LETTER HOME

Using Patterns

Dear Family Member:

Your child will look for patterns in data and use these patterns to make predictions in a variety of ways. To prepare for later work with algebra, students will write rules for these patterns. Two experiments will set the stage for much of the unit's work. During the *Volume vs. Number* lab, students will use patterns to predict the volume of a given number of marbles. During the *Sandwich Mass* lab, students will use graphs and tables to predict the number of bites it takes to eat a sandwich.

As an extension of the volume investigation, students will also look at patterns represented in tables to convert one unit of measure to another, for example, milliliters to liters or inches to feet.

Students write rules for number patterns created by "function machines." Your child will use machines such as the "doubler" to predict what happens when a number is entered into the machine. For example, the "doubler" will multiply a number by two (2 x N).
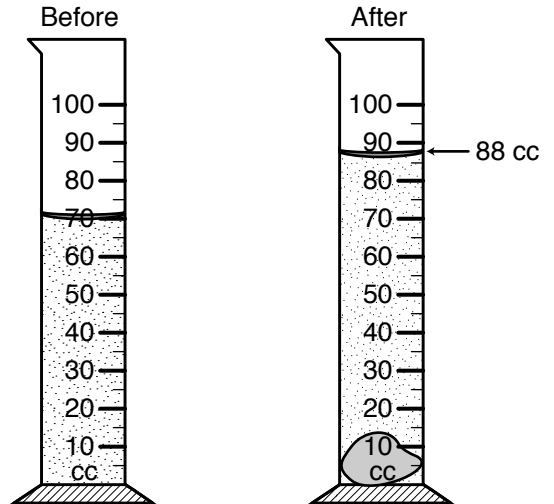
To help your child at home:

Measure Volume. Ask your child to explain the pictures. The picture on the left shows a graduated cylinder with water in it. The picture on the right shows the same graduated cylinder after a lump of clay has been added. Why is the water level higher in the picture on the right? What is the volume of the clay?

Compare Units. Encourage your child to explore units used to measure volume. For example, find the number of cups in a gallon by filling a measuring cup with water and using it to fill an empty gallon container.

Send a Sandwich. Please have your child bring a sandwich to school when we begin the *Sandwich Mass* lab.

Students learn about measuring volume with graduated cylinders.

Play Guess My Rule. One player is the Function Machine and chooses a rule but does not share the rule with the other players. The other players, the Guessers, try to guess the rule by giving an input. The Function Machine player responds with a corresponding output. This is repeated until the Guessers figure out the rule for the Function Machine. Directions are in Unit 5 Lesson 6 in the *Student Guide.*

If the input is 4…

…the output is 8.

Roberto — Guesser

Jerome — Function Machine

Input	Output
3	6
4	8
5	10
100	200
n	$n \times 2$

What is the rule? (Multiply the input number by 2.)

Sincerely,

Unit 13: Home Practice

Part 1 Practicing the Operations

Solve the following problems using paper and pencil or mental math. Estimate to make sure your answers are reasonable.

1. **A.** $546 + 89 =$ **B.** $3438 - 723 =$

     C. $2905 + 376 =$ **D.** $79 \times 5 =$

     E. $2306 \times 8 =$ **F.** $347 \div 5 =$

     G. $62 \times 40 =$ **H.** $5073 - 782 =$

     I. $9540 \div 6 =$ **J.** $504 \div 9 =$

     K. $1789 + 4532 =$ **L.** $6730 - 762 =$

     M. $29 \times 44 =$ **N.** $4003 \div 7 =$

2. Show or tell how you know your answer is reasonable for Question 1F.

Part 2 Telling Time

1. What time is it? _____

2. What time will it be in 3 hours? _____

3. What time was it 45 minutes ago? _____

4. What time will it be in $1\frac{1}{2}$ hours? _____

5. What time was it 90 minutes ago? _____

6. Jacob's grandmother is coming to Chicago for a visit. Her plane takes off in Florida at 11:30 A.M. It will take her about 45 minutes to get to the airport. If she wants to arrive at the airport about $1\frac{1}{2}$ hours before take-off, what time should she leave her home?

7. Irma's brother is in high school. He has four 55-minute classes before lunch. If his first class starts at 8:05 and there are 5 minutes between each class, what time is his lunch period? Show how you decided.

8. If one year is 365 days, about how many days old will you be when you are 15 years old?

Part 3 Solving Problems

Choose an appropriate method to solve each of the following problems. For some questions, you may need to find an exact answer, while for other questions you may need only an estimate. For each question, you may choose to use paper and pencil, mental math, or a calculator. Be prepared to tell the class how you solved each problem.

1. Nila has $585 in her savings account. On her birthday, she deposits $75 that she got for birthday gifts. How much money is in her savings account after her birthday?

2. Jackie and her family are taking a 32-mile ferry ride to an island in Lake Michigan. A round-trip ferry ride ticket costs $29 per adult and $15 per child. If 4 adults and 3 children purchase tickets, how much will the ferry ride cost the entire family?

3. John's older brother is in college. His brother and his three roommates want to buy furniture that costs $764. If they split the cost of the furniture evenly, how much should each student pay?

4. Ming built a house of cards. Before the house came tumbling down, he used 2 full decks of cards. The house also contained all but 15 cards from a third deck. About how many cards were in Ming's house of cards? (A deck of cards has 52 cards.)

5. On vacation, Shannon's family took 3 rolls of 24 pictures and 2 rolls of 36 pictures. How many pictures did the family take in all?

6. Roberto is driving with his family to visit his grandmother. After driving 144 miles from Chicago, the family stops for lunch. They drive 89 more miles and stop for gas. Then, they stop for a soft drink after driving 123 more miles. Roberto's grandma lives 375 miles from Chicago. About how many more miles must they drive before they reach their grandmother's house?

Part 4 Multiples of 1O and 1OO

Solve each pair of related number sentences.

1. $4 \times 80 =$ $320 \div 4 =$

2. $40 \times 6 =$ $240 \div 40 =$

3. $70 \times 4 =$ $280 \div 70 =$

4. $60 \times 7 =$ $420 \div 7 =$

5. $8 \times 70 =$ $560 \div 70 =$

6. $80 \times 60 =$ $4800 \div 80 =$

Part 5 Number Relationships

1. **A.** Is 51 prime? Tell how you know.

   B. Is 53 prime? Tell how you know.

   C. Is 55 prime? Tell how you know.

2. **A.** Is 6 a factor of 96? How can you tell?

   B. Is 6 a factor of 116? How can you tell?

3. Make a factor tree to find the prime factors of 54.

Part 6 **Function Machines**

1. Complete each function table. Use the rules in the second column.

A.

Input	Output
N	**8 × N − 4**
1	4
3	
5	
7	
9	
11	

B.

Input	Output
N	**50 − N × 2**
2	46
4	
6	
8	
10	
12	

C.

Input	Output
N	**7 × N + 2**
4	
6	
8	
	72

D.

Input	Output
N	**9 × N**
5	
	63
	72
	90

2. Find the rule for each function table. Write the rule in the second column. Then, find the missing numbers in each of the tables.
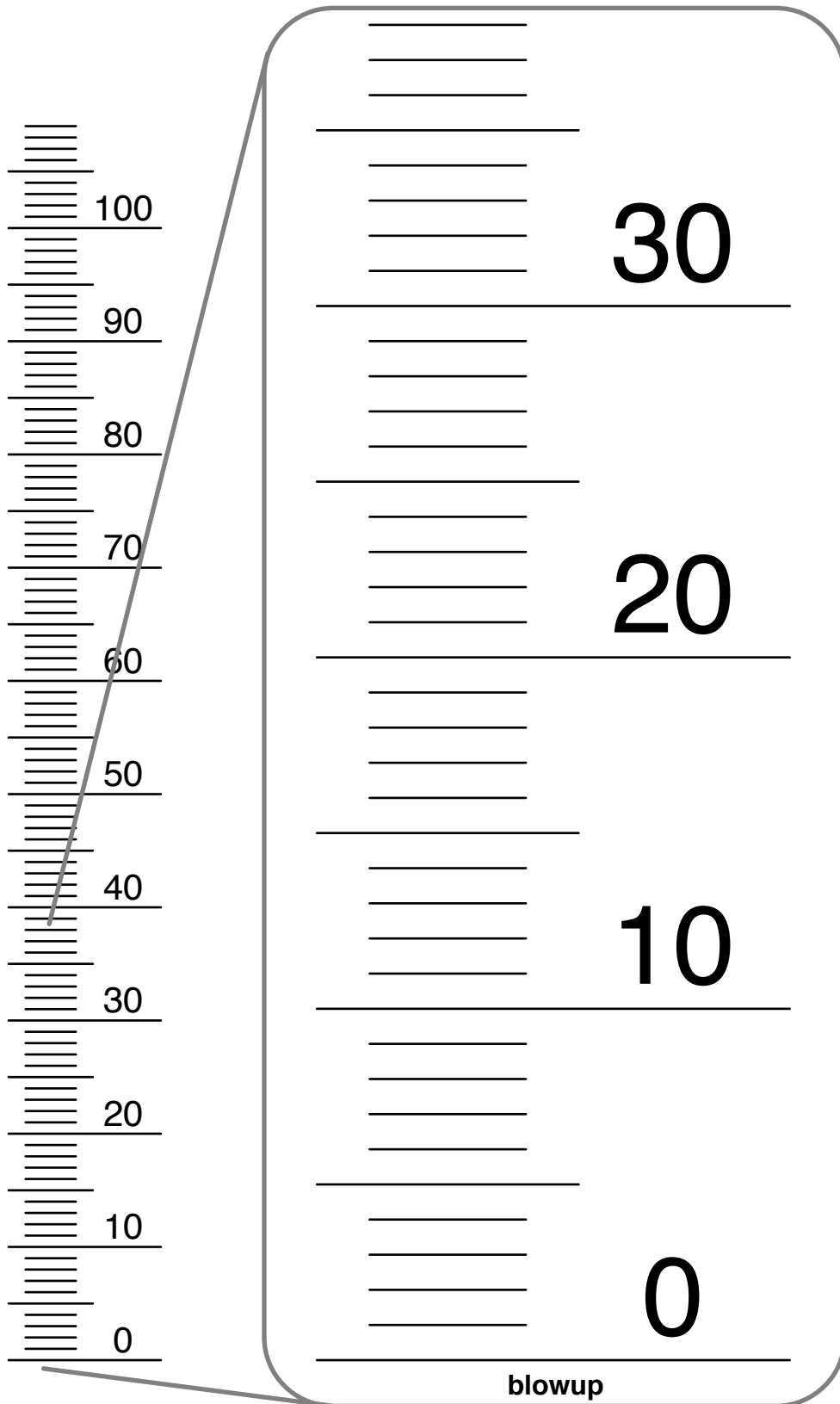
A.

Input	Output
N	**_____**
11	5
15	9
23	17
	27
	53
100	

B.

Input	Output
N	**_____**
4	80
5	100
	140
9	180
	200
30	
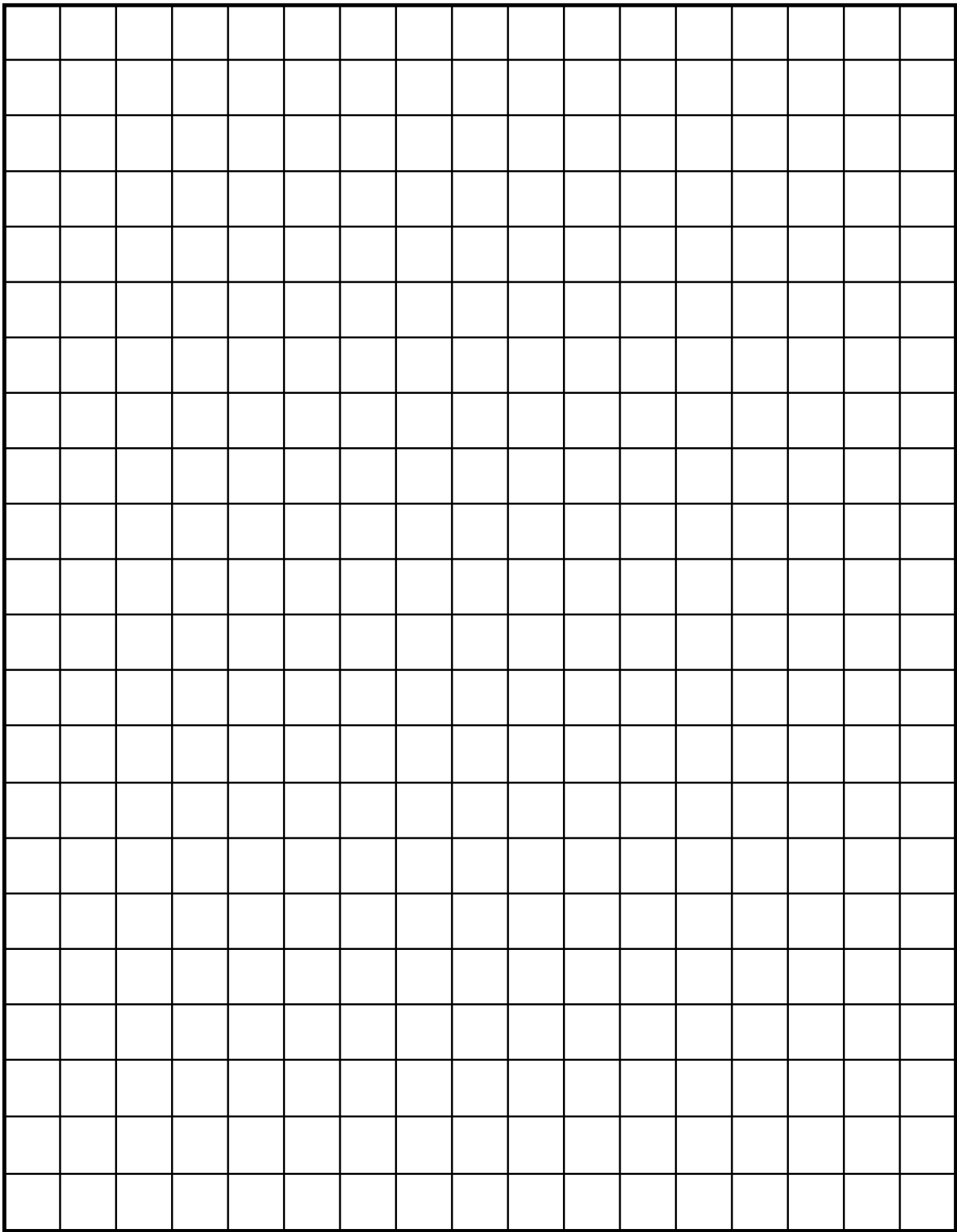
100-cc Graduated Cylinder Scale

100

90

80

70

60

50

40

30

20

10

0

30

20

10

0

blowup

250-cc Graduated Cylinder Scale

220

200

180

160

140

120

100

80

60

40

20

0

60

40

20

0

blowup
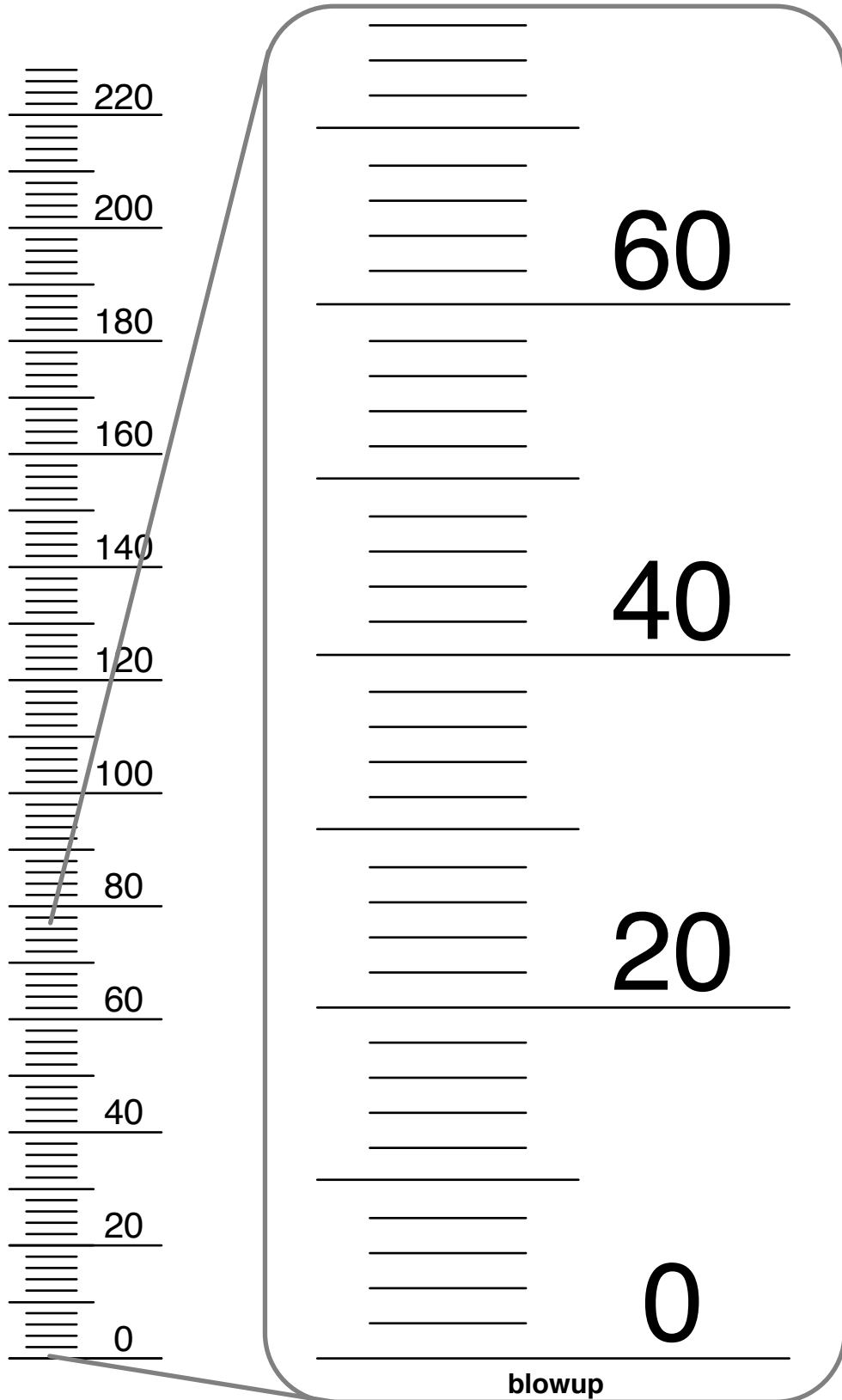
Reading a
Graduated Cylinder

Which student is reading the graduated cylinder correctly? Explain.

A.

B.

C.

100 cc
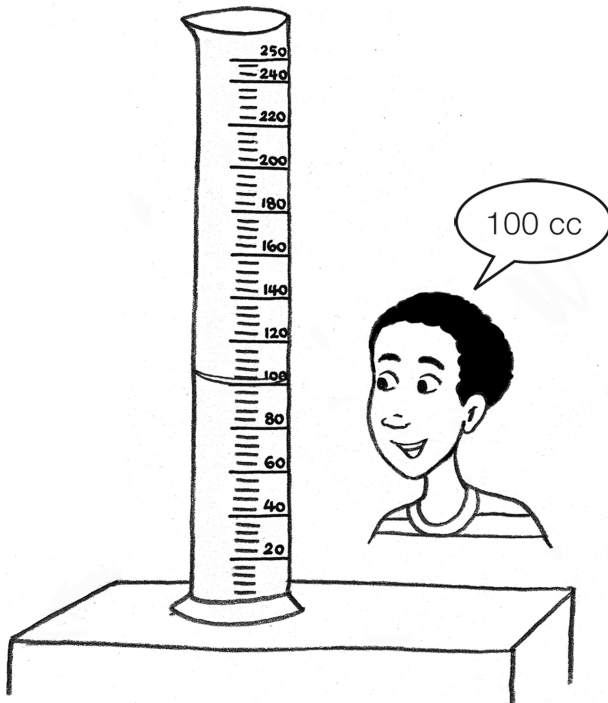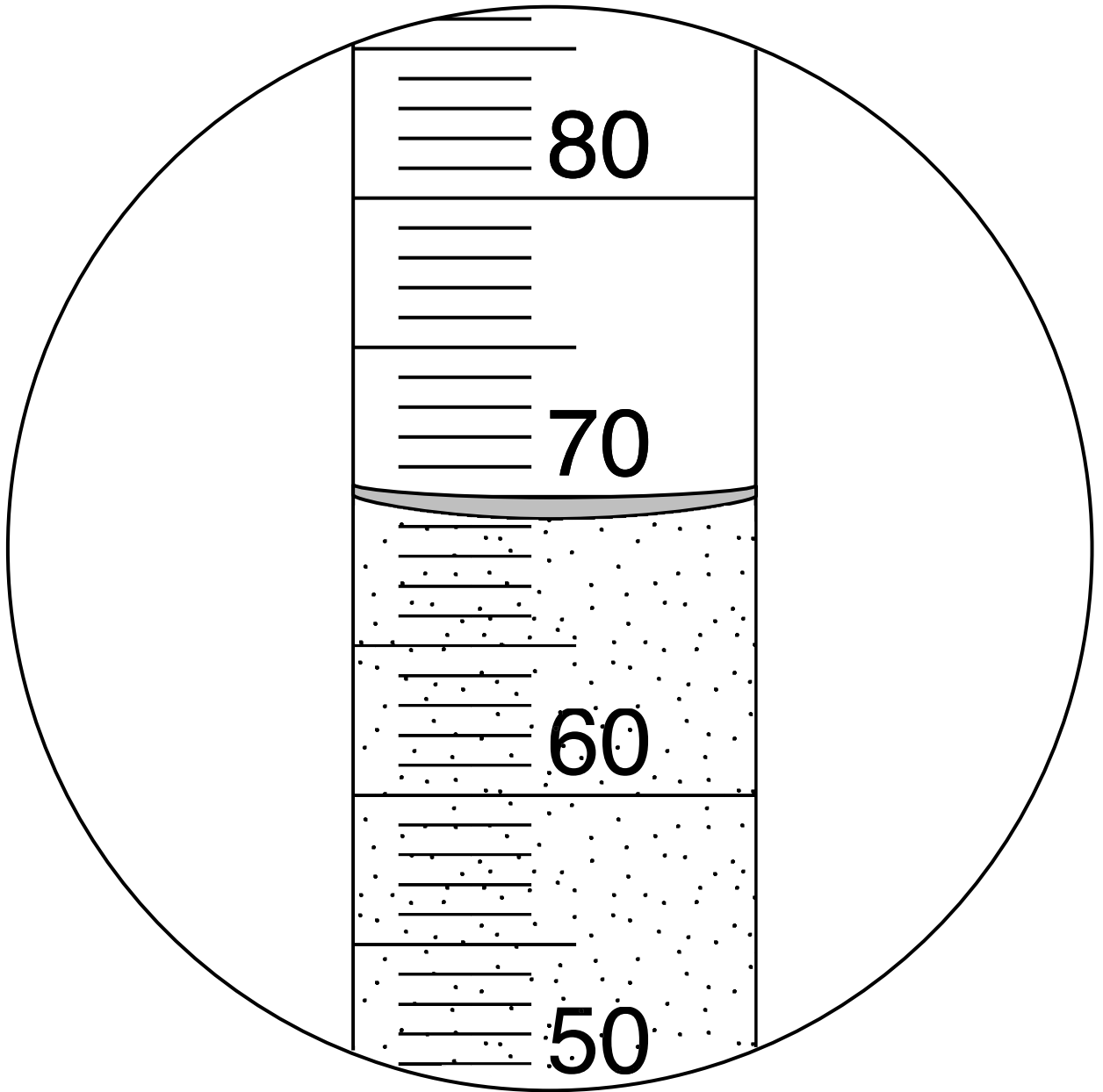
Meniscus

Read the lower line of the meniscus.
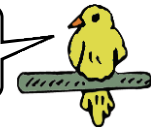
Name _____ Date _____
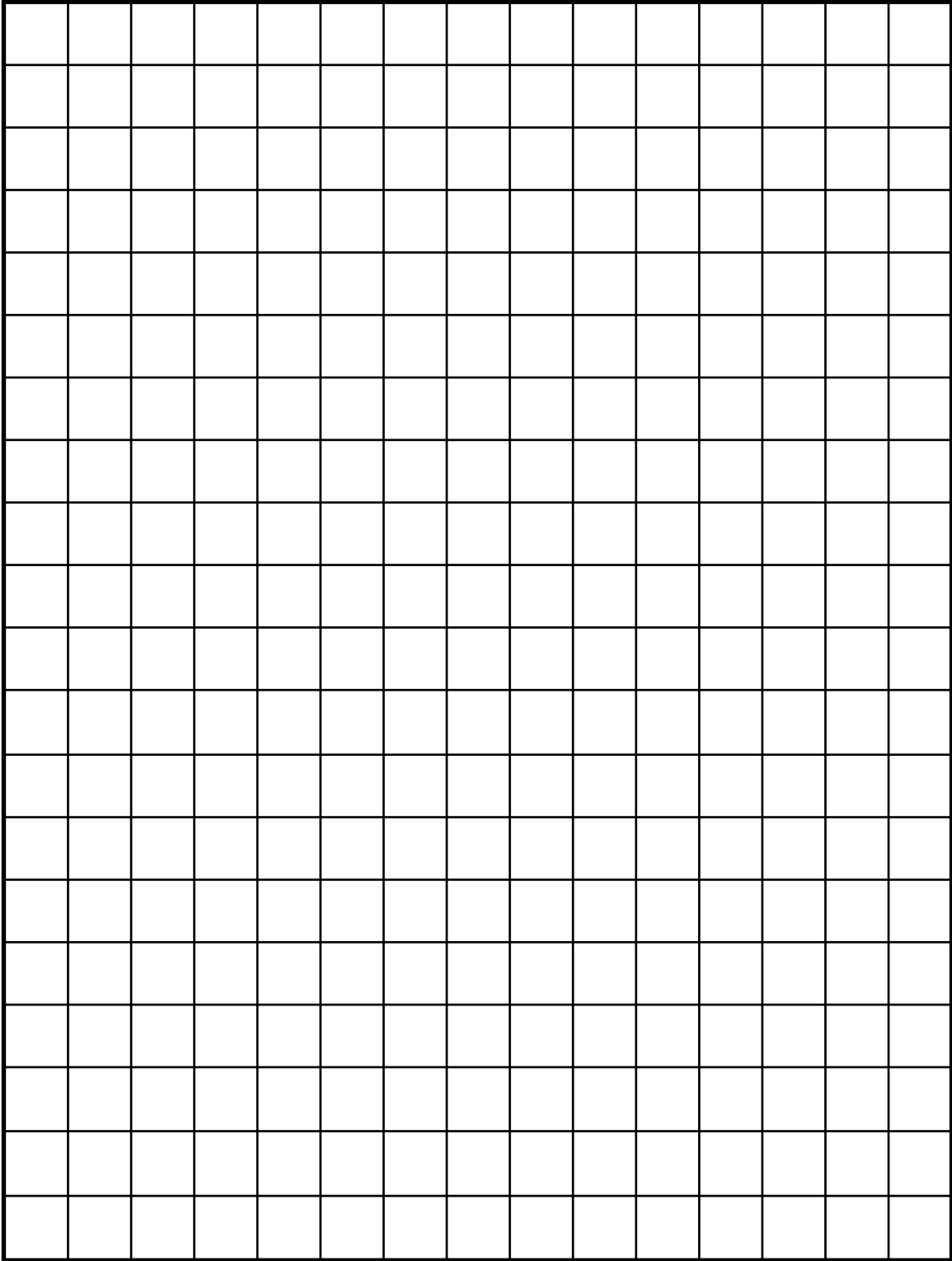
Volume vs. Number
Questions 1-15
Feedback Box

	Expec-tation	Check In	Comments
Show the variables and procedures of an investigation in a drawing. • Identify variables as Number of Marbles (N) and Volume (V). [Q# 1–4, Drawing]	E9		
• Identify the variables that are fixed. [Q# 3, Drawing]	E9		
• Show the procedure: varying size of marbles, varying number of marbles, read the scale on graduated cylinder. [Drawing]	E9		
• Label the variables. [Drawing]	E9		
Collect data by measuring volume by displacement. [Data Table]	E6		
Make a point graph and draw a best-fit line. [Graph, Q# 5–7]	E10		
Make predictions about a data set using data tables and graphs. [Q# 8–12]	E12		
Estimate the volume of small objects. [Q# 13–15]	E7		

Name _____ Date _____

Volume vs. Number
Check-In: Questions 16-17 Feedback Box

	Expectation	Check In	Comments
Solve problems involving volume. [Q# 16–17]	E4		
Make predictions using tables and graphs. [Q# 16–17]	E12		

	Yes . . .	Yes, but . . .	No, but . . .	No . . .
MPE3. **Check for reasonableness.** I look back at my solution to see if my answer makes sense. If it does not, I try again. [Q# 16–17]				
MPE5. **Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 16–17]				
MPE6. **Use labels.** I use labels to show what numbers mean. [Q# 16–17]				

Function Table

Input	Output

Name _____ Date _____

Using Different Units
Check-In: Questions 8–10
Feedback Box

	Expec-tations	Check In	Comments
Identify and extend patterns for increasing functions. [Q# 8]	E1		
Represent patterns and functions using words, symbols, and tables. [Q# 8–9]	E2		
Generate a pattern from a rule. [Q# 9]	E3		
Make generalizations using data tables. [Q# 10]	E12		

- -

Name _____   Date _____

_____

Graphing Mistakes: What's Wrong Here?

Massing a Sandwich

Master
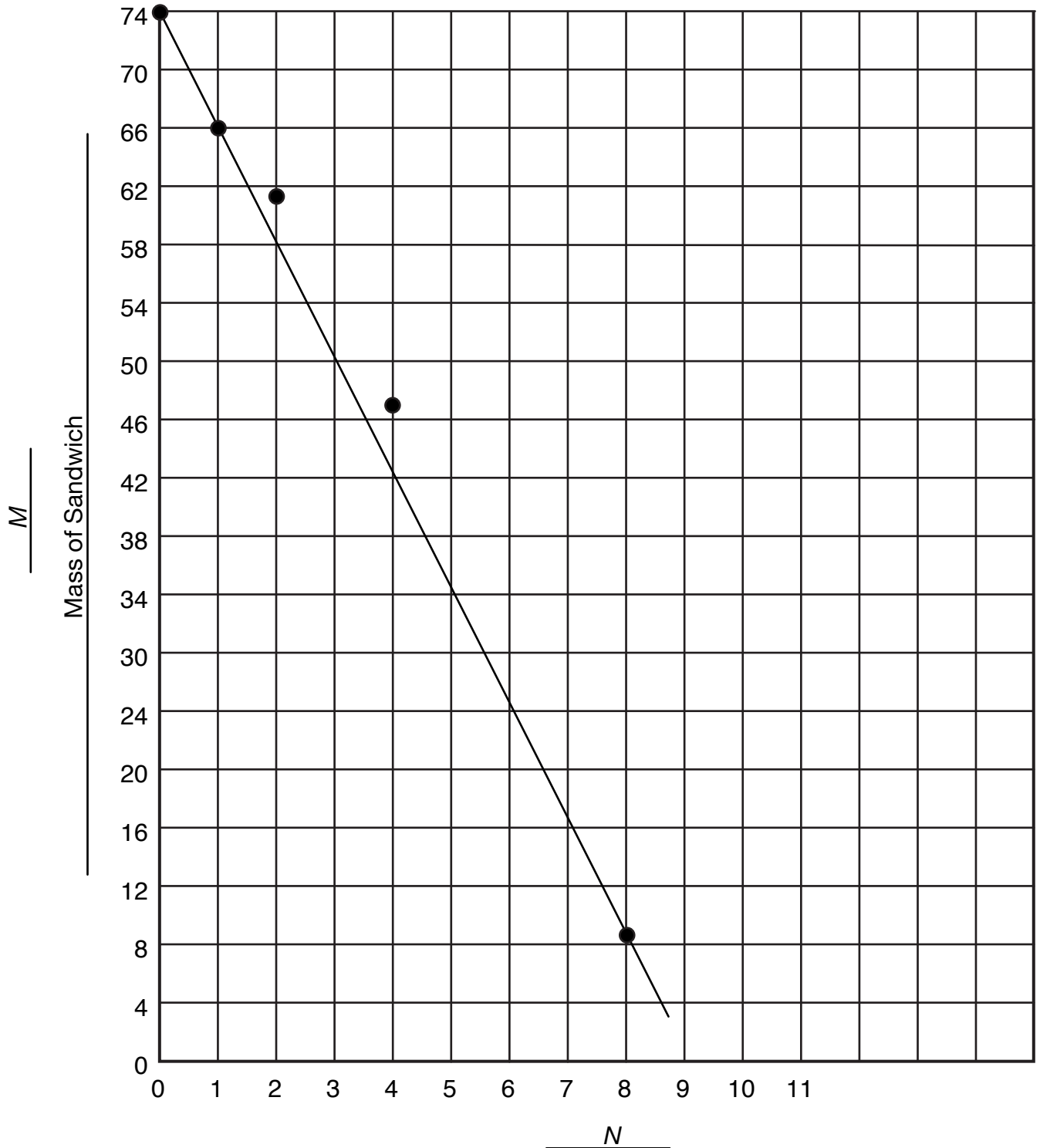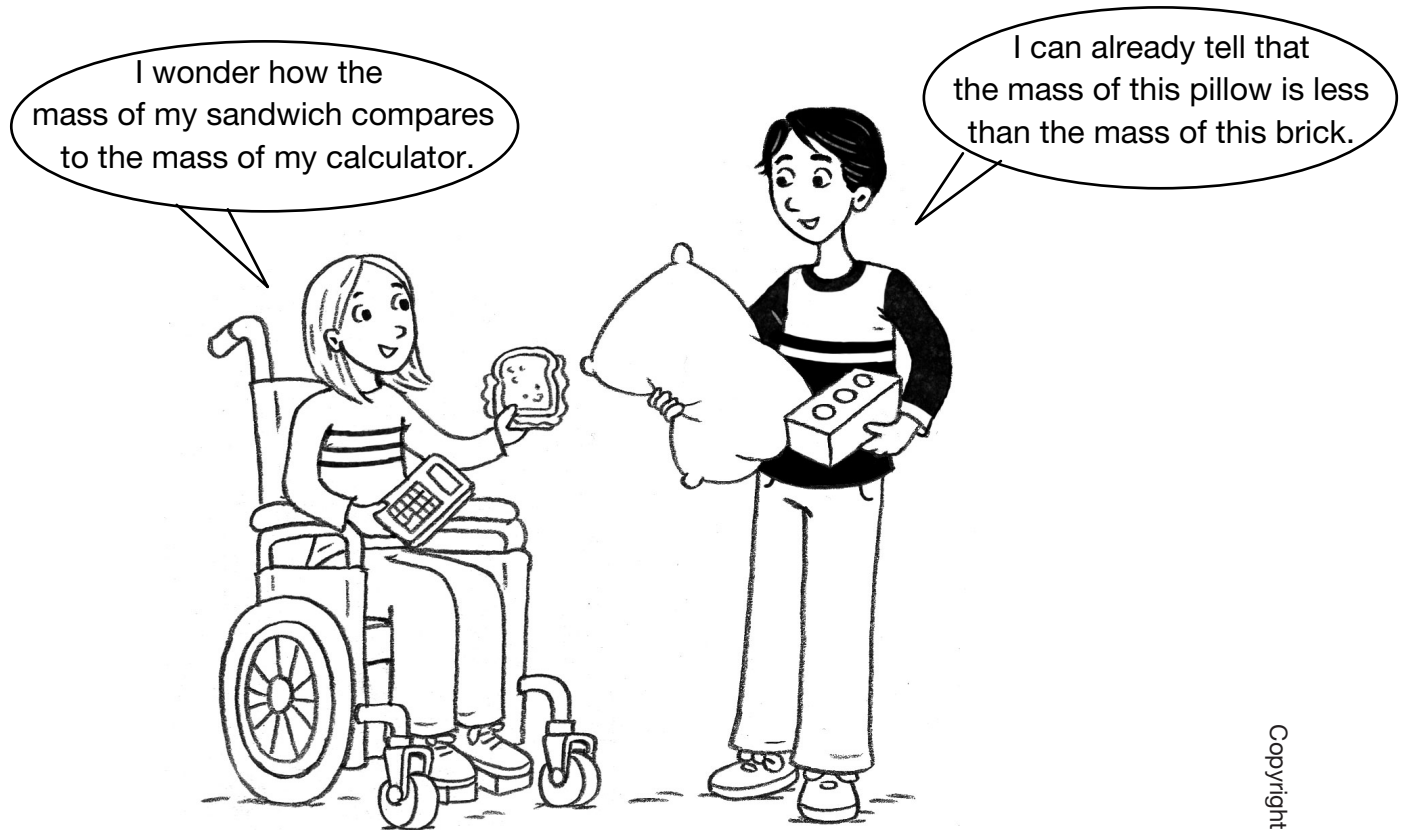
Mass Review

What is mass?

Mass is the amount of matter in an object. We can get an idea about the mass of an object by lifting it up.

> I wonder how the mass of my sandwich compares to the mass of my calculator.

> I can already tell that the mass of this pillow is less than the mass of this brick.

If we want to compare the mass of two things, we can use a two-pan balance. Before we use the balance, we should make sure it is level. We can use a small piece of clay to level the balance by placing it on the side that is higher.

Name _____ Date _____

In order to measure mass, we need a unit of measure. Common metric units of mass are the gram (g) and the kilogram (kg). A kilogram is 1000 grams. We measure the mass of small objects in grams and the mass of large objects in kilograms.

We can find the mass of an object using the two-pan balance.

Michael used the two-pan balance to find the mass of his calculator. His standard masses have a mass of 1 gram and 10 grams. He found the mass was 92 grams.
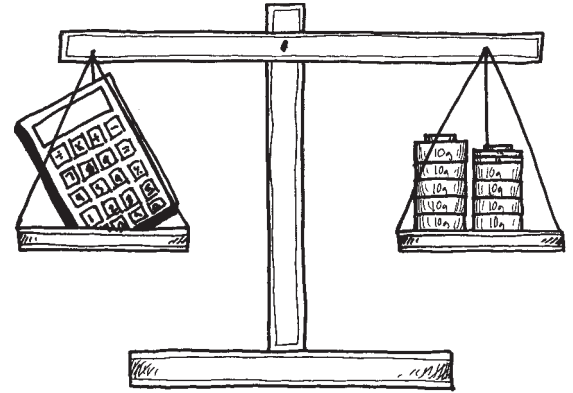
I. Use a two-pan balance to find the mass of at least four objects. Record your results in the data table below.

O Object	M Mass (in _____) *unit*

Use your data to answer the following questions. Sometimes, you will have to collect more data to provide an answer.

2. Which object has the most mass?

3. Which object has the least mass?

4. Compare the mass of the objects from Questions 2 and 3 using words or number sentences.

5. Choose any two of your objects, and use your data to predict the total mass of those two objects together.

    A. Write down the mass of each object and your prediction for the total.

    B. Use the balance to find the actual mass of the two objects together.

    C. Was your predicted mass close to the actual mass? How close?

6. A. Put the object with the most mass in one pan. Put the object with the second largest mass in the other pan. Predict how much mass you will have to add to the lighter side to get the pans to balance. Write down your prediction.

    B. Check your prediction by adding mass to the lighter side until the pans balance. Write down the actual number of grams you added to the balance. Is the actual number close to your prediction?

7. Were any of your predictions different from your actual results? On a separate sheet of paper, discuss why that might have happened.

Predictions Quiz

You will need a ruler to complete these questions.

1. Professor Peabody used the Sandwich Mass lab to see how long it took his mouse, Milo, to eat a dish of food. He recorded the data in a table.

    A. Plot a graph for Professor Peabody's data.

    B. If your graph suggests a line, draw a best-fit line.

    • Title the graph
    • Label the axes
    • Record units

N Number of Days	M Mass in Grams
0	114
1	103
2	91
4	67
6	43
8	22
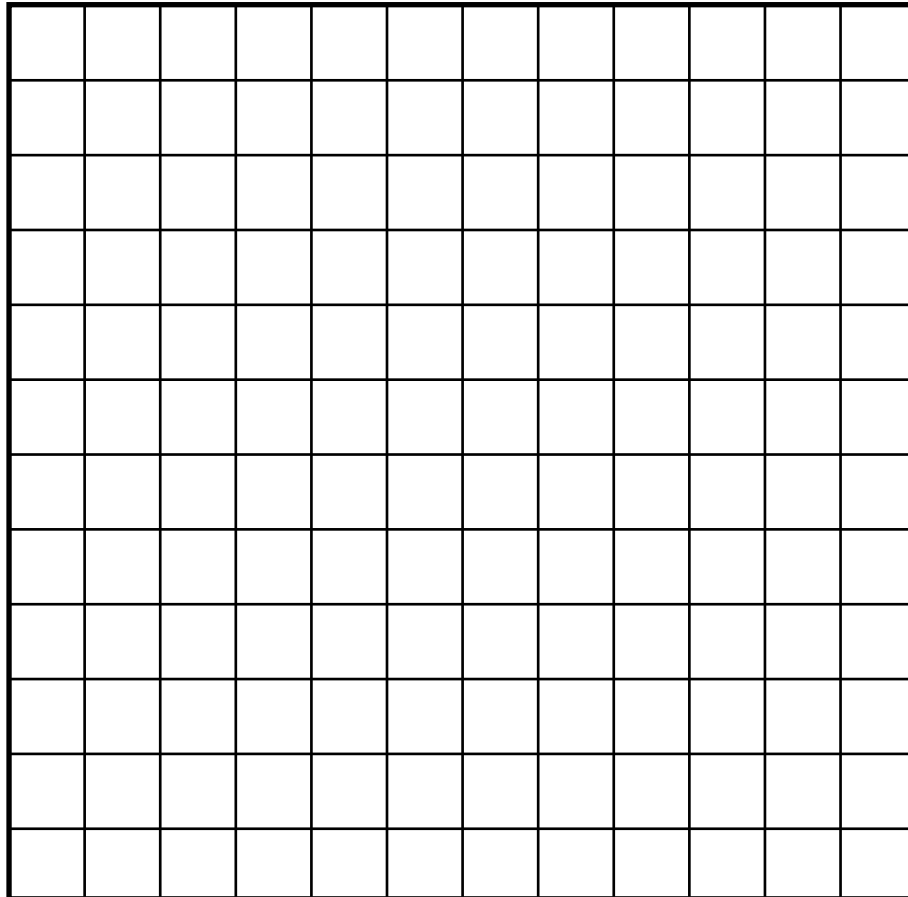
2. Tell the story of your graph. What does it tell you about the mass of the food the mouse ate?

3. Predict the mass of the food left in the dish after 3 days. Show or tell how you know.

4. Predict how many days it would take Milo to eat the entire dish of food. Show or tell how you made your prediction.

5. About how much food did Milo eat each day? Show or tell how you know.

Name _____ Date _____

Predictions Quiz
Feedback Box

Expectation	Check-In	Comments
Make a point graph. [Q# 1] E10		
Draw a best-fit line. [Q# 1] E10		
Tell the story in a graph. [Q# 2] E11		
Solve problems involving mass. [Q# 3, 4, 5] E4		

	Yes . . .	Yes, but . . .	No, but . . .	No . . .
MPE3. Check for reasonableness. I look back at my solution to see if my answer makes sense. If it does not, I try again. [Q# 3, 4, 5]				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 3, 4, 5]				
MPE6. Use labels. I use labels to show what numbers mean. [Q# 3, 4, 5]				

**Rules, Tables, and Graphs
Check-In: Questions 9–10
Feedback Box**

	Expec-tations	Check In	Comments
Identify and extend patterns for decreasing functions. [Q# 9A]	E1		
Make a point graph and draw a best-fit line. [Q# 9B]	E10		
Represent patterns and functions using words, symbols, tables, and graphs. [Q# 9, 10B]	E2		
Solve problems involving mass. [Q# 10]	E4		
Make generalizations using data tables and graphs. [Q# 10]	E12		

End-of-Year Test

Part 1

For this part of the test, use only paper and pencil or mental math to solve the problems. Estimate to make sure your answers are reasonable.

1. $$\begin{array}{r} 1225 \\ -397 \\ \hline \end{array}$$

2. $$\begin{array}{r} 1362 \\ +3758 \\ \hline \end{array}$$

3. $$\begin{array}{r} 2003 \\ -795 \\ \hline \end{array}$$

4. $$\begin{array}{r} 13 \\ \times 28 \\ \hline \end{array}$$

5. $$\begin{array}{r} 5992 \\ \times 4 \\ \hline \end{array}$$

6. $$\begin{array}{r} 97 \\ \times 50 \\ \hline \end{array}$$

7. $3\overline{)88}$

8. $5\overline{)735}$

9. **A.** Explain your estimation strategy for Question 6.

    B. Explain a mental math strategy for Question 5.

10. Bessie Coleman School is collecting paper for a recycling program. After three months they collected 3,908 pounds of paper. They collected about the same amount of paper each of the three months.

    A. Estimate the amount of paper collected each month. Write a number sentence to show how you found your estimate.

    B. Recycling 1 ton (2000 pounds) of paper saves about 17 trees. About how many trees did the students at Bessie Coleman School save during the first three months of the recycling program? Show or tell how you solved this problem.

Name _____   Date _____

11. Use the divisibility rules to answer Questions A–F about these numbers.

238   396   415   360

8235   5050   3063   4977

A. Which numbers are divisible by 2? Tell how you decided.

B. Which numbers are divisible by 3? Tell how you decided.

C. Which numbers are divisible by 5? Tell how you decided.

D. Which numbers are divisible by 6? Tell how you decided.

E. Which numbers are divisible by 9? Tell how you decided.

F. Which numbers are divisible by 10? Tell how you decided.

12. Estimate the measure (in degrees) of each of the following angles.

_____   _____   _____
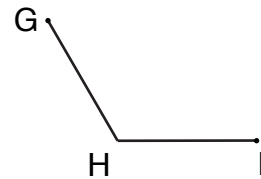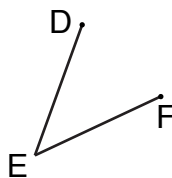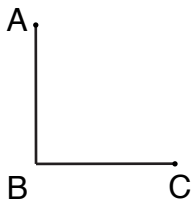
Part 2

Solve the following problems. You may use any of the tools that you usually use in class including a calculator.

13. Complete the following table. A flat ⬜ is equal to 1.

Base-Ten Shorthand	Decimal	Fraction
⬜ ⬜ // ·····		$2\frac{25}{100}$
	1.6	
		$3\frac{4}{100}$
⬜ ⬜ ///:····		

14. Construct a quadrilateral ABCD using the following rules:
    A. $\overleftrightarrow{AB}$ must be parallel to $\overrightarrow{DC}$
    B. $\overleftrightarrow{AD}$ must be perpendicular to $\overleftrightarrow{DC}$
    C. The measure of Angle A equals 90 degrees.
    D. The measure of Angle B is less than 90 degrees.

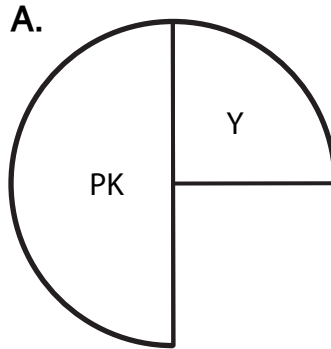15. Put the following fractions in order from smallest to largest.

    A. $\frac{1}{6}, \frac{1}{4}, \frac{1}{2}, \frac{1}{3}$

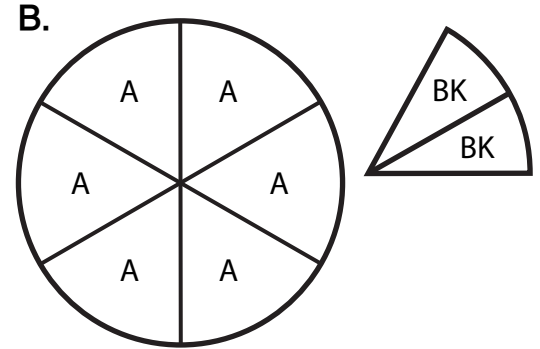   B. $\frac{4}{12}, \frac{1}{12}, \frac{13}{12}, \frac{14}{12}$

16. If a red circle is equal to 1 whole, name the following numbers each figure represents. You may use fraction circle pieces to help you.

A.   **B.**

R

1 Whole

Y

PK

A   A

A   A

A   A

BK

BK

_____   _____
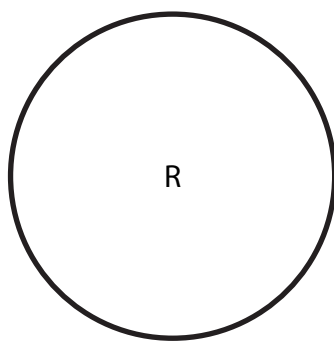
17. Jackie ordered a special gift box of Chocos. There were 12 candies in the box.

A. $\frac{1}{3}$ of the candies in the box have cream filling.

B. $\frac{1}{6}$ of the candies in the box have caramel filling.

C. $\frac{3}{12}$ of the candies in the box are nutty clusters.

D. $\frac{1}{4}$ of the candies in the box have coconut filling.

How many of each kind are in Jackies's box? Complete the table. Write a multiplication number sentence.

Kind of Candy	Number Sentence	Number of Candies in the Box
Cream Filling		
Caramel Filling		
Nutty Clusters		
Coconut Filling		

18. Which number sentences are true?

|	True	False
A. $3 \times \frac{2}{3} = 3 \times \frac{1}{2} \times 2$		
B. $6 \times \frac{1}{3} = 2$		
C. $4 \times \frac{3}{8} = 2 \times 3$		
D. $4 \times \frac{3}{8} = \frac{3}{8} + \frac{3}{8} + \frac{3}{8} + \frac{3}{8}$		
E. $4 \times \frac{3}{8} = \frac{12}{8}$		
F. $4 \times \frac{3}{8} = \frac{12}{32}$		
G. $3 \times \frac{2}{3} = 6 \times \frac{1}{3}$		

H. Show or tell how you decided whether the number sentence in 18G is true or false.

Name _____   Date _____

19. Use the graph below to answer the following questions. Use a separate sheet of paper to record your answers.

Average Girls' Weight by Age

A. Describe the graph.

B. Do the points lie close to a straight line? If so, use a ruler to draw a best-fit line.

C. If possible, predict the weight of an average 14-year-old girl. Explain your answer.

D. If possible, predict the weight of an average 23-year-old woman. Explain your answer.

E. If possible, predict the weight of an average 1-year-old girl. Explain your answer.

20. Use the diagram below to answer Questions A–F below.
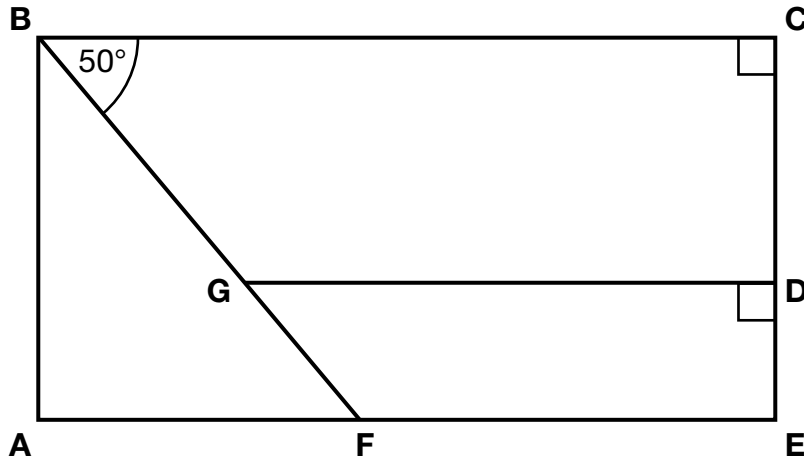
Find the measures of the following angles.

A. ∠ABF

B. ∠AFB

C. ∠CDG

D. ∠BGD

E. ∠DGF

F. ∠EFG

G. Show or tell how you found the answer for 20D.

21. Use the fraction circle pieces and the *Fraction Chart* to complete each table.

Multiply by $\frac{1}{3}$

A.

Input	Output
6	
9	
12	
15	

Multiply by $\frac{2}{3}$

B.

Input	Output
6	
9	
12	
15	

Multiply by $\frac{1}{5}$

C.

Input	Output
5	
10	
15	
20	

Multiply by $\frac{3}{5}$

D.

Input	Output
5	
10	
15	
20	

Multiply by $\frac{1}{4}$

E.

Input	Output
2	
4	
6	
8	
12	
16	

Multiply by $\frac{3}{4}$

F.

Input	Output
2	
4	
6	
8	
12	
16	