Investigating Mass vs. Number

Draw

✓ Check-In: Questions 1–2

1. Draw a picture of what you are going to do in this experiment. Label the variables in your picture.

Collect

2. You will mass ten objects that look the same. Discuss with your class the values of *N* you will put in the table. Make your measurements and record your data in the table.

Mass vs. Number

N **Number of** _____	*M* **Mass (in _____)** *unit*
1	
2	
3	
4	
6	
10	

3. Look for patterns in the data table.

    A. What patterns do you see if you look down the column?

    B. What patterns do you see if you look across the rows?
       (Hint: Use friendly numbers.)

4. If you triple the number of objects, what happens to the mass?
Show or tell how you found your answer.

5. If the number of objects goes up by 2, does the mass go up by two grams?
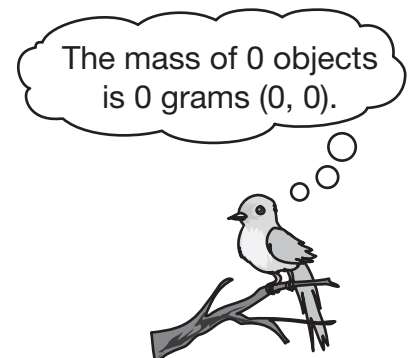Explain what happens.

Graph

Check-In: Question 6

6. Use a piece of *Centimeter Graph Paper* to make a point graph.
- Put Number of _____ (*N*) on the horizontal axis.
- Put Mass in Grams (*M*) on the vertical axis.
- Remember to title the graph, number the axes, and include units.
- Be sure to start numbering with 0.

The mass of 0 objects
is 0 grams (0, 0).

Name _____ Date _____

Use your Mass vs. Number graph and data table to answer the following questions.

7. Think about the patterns you see in your data points. Which of the following looks most like your graph? Circle A, B, or C.

A ⟋   B ⟍   C ⟋
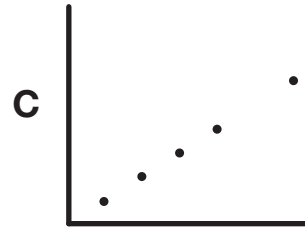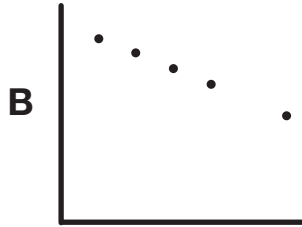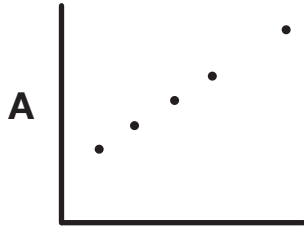
8. Use a ruler to draw a **best-fit line** for your data points. Since 0 objects have 0 mass, remember to start the line at 0, 0.

Explore

9. **A.** Predict the mass of five of your objects using the pattern in your graph.

   B. Check your prediction by measuring the mass of five of your objects. What is the actual mass?

   C. Was your prediction close? _____
   Explain why you think this.

10. Find another way to predict the mass of five objects. (Do not use your graph.) Show your work. Is this new prediction better, worse, or about the same?

11. A. Predict the mass of seven of your objects. Record your prediction and explain how you made it.

B. Check your prediction by massing seven of your objects. What is the actual mass? Was your prediction close? Explain why you think this.

12. A. Use your data table to predict the mass of $5\frac{1}{2}$ of your objects. Tell how you used the data table.

B. Show or tell how to check your prediction with your graph. Is your prediction reasonable?

13. A. Predict about how many of your objects you will need to get a total mass of 100 g. Show how you made your prediction.

B. Check your prediction another way. Show your work.

14. If you know the number of objects, explain two ways to find the total mass. You may use words, pictures, your data table, your graph, or number sentences in your answer.

Name _____ Date _____

Investigating Mass vs. Number Feedback Box	Expectation	Check In	Comments
Represent the variables and procedures of an investigation in a drawing. [Q# 1]	E8		
• Identify and label the variables as Number of Objects (*N*) and Mass (in grams) (*M*).			
• Show the procedure: measuring the mass of identical objects, and using a two-pan balance and standard masses.			
Measure mass in grams. [Q# 2]	E6		
• Level the two-pan balance properly.			
• Balance the two pans as closely as possible.			
• Add the standard masses correctly.			
• Measure the common object within an appropriate range.			
Collect and organize data in a table. [Q# 2]	E7		
Make a point graph using ordered pairs and draw a best-fit line. [Q# 6]	E9		
• Transfer information in the data table to a graph and plot points.			
• Label and number the axes.			
• Title the graph.			
• Draw a straight line with a ruler with as many data points above it as below.			
• Include the (0,0) point in the best-fit line.			