
4. Ask each student to write his or her five favorite foods?		
5. Watch your best friend eat?		
6. Ask the custodian?		
7. Give students a list of foods and ask them to circle their five favorite foods?		

Name: _____ Date: _____

Greening Up Survey

Person Surveyed:_____

	Greening Practice: Do you…?	Yes	No
Recycling	1.		
	2.		
	3.		
Reducing	4.		
	5.		
	6.		
Reusing	7.		
	8.		
	9.		
	Totals		

Name: _____ Date: _____

Administering Our Survey

1. Make sure the person wants to participate. Ask:

   “Could I ask you 9 questions about saving the planet?”

2. If the person says “Yes,” read the following:

   “I will read an example of a way to help save Earth, and then you say whether or not you do it. You need to answer ‘yes’ or ‘no’ to each question.”

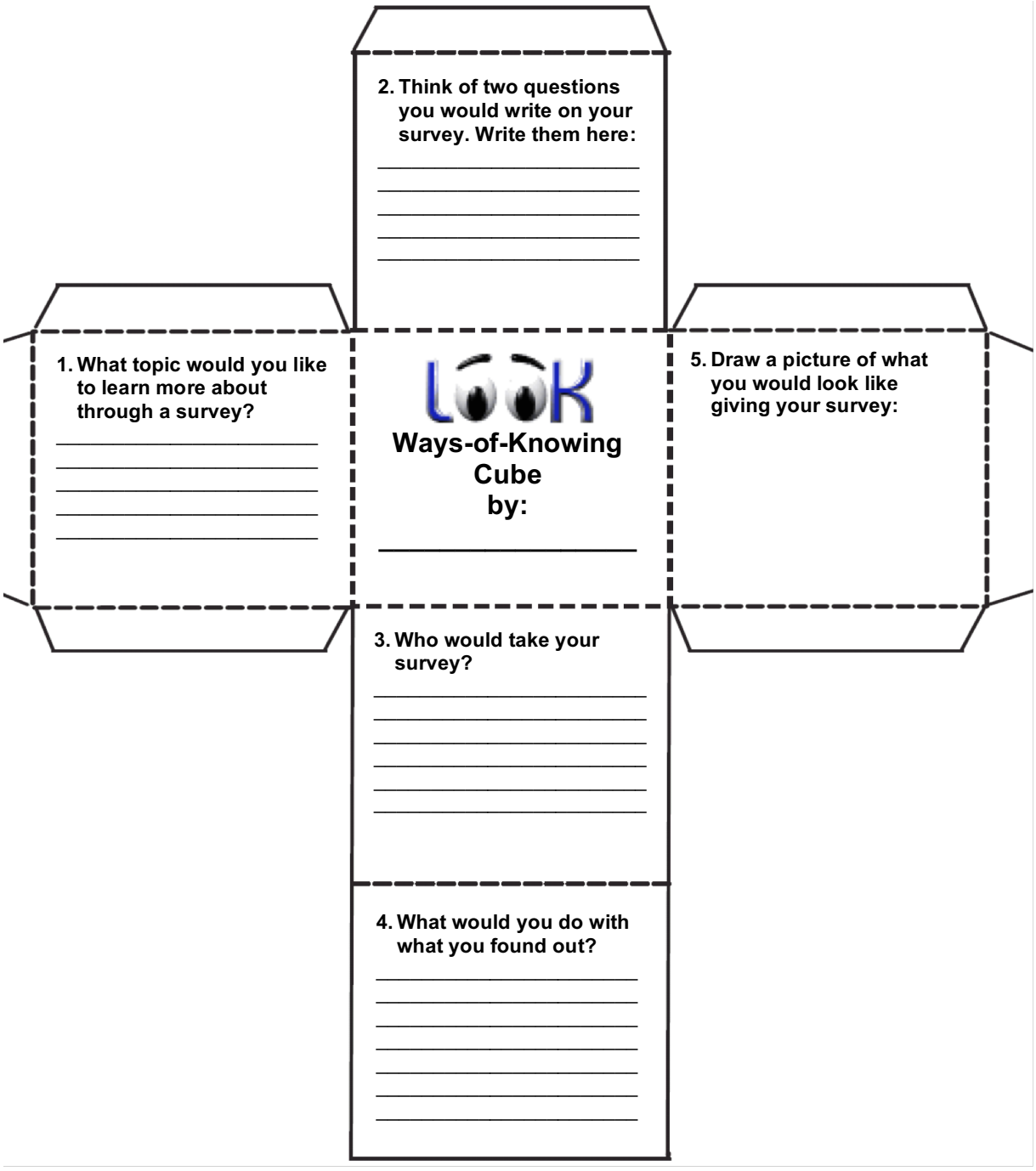
3. Ask, “Do you (read the first item)?” Ask if their answer is “yes” or “no.”

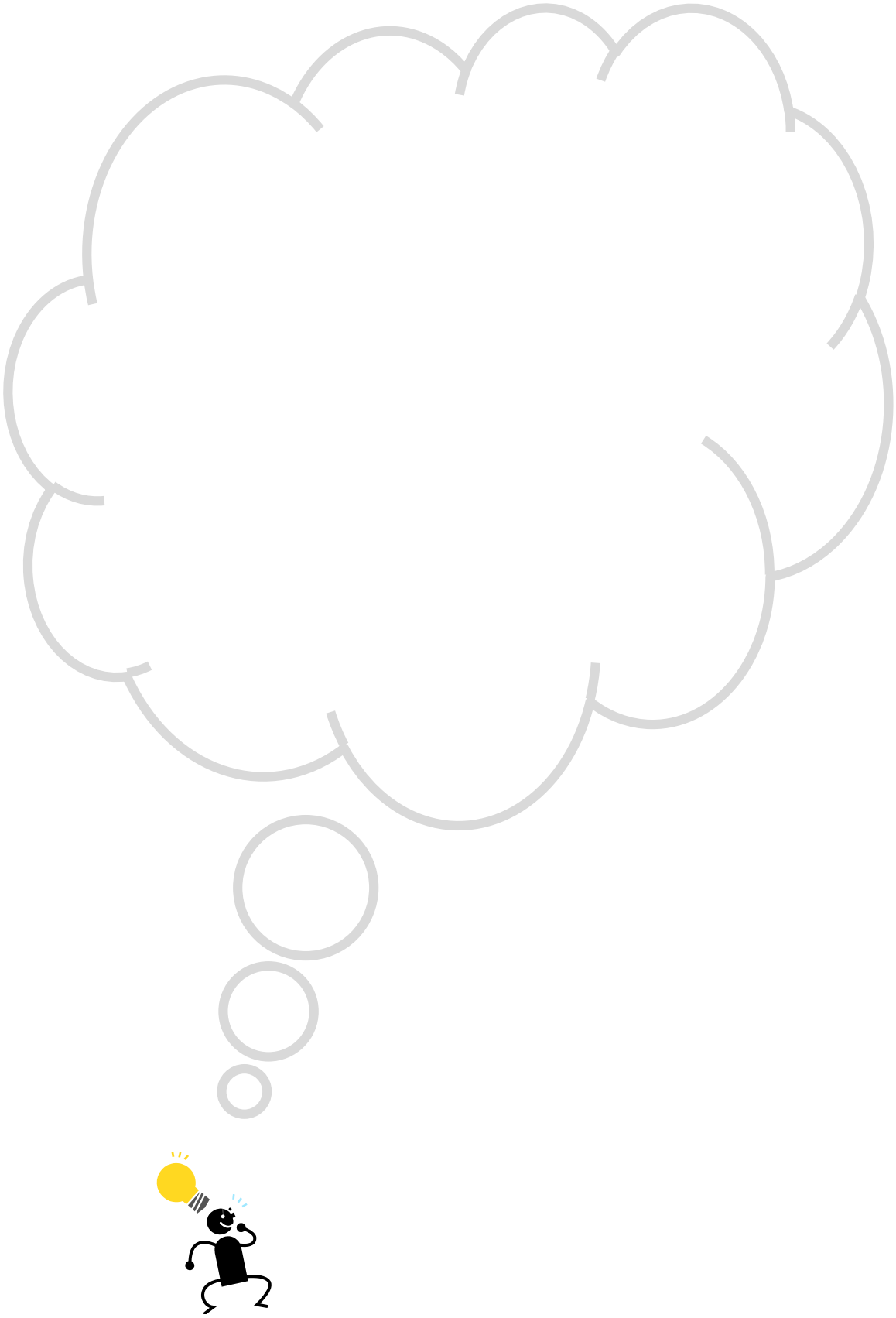
4. Check the column with answer on the survey page.

5. Do this for each item.

6. Thank the student and his or her teacher for their time and participation. ☺

Ways of Knowing Cube
Think Deeply 1





Name: _____ Date: _____

Designing Surveys
Think Deeply 2

Many different types of people design surveys. Your job is to think about what kinds of questions these people may ask and why.

Type of Person	Give 2 questions for this person's survey.	Whom would he or she ask?	What would he or she do with the information?
President 			
Scientist 			
TV Producer 			

Babbage

My Very Own Survey

My Name: _____

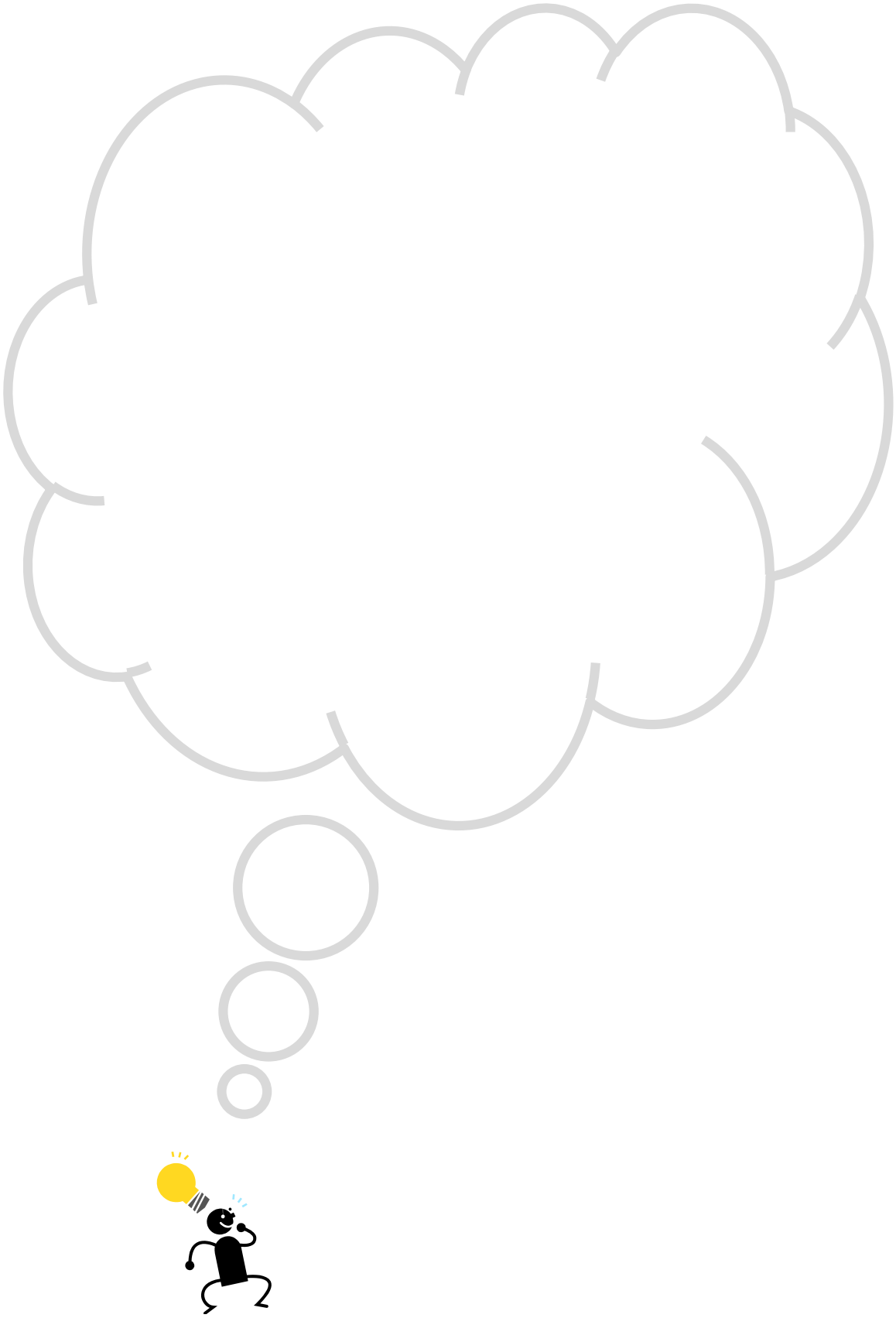
My Very Own Question:

_____

_____

Frequency Table:

Answer	Student Count	Number of Students
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
More than 15		



Babbage

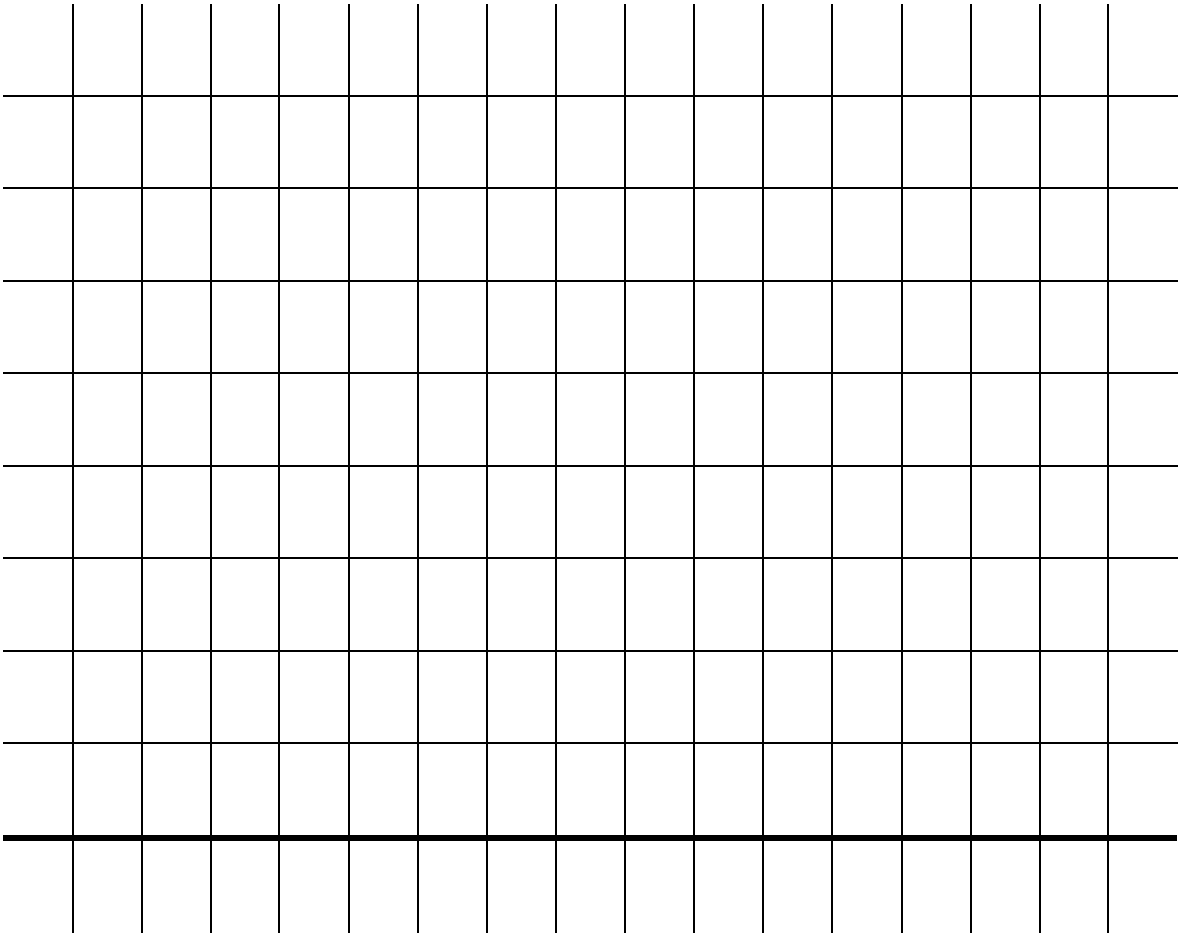
My Very Own Survey—Line Plot

Babbage and Galileo Groups

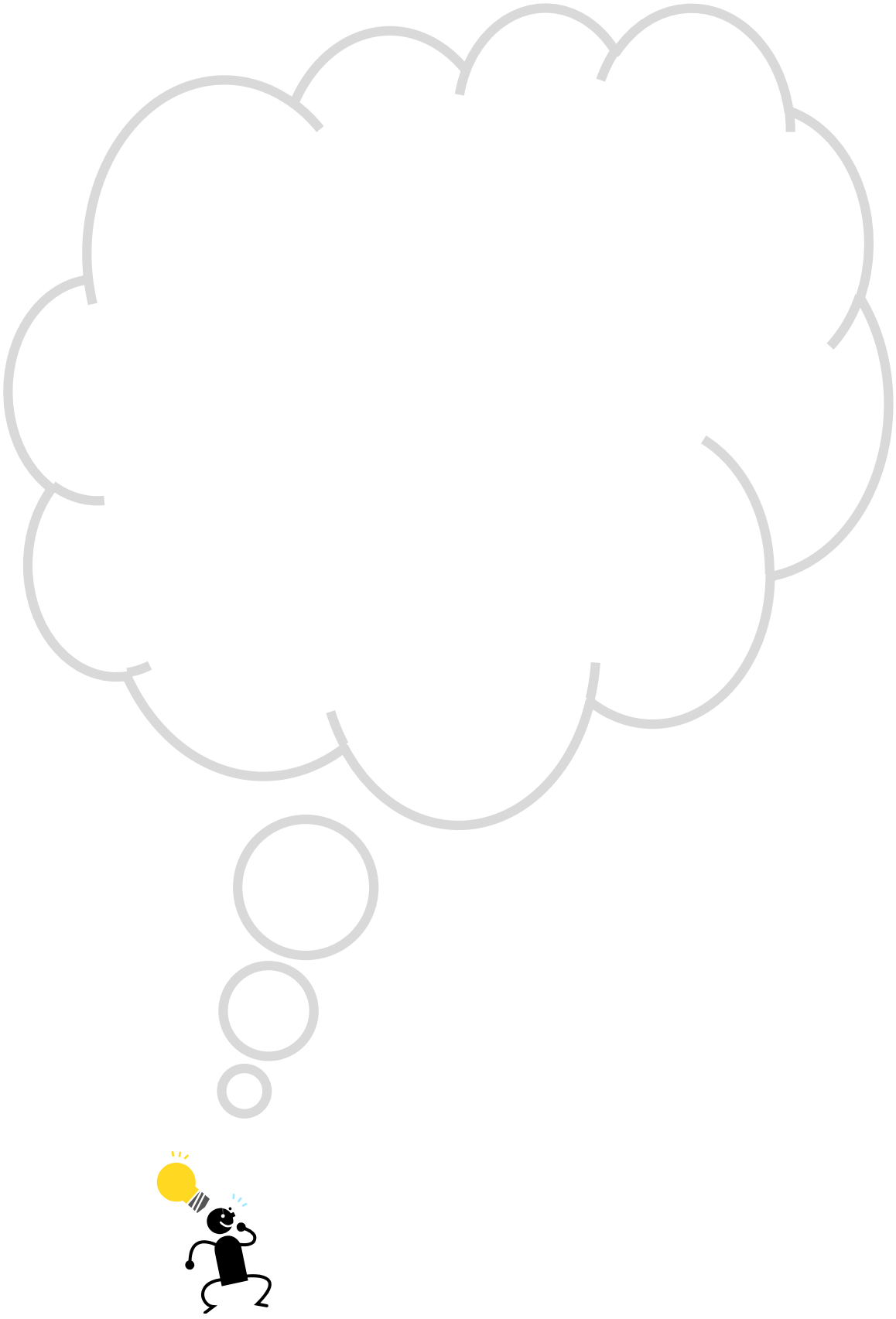
Minimum: _____ Maximum: _____

My Line Plot

Title: _____



Label: _____



Babbage

My Very Own Survey—Reflection

1. Mode: _____

2. Median: _____

3. What does your data tell you? Did most people respond in the same way?

_____

_____

4. Were there any outliers? Why or why not?

_____

_____

5. What do you think would happen if you used the same question and surveyed the whole school?

_____

_____

Galileo

My Very Own Survey

My Name: _____

My Very Own Question:

_____

_____

Frequency Table:

Answer	Student Count	Number of Students
0 - 2		
3 - 5		
6 - 8		
9 - 11		
12 - 14		
15 - 17		
18 - 20		
More than 20		

Galileo

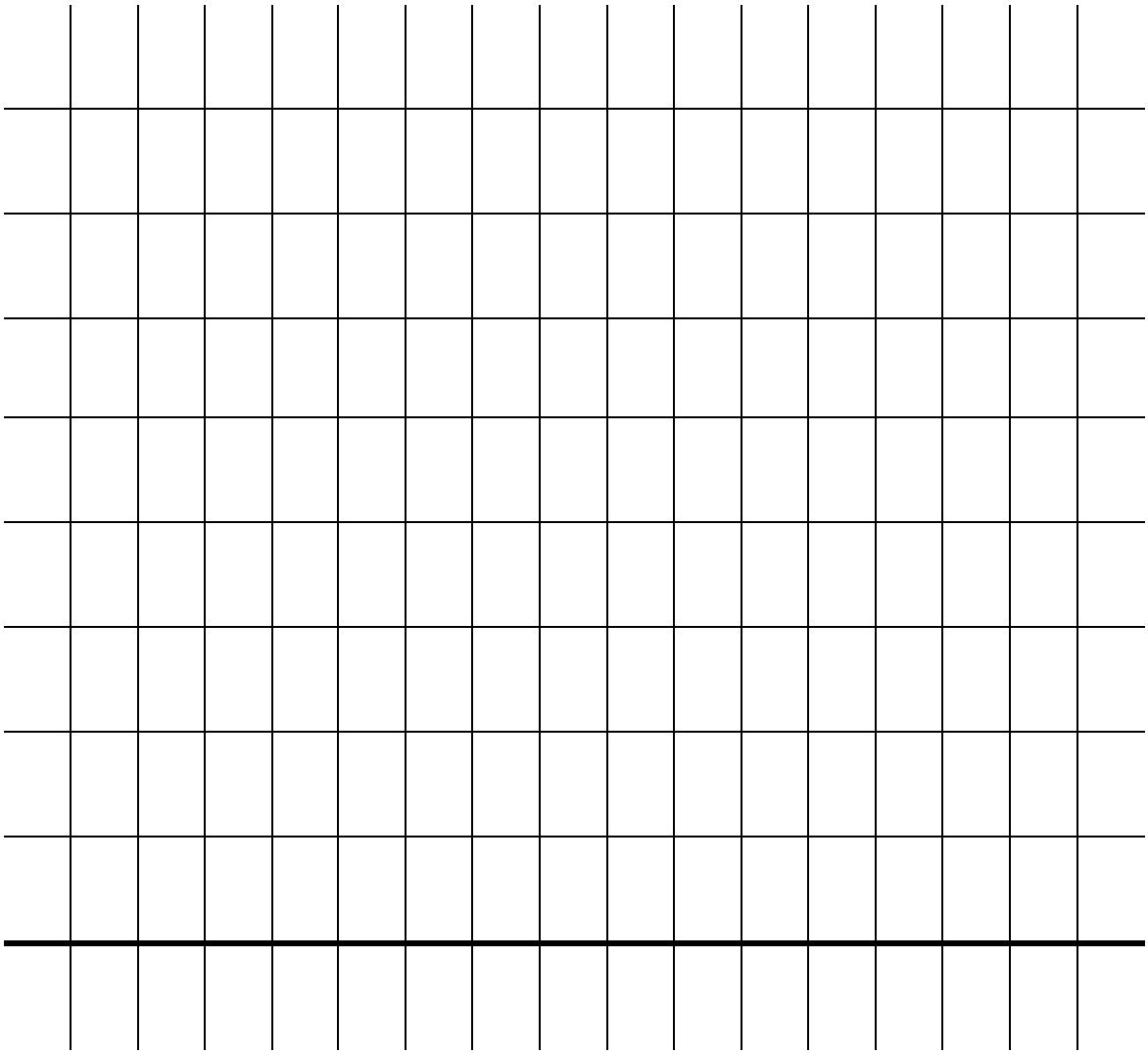
My Very Own Survey—Line Plot

Range That Contains the Minimum: _____

Range That Contains the Maximum: _____

My Line Plot

Title: _____



Label: _____

My Very Own Survey—Reflection

1. What was the most popular answer to your survey question? Explain how you can tell.

_____

_____

2. What does your data tell you? Did most people respond in the same way?

_____

_____

3. Were there any outliers?

_____

_____

4. What do you think would happen if you used the same question and surveyed the whole school?

_____

_____

Falconer

My Very Own Survey

My Name: _____

My Very Own Question:

_____

_____

Frequency Table:

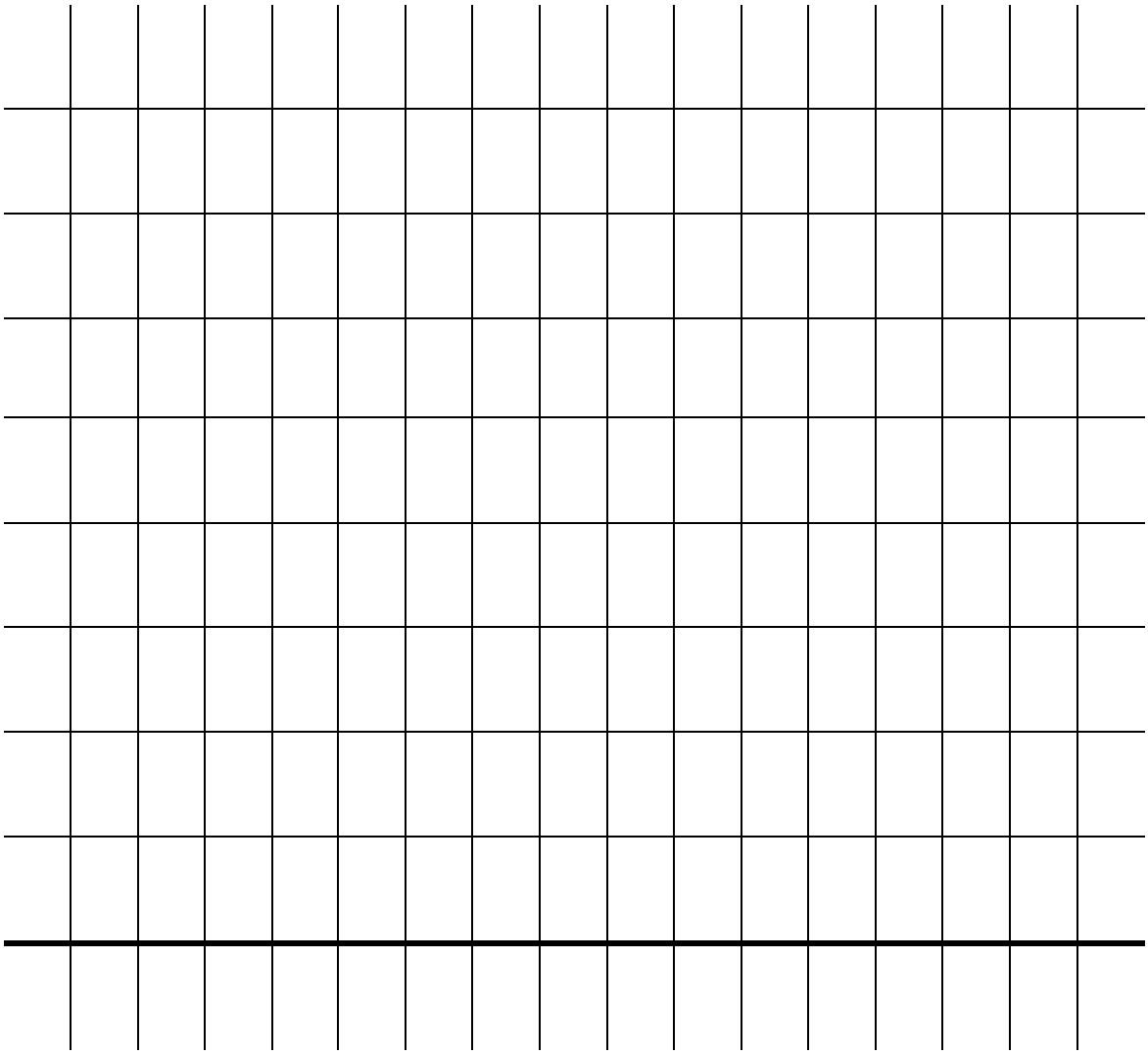
Answer	Student Count	Number of Students

Falconer

My Very Own Survey—Line Plot

My Line Plot

Title: _____



Label: _____

Falconer

My Very Own Survey—Reflection

1. What does your data tell you? Did most people respond in the same way?

_____

_____

2. Were there any outliers?

_____

_____

3. What do you think would happen if you used the same question and surveyed the whole school?

_____

_____

Babbage & Galileo

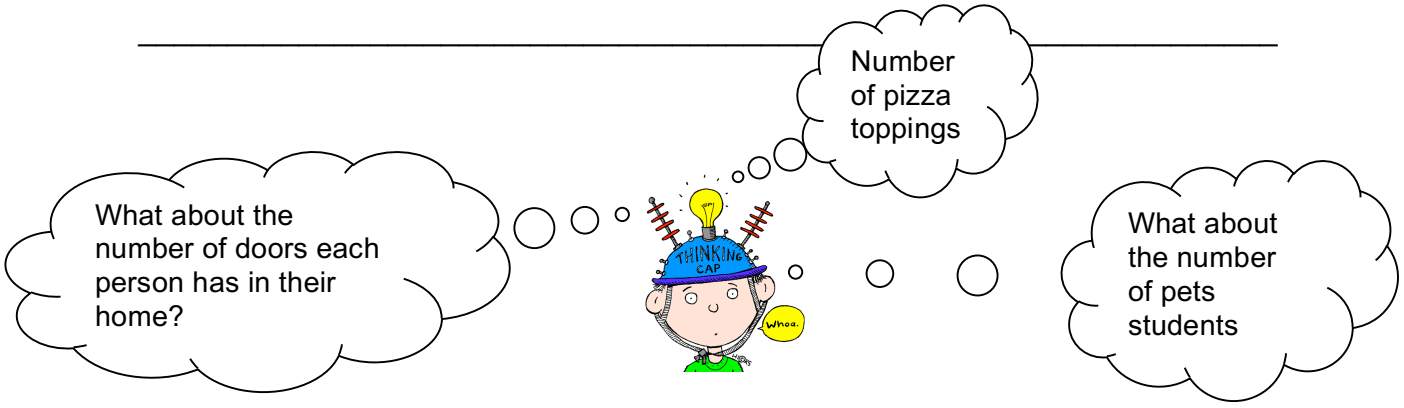
Name: _____ Date: _____

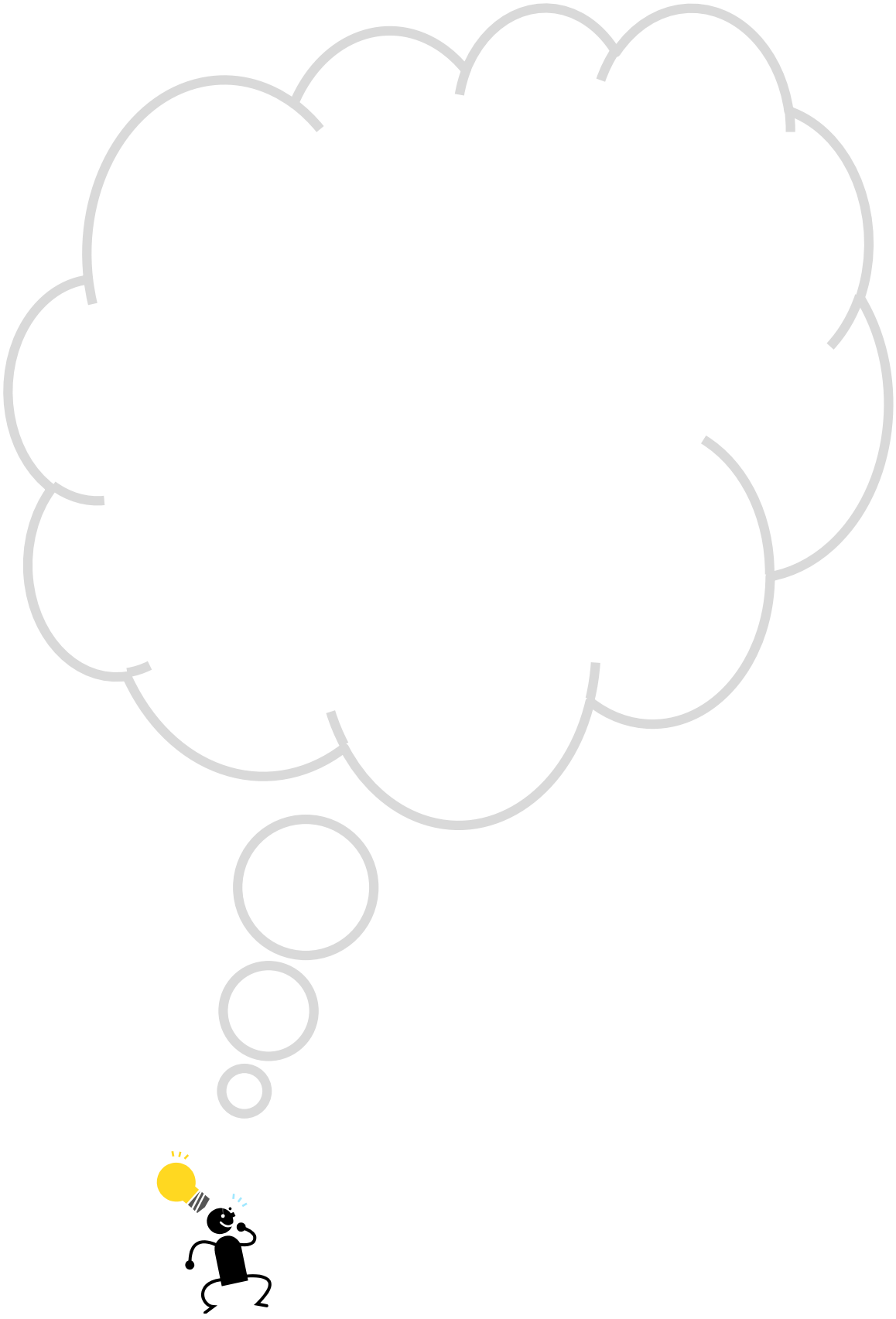
You Decide

				X			
	X			X			
	X		X	X			
	X	X	X	X			
	X	X	X	X	X		
X	X	X	X	X	X		X
3	4	5	6	7	8	9	10

Think of a story to go with the graph. Label the graph.

Explain this graph. Be sure to talk about the median and the mode.





Falconer

Name: _____ Date: _____

You Decide

Your job is to create a line plot that illustrates that information below. You will need to make up the data. There is not one right answer. Think about what the mode is. Then illustrate that. Then think about what the median is and change the graph to fit the median.

Mode: 4 Median: 7 Range: 3-10

3	4	5	6	7	8	9	10

Label: _____

Think of a story to go with the graph. Label the graph.

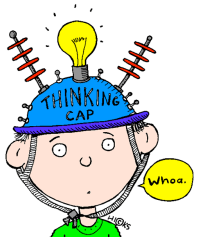
Explain your graph.

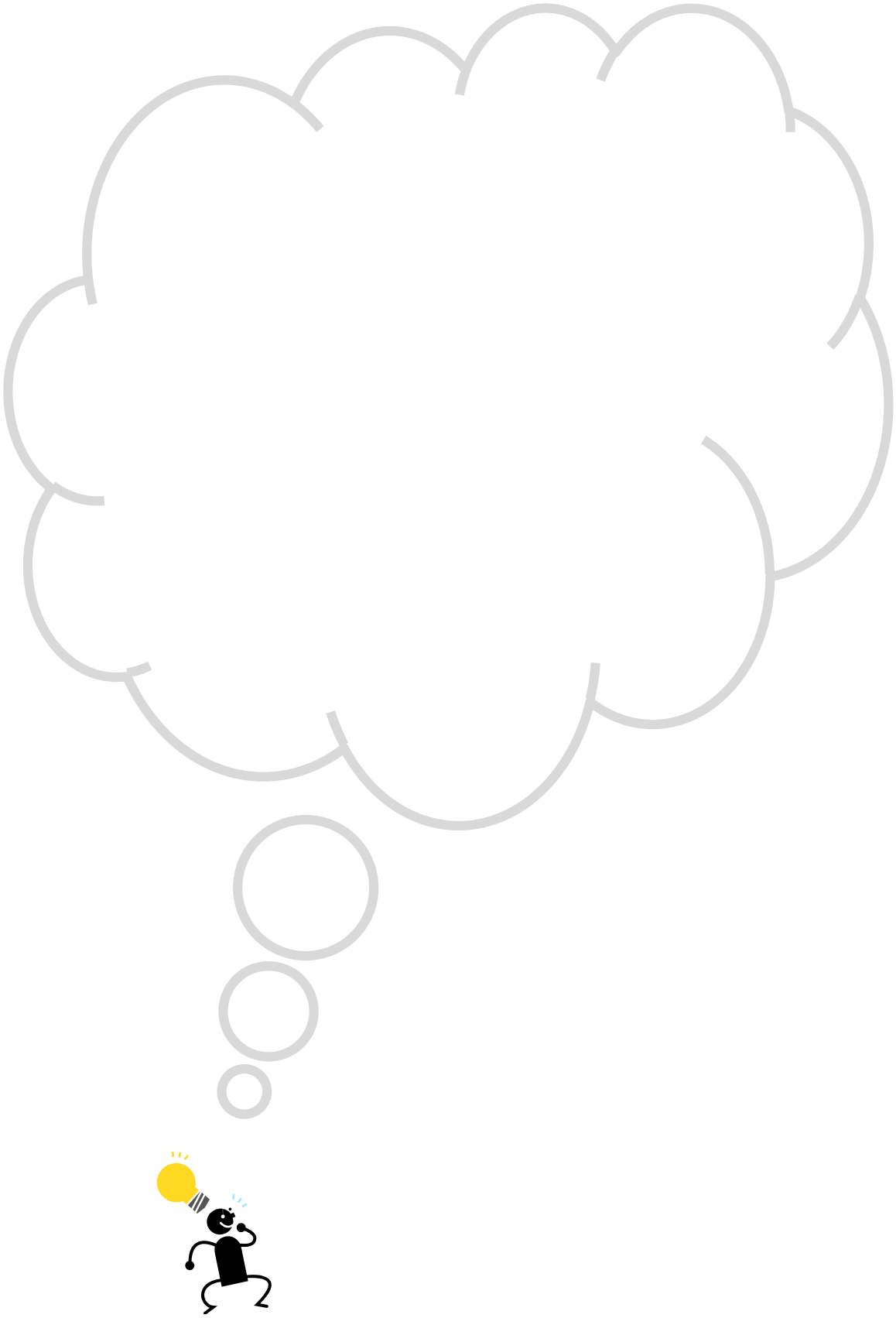
_____

_____

_____

_____





Name: _____

Greening Up Frequency Table

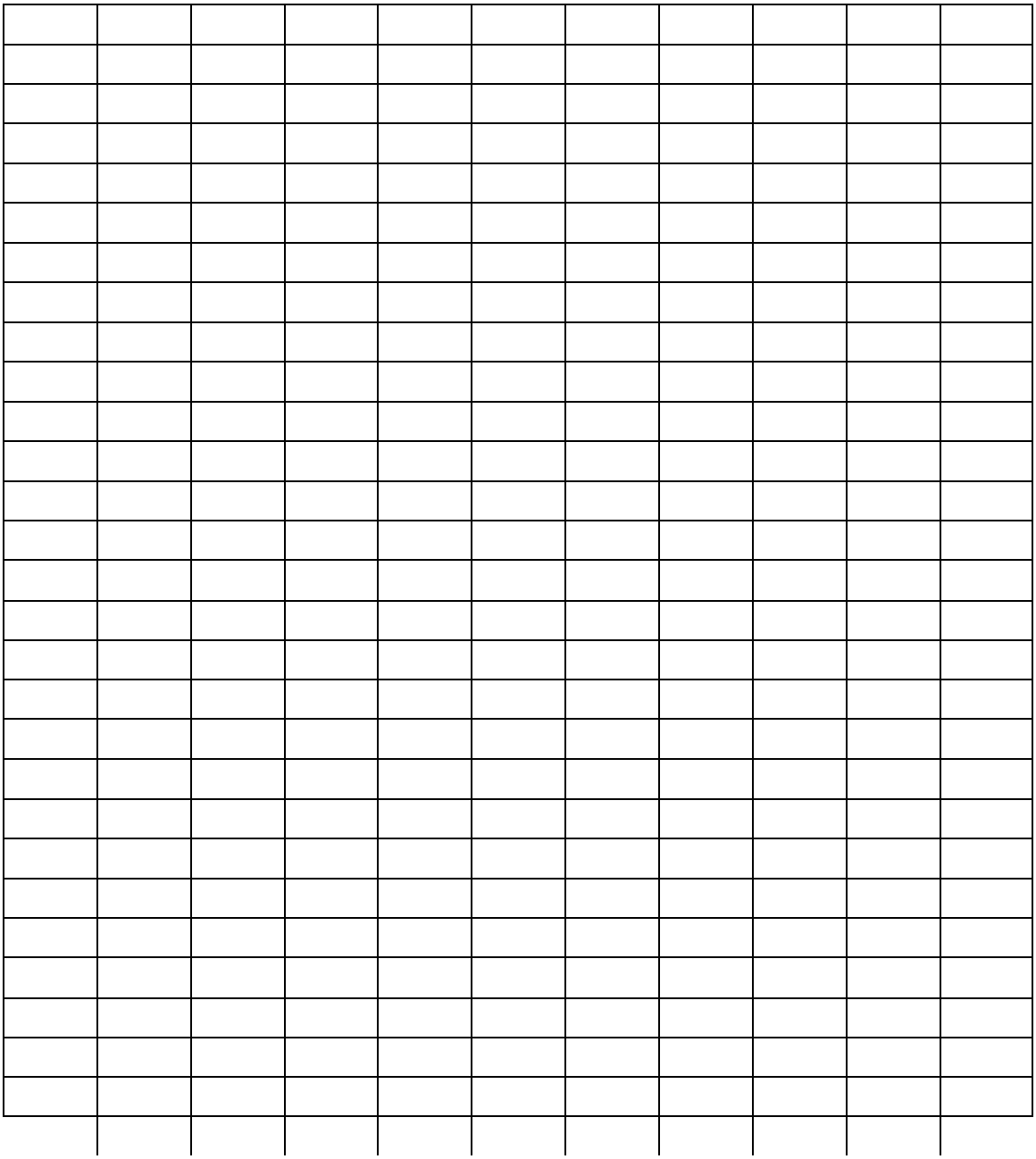
	People Who Used This Number of Greening Practices
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

Name: _____

Greening Up Line Plot

Directions: Create a line plot using the data in your table.

Title: _____



Babbage

Name: _____ Date: _____

Greening Up Conclusions

1. Use the data from the class survey to find the mode, range, and median.

   Mode: _____ Range: _____ Median: _____

2. Think about the number of different “greening up” practices on the survey. How many “greening up” practices were on the survey?

   _____

   _____

3. What if we only asked about 3 “greening up” practices? What might happen to the results?

   _____

   _____

4. How does the number of “greening up” practices on the survey affect the line plot?

   _____

   _____

Galileo

Name: _____ Date: _____

Greening Up Conclusions

1. Use the data from the class survey to find the mode, range, and median.

   Mode: _____ Range: _____ Median: _____

2. Think about the "greening up" practices on the survey. Were they the most common "greening up" practices?

   _____

   _____

3. How would the data change if you only used the unpopular "greening up" practices, like reusing a lampshade as a hat?

   _____

   _____

4. How does the popularity of the "greening up" practice affect the line plot?

   _____

   _____

Falconer

Name: _____ Date: _____

Greening Up Conclusions

1. Use the data from the class survey to find the mode, range, and median.

   Mode: _____ Range: _____ Median: _____

2. Think about the types of people the class surveyed. Who participated in the survey?

   _____

   _____

3. How would the data change if you only surveyed people who lived in the same house?

   _____

   _____

4. How does the type of people you survey affect the line plot?

   _____

   _____

Name: _____

Miss Numbers' Cookie Party

Miss Numbers loves numbers! She loves numbers so much that she wants to give a party and invite all of the numbers she knows. She wants to invite her friends **2, 4, 5, 1, and 9.**

However, she has to plan carefully to have enough food. Each number will eat the same number of cookies as it stands for, and so number **1** will eat **one** cookie, number **2** will eat **two** cookies, and so on. Help Miss Numbers plan her party by answering the questions below (Do your work on a separate piece of paper).

1. **HOW MANY** cookies in total will Miss Numbers need to buy to feed her guests? _____

2. What is the **MEDIAN** of all the cookies eaten? _____

3. What is the **MAXIMUM** number of cookies a guest will eat? _____

4. What is the **MINIMUM** number of cookies a guest will eat? _____

5. Is there a guest number that could be considered an **OUTLIER**? If so, which guest?_____

Now suppose the number 2 has a twin sister, and we'll call her 2b. She also eats 2 cookies.

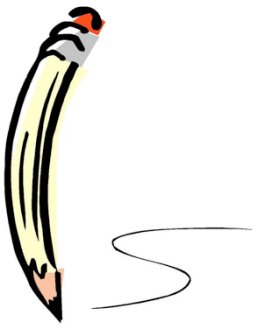
6. What is the **MODE** of all the cookies eaten? _____

Miss Numbers thanks you! Mmmm….cookies!

Name: _____ Date: _____

Crazy Circus Hats

Clara went to the circus and kept track of how many hats each person or animal was wearing. Help her out by completing the table with the totals.



	People/Animals Wearing this Number of Hats	Total
0	𝍸	
1	𝍸	
2	𝍸	
3	𝍸	
4		
5	𝍸	

Create a line plot using the information in the table.

0	1	2	3	4	5

1. What is the mode? _____ What is the median? _____

2. What does it mean when the mode and the median are different?

_____

_____

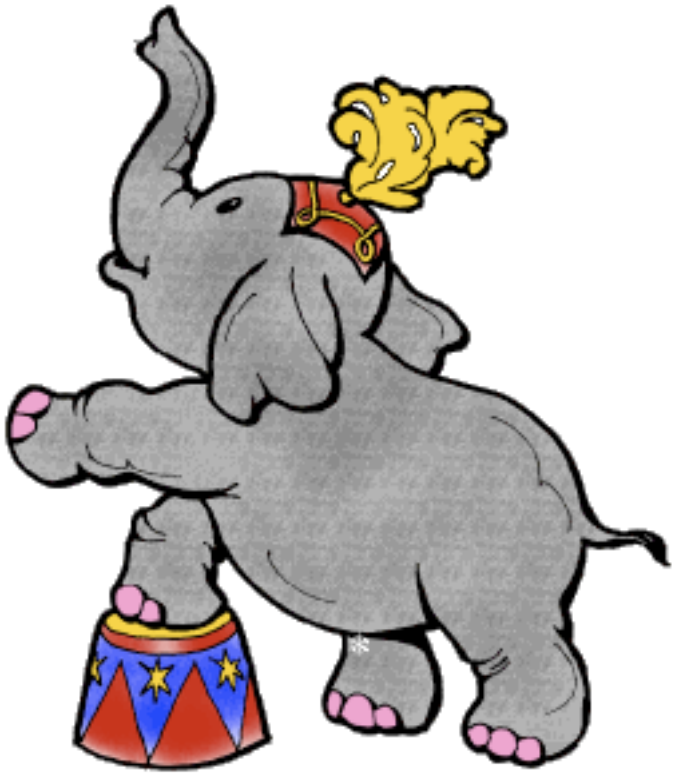
3. Jane wanted to join the circus. How many hats should she wear? Use the data from the line plot to explain your thoughts.

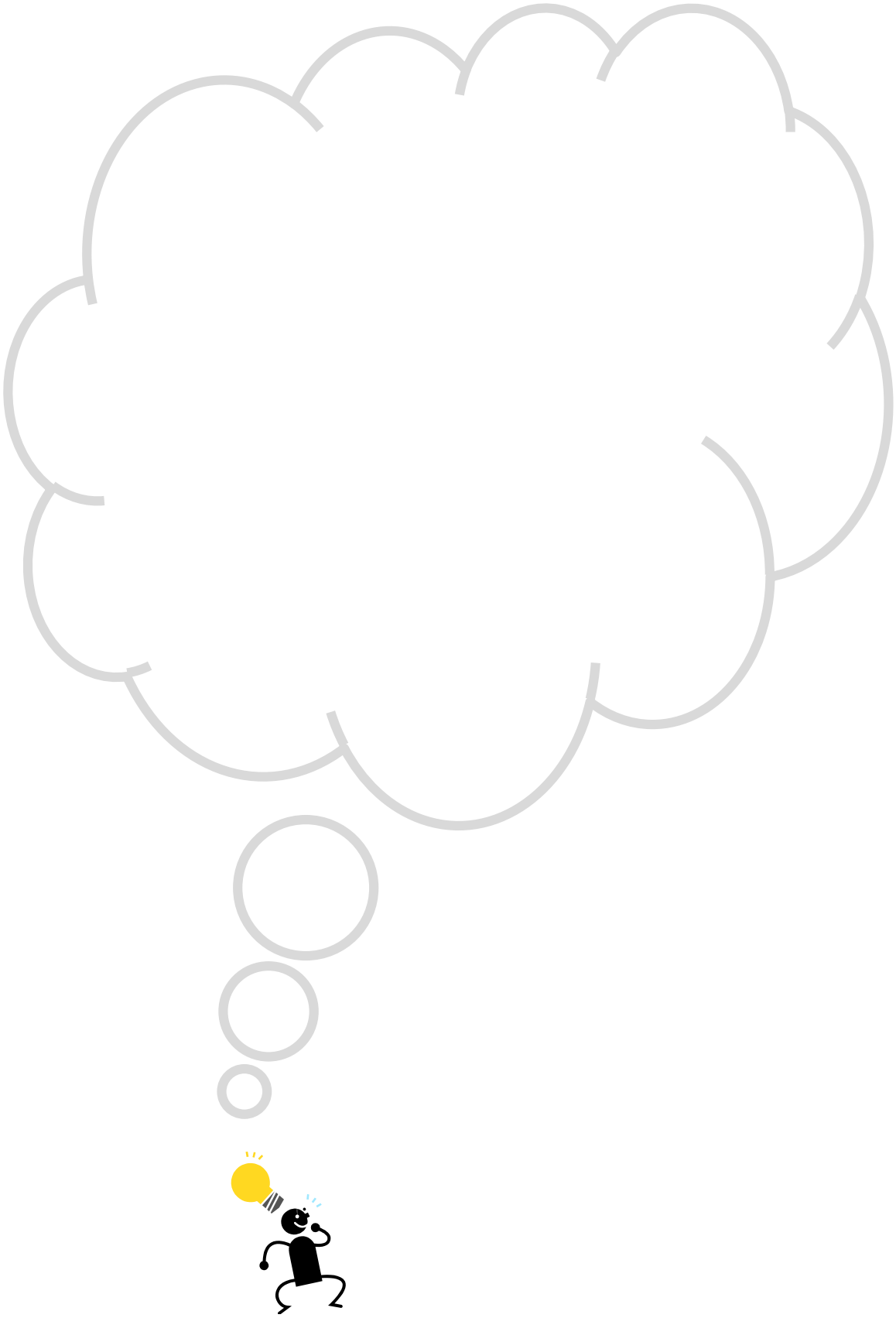
_____

_____

_____

_____





Name: _____ Date: _____

Curious Questions

Think about the survey data you collected. What other questions could you answer using these data?

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____

Greening Up Data Table 2

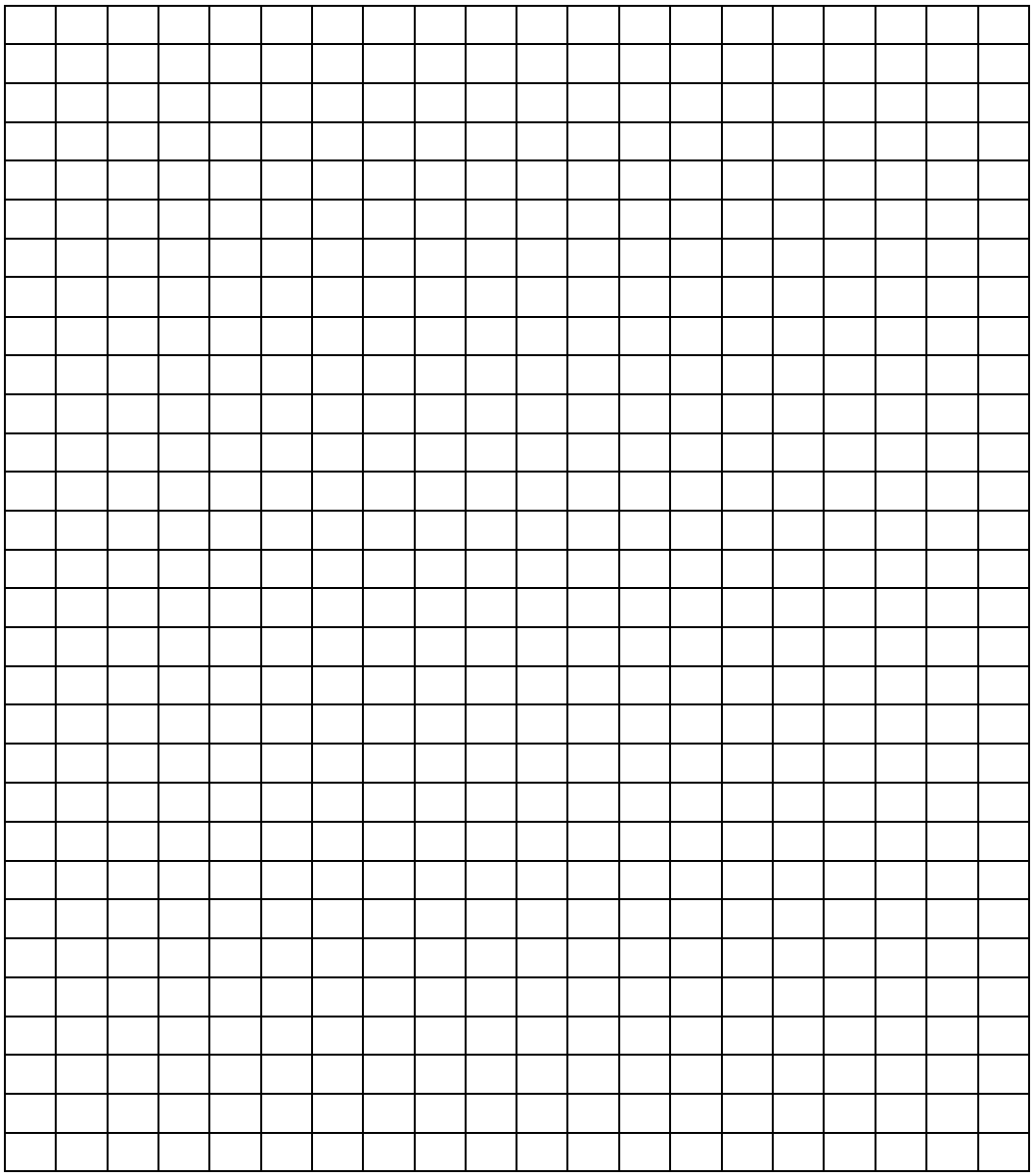
Question #	People Who Said "Yes"	Total
1		
2		
3		
4		
5		
6		
7		
8		
9		

Name: _____ Date: _____

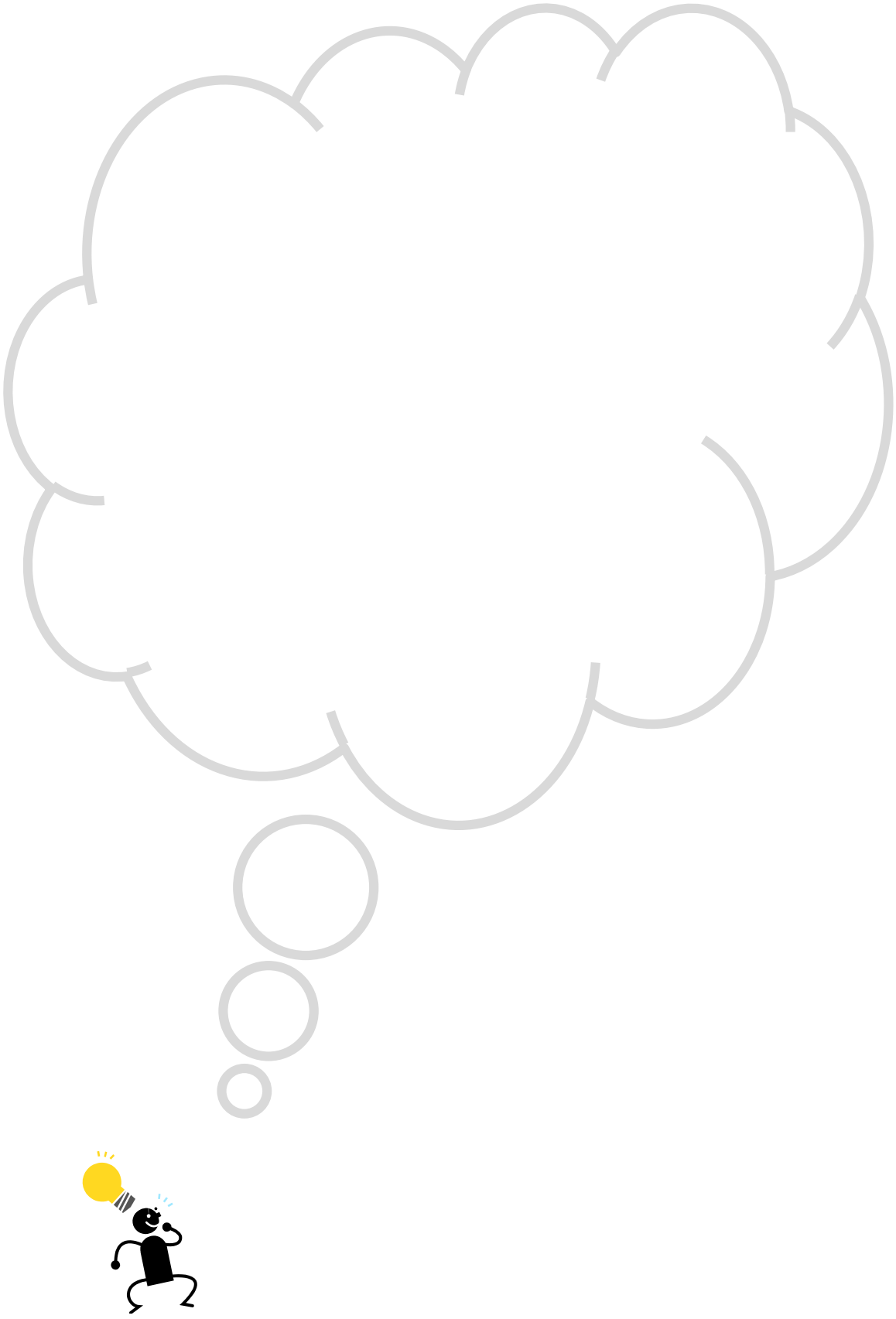
A New Greening Up Graph

Title: _____

Label: _____



Label: _____



Name: _____ Date: _____

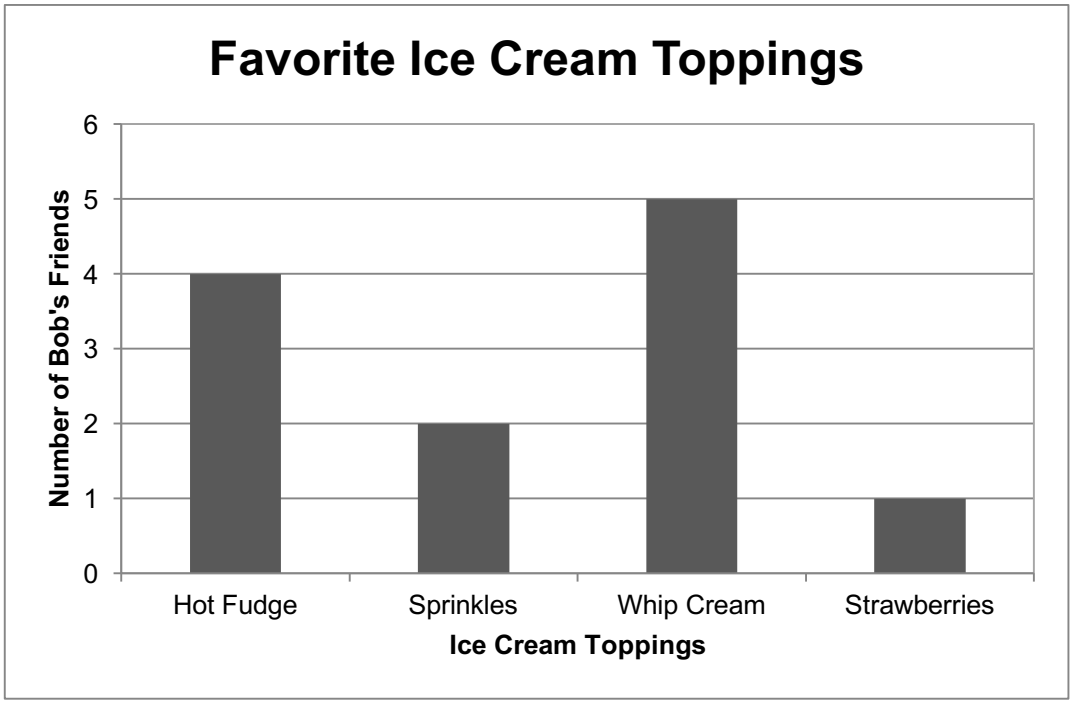
Ice Cream Party

Bob had an ice cream party to celebrate his birthday. The first game at Bob's party was to see who could eat their ice cream in the fewest bites. Because he loves graphing so much, he also had all of his friends record their favorite toppings.

Total Bites to Eat a Cup of Ice Cream

		X		
	X	X		
X	X	X	X	
X	X	X	X	X
18	19	20	21	22

Number of Bites



1. How many students came to Bob's party? Explain how you can tell from the line plot and the bar graph.

_____

_____

_____

_____

2. Who won the ice cream contest?

_____

_____

3. What is different about the two graphs?

_____

_____

4. Bob decided next year he would see how many bites it took to eat a piece of pizza. What would the line plot of that look like?

5. Compare your pizza line plot to the ice cream line plot.

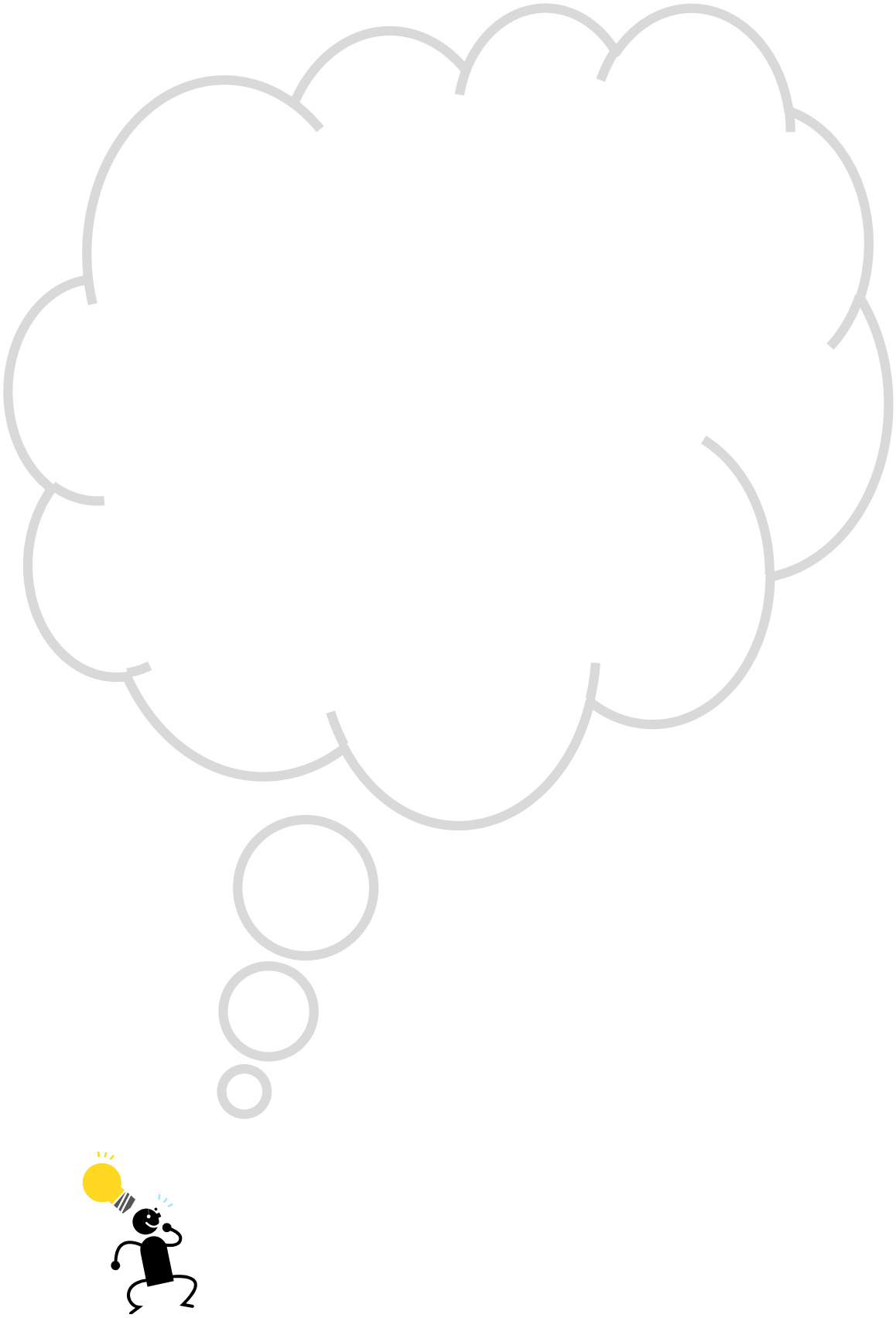
_____

_____

_____

_____

Optional: How many ice cream bites did all the friends take? _____



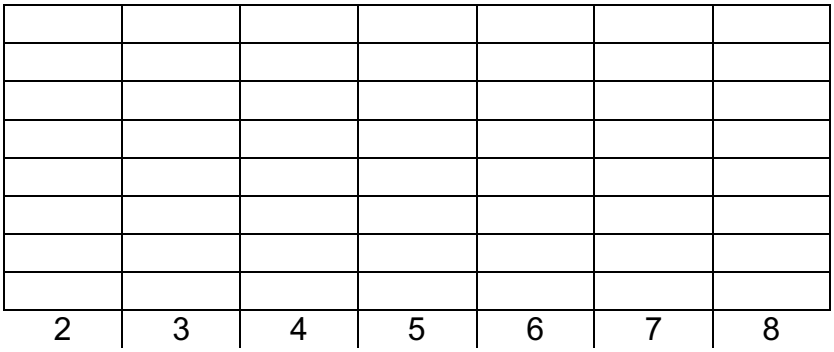
Name: _____ Date: _____

Check Up #3

1. Mr. Robinson's math class surveyed 10 students in their school. They asked them how many books they read last month. Here are their answers:

   7 2 6 8 7 5 7 6 5 7

   Make a line plot that shows these data. (Don't forget to label!)



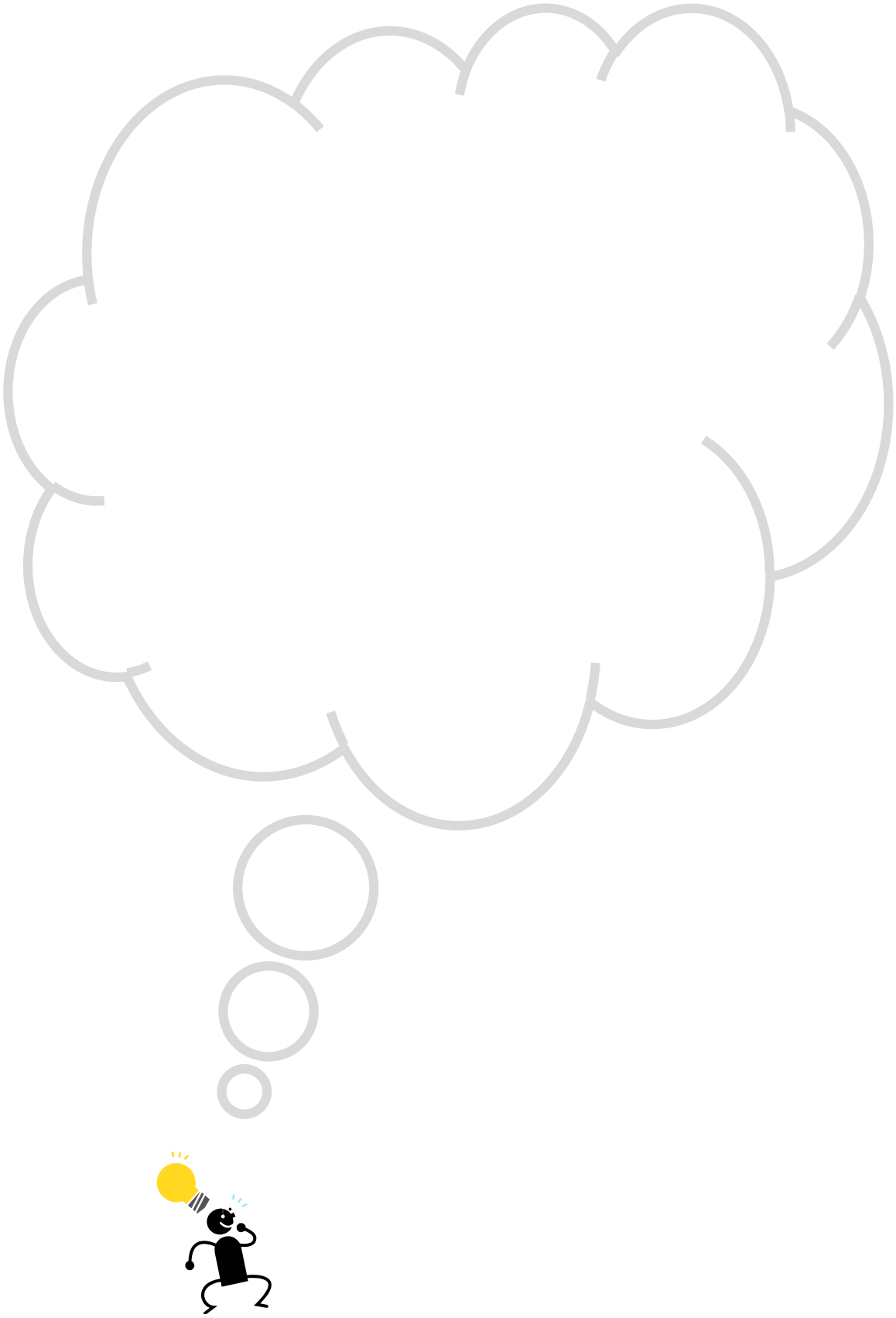
2. What is the mode of these data? _____
3. What is the median? _____
4. What is the maximum? _____
5. What is the minimum? _____
6. The principal wants to know if most students are reading at least 6 books. What would you tell her? Use data from the line plot.

   _____

   _____

   _____

   _____



7. The closest estimate for $4.78 + $1.13 is ___.

   A. $4
   B. $5
   C. $6
   D. $7

8. 75 - 28 =

9. 696
   + 302

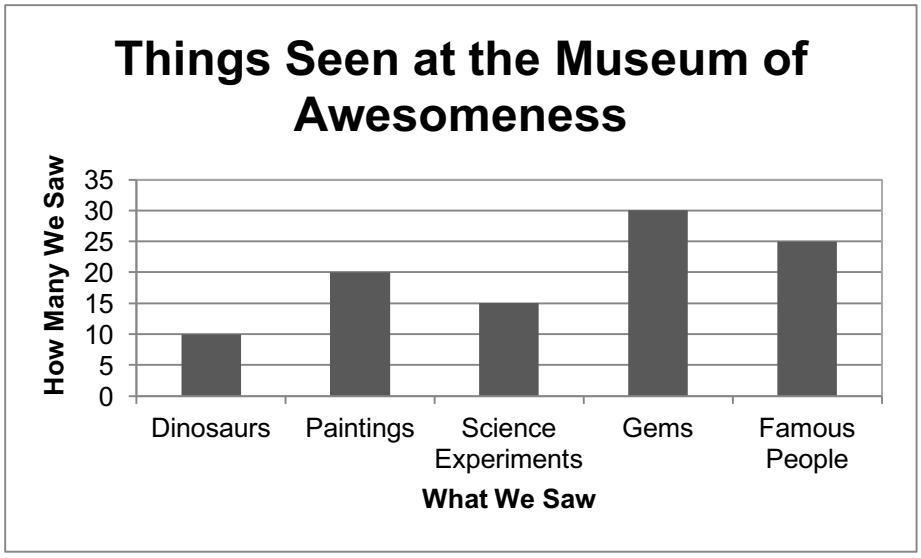
10. 6,086 - 45 =

Name: _____ Date: _____

Museum Madness

All the Sunny Elementary students went to the Museum of Awesomeness. Caleb and Kobe decided to create graphs of their trip. They both saw the same things at the museum.

Caleb made this bar graph.

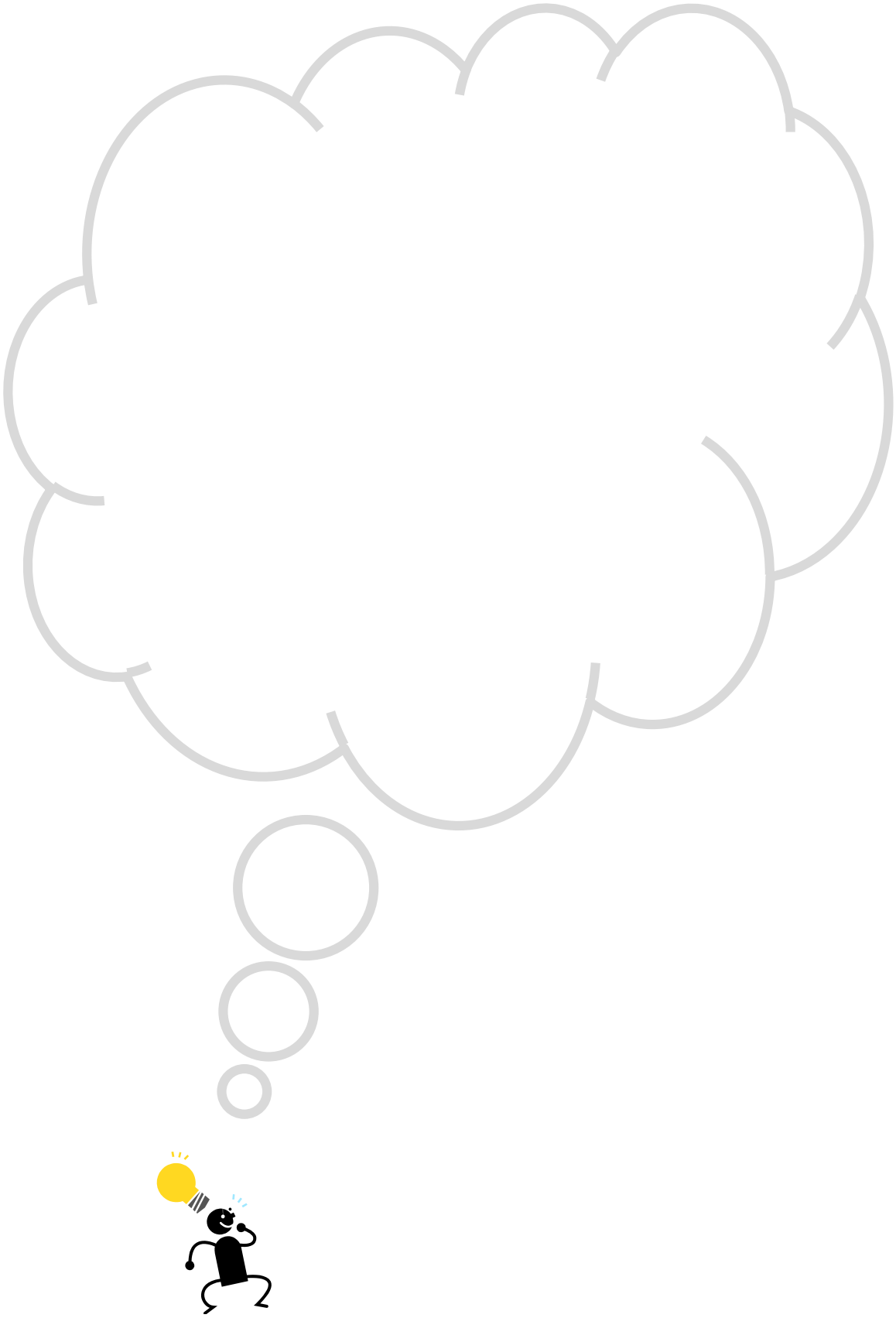


Kobe made this pictograph.

Things Seen at the Museum of Awesomeness	
What We Saw	How Many We Saw
Dinosaurs	
Paintings	
Science Experiments	
Gems	
Famous People	

Kobe forgot to include a key for his pictograph. Create a key to go with Kobe's pictograph.

 = _____



Sara wanted to make her own pictograph of her trip to the museum. Here is a table of what she saw.

Sara's Trip to the Museum of Awesomeness	
What She Saw	How Many She Saw
Pyramids	8
Dinosaurs	24
Dresses	12

She does not want to use <u>part of</u> a picture to represent what she saw. Could this be her key? Explain.

 = 3 Items

_____

_____

_____

_____

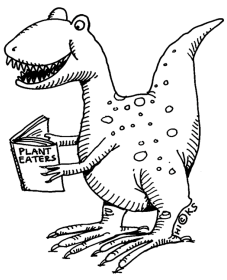
Give Sara two suggestions for her key. Explain why your ideas would keep her from having to use part of a picture.

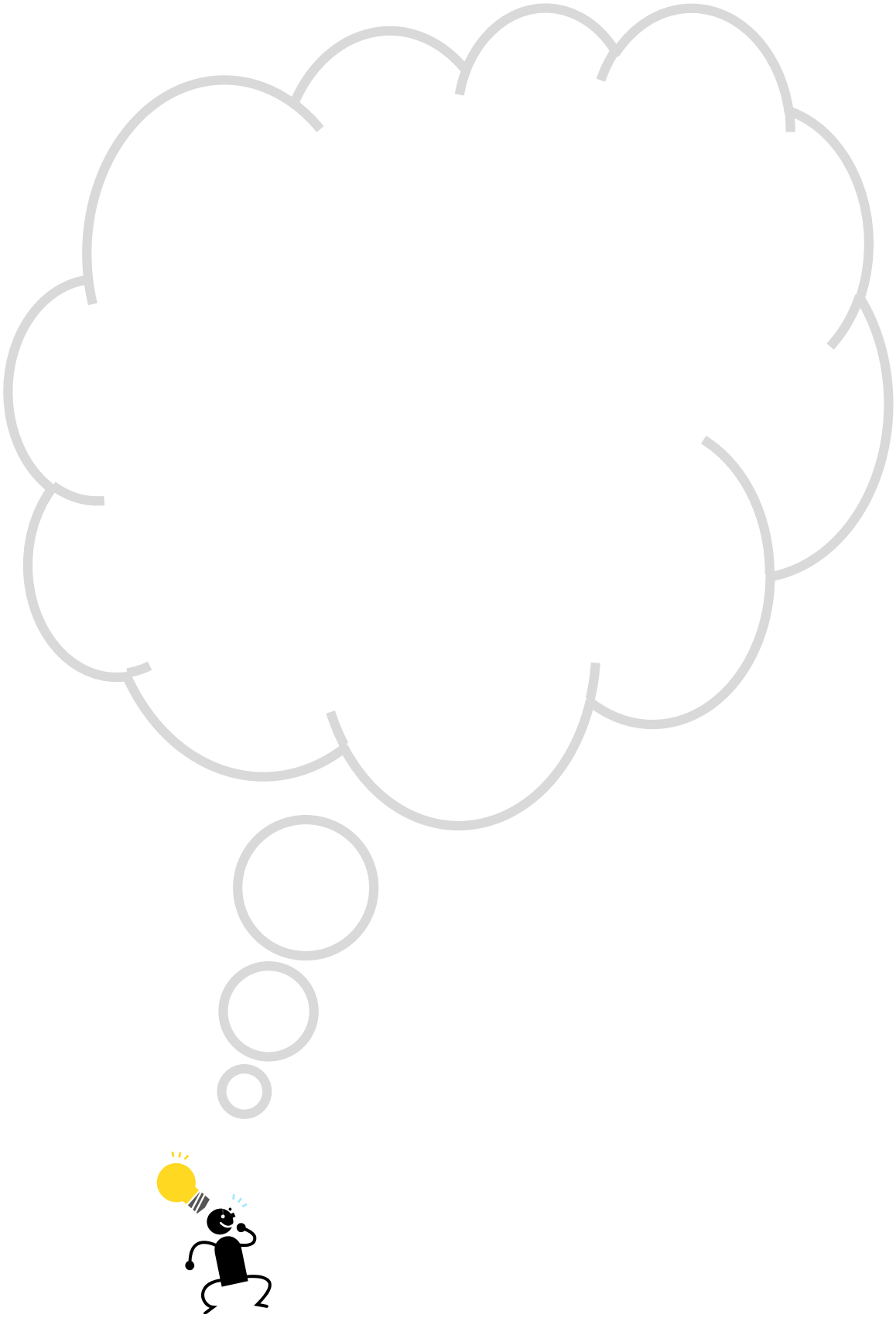
_____

_____

_____

_____





Appendix
States and Their Capitals

State	Capital		State	Capital
1. Alabama	Montgomery		26. Montana	Helena
2. Alaska	Juneau		27. Nebraska	Lincoln
3. Arizona	Phoenix		28. Nevada	Carson City
4. Arkansas	Little Rock		29. New Hampshire	Concord
5. California	Sacramento		30. New Jersey	Trenton
6. Colorado	Denver		31. New Mexico	Santa Fe
7. Connecticut	Hartford		32. New York	Albany
8. Delaware	Dover		33. North Carolina	Raleigh
9. Florida	Tallahassee		34. North Dakota	Bismarck
10. Georgia	Atlanta		35. Ohio	Columbus
11. Hawaii	Honolulu		36. Oklahoma	Oklahoma City
12. Idaho	Boise		37. Oregon	Salem
13. Illinois	Springfield		38. Pennsylvania	Harrisburg
14. Indiana	Indianapolis		39. Rhode Island	Providence
15. Iowa	Des Moines		40. South Carolina	Columbia
16. Kansas	Topeka		41. South Dakota	Pierre
17. Kentucky	Frankfort		42. Tennessee	Nashville
18. Louisiana	Baton Rouge		43. Texas	Austin
19. Maine	Augusta		44. Utah	Salt Lake City
20. Maryland	Annapolis		45. Vermont	Montpelier
21. Massachusetts	Boston		46. Virginia	Richmond
22. Michigan	Lansing		47. Washington	Olympia
23. Minnesota	St. Paul		48. West Virginia	Charleston
24. Mississippi	Jackson		49. Wisconsin	Madison
25. Missouri	Jefferson City		50. Wyoming	Cheyenne

Greening Up With Graphing Mathematical Language

Bar graph: A graph that uses bars to display quantities of categorical data.

Baseline: The data collected before the intervention.

Categorical Data: Data that can be organized in groups (ex: types of food, eye color, book genre).

Category: A set of things grouped together because they share a common trait.

Column: The vertical, or up and down, display on a graph that represents numbers.

Conclusion: A supported answer to a question in an experiment.

Data: Information such as numbers that researchers gather during an experiment (see website: amath'sdictionaryforkids.com).

Data Collection: The process of collecting information and writing it down.

Data Set: Information that is organized to answer a research question.

Data Table: A way for researchers to organize their data.

Experiment: A test, trial, or procedure to discover something new or test an idea.

Fair Share: Distributing a group of objects so that each person receives an equal number.

Frequency: The number of times a particular item appears in a set of data.

Frequency Table: A table that is used to count and total data for different categories.

Horizontal Axis (*x*-axis): The line on a graph that runs from left to right.

Hypothesis: What you think will happen in an experiment, based on facts and your ideas.

Intervention: The process of changing something to determine if you can affect the outcome.

Line Graph: A graph that shows how data changes over time.

Line Plot: A graph that shows the frequency of data on a number line.

Maximum: The largest value in a data set.

Median: The middle value in a data set when data is presented in numerical order.

Minimum: The smallest value in a data set.

Mode: The number that appears most frequently in a set of numbers.

Outlier: An extreme value in a data set.

Question: What you want to know in an experiment.

Range: The minimum to maximum values in a data set (ex: 2 to 6).

Recycle: To create new products from waste materials.

Reduce: To decrease the amount of waste that you produce.

Reuse: To use again, sometimes for a different purpose.

Scale: A series of marks along the axes to determine unit lengths; a scale could vary by 1 unit, 2 units, 10 units, ½ units, and so forth.

Sort: To arrange objects by something they have in common.

Spreadsheet: A table used in computer programs to organize data in rows and columns.

Survey: A list of questions presented to people to gather information from them.

Tally: To count using some type of mark.

Unit: One of an item.

Vertical Axis (*y*-axis): The line on a graph that runs vertically up and down.

The National Research Center on the Gifted and Talented

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