LETTER HOME

Equivalent Fractions Using Proportions

Dear Family Member:

In this unit, students focus on the concepts of ratio and proportion. Ratios and proportions are used in everyday life and in the specialized worlds of math, science, art, music, and architecture. Speed, a comparison of distance per time, is a commonly used ratio. Number of miles traveled per gallon of gas is another common ratio. Ratios are found at the grocery store where the price for apples may be 1 pound for 89¢. Proportional thinking is used when doubling or tripling a recipe or when figuring out prices in a foreign currency. In mathematics, understanding proportions is necessary for understanding concepts in algebra and geometry.

The unit begins with ratios in students' own lives and proceeds to an examination of the use of proportional reasoning in science. Students explore why some objects sink and others float in water.

Students find the ratio of an object's mass to its volume to help understand why objects sink and float.

Students will also discover a special ratio in mathematics—π (pronounced pie). π arises out of the natural world. It is found by dividing the circumference of a circle (the distance around the outside) by its diameter (the distance across the circle through the center). For any size circle, the result of this division is always π—a little more than 3. Thus, the distance required to go around a circle is a little more than three times the distance required to go across the
circle through the middle. Students will discover this relationship in a laboratory investigation where they measure, graph, and analyze the circumference and diameter of different-sized round cans or lids.

You can help your child at home by:

- **Finding ratios.** Point out comparisons made with ratios whenever they occur. Some places to look are the miles per gallon ratings for cars, the exchange rates for currencies, and the prices for groceries.
- **Adjusting a recipe.** Ask your child to help you adjust a recipe to serve more people when you are cooking.
- **Looking for Designs.** Many designs in tiles and wall coverings include circles. Talk together about the geometry of the designs. Ask your child to show you the circumference, diameter, and radius of these circles.
- **Showing "About 3."** Ask your child to demonstrate the relationship between the circumference and diameter of a circle. Provide a can or lid and some string to help in the demonstration.
- **Collecting Circles.** We will need cans and plastic, circular lids of various sizes to complete the laboratory investigation in class. Please send any unneeded cans or lids to school with your child.

Sincerely,

Name _____ Date _____

Unit 11: Home Practice

Part 1 Division Facts

Solve the following problems in your head.

1. Find the number N that makes each sentence true.

   A. $30 \div N = 6$ **B.** $N \div 6 = 7$ **C.** $24 \div 6 = N$ **D.** $36 \div N = 9$

   E. $N \div 8 = 8$ **F.** $16 \div N = 2$ **G.** $21 \div 3 = N$ **H.** $32 \div N = 8$

2. Solve.

   A. $40{,}000 \div 80 =$ **B.** $720 \div 90 =$ **C.** $3600 \div 6 =$ **D.** $270 \div 30 =$

   E. $48{,}000 \div 80 =$ **F.** $2000 \div 5 =$ **G.** $81{,}000 \div 90 =$ **H.** $3500 \div 70 =$

3. Follow the order of operations to solve each of the following.

   A. $5 \times 3 + 14 =$ **B.** $(33 + 7) \times 9 =$ **C.** $45 + 45 \div 9 =$ **D.** $7^2 + 8 \times 3 =$

Part 2 Equivalent Fractions

Find *n* to make each pair of fractions equivalent. Use the *Finding Equivalent Fractions and Ratios Menu* in the *Student Guide* Reference section.

A. $\frac{4}{5} = \frac{n}{20}$ **B.** $\frac{9}{10} = \frac{36}{n}$ **C.** $\frac{4}{n} = \frac{28}{49}$

D. $\frac{n}{8} = \frac{4}{32}$ **E.** $\frac{5}{6} = \frac{n}{36}$ **F.** $\frac{3}{4} = \frac{60}{n}$

Name _____ Date _____

Part 3 Computation Practice

Choose a strategy to solve each problem. Use the resources in the *Student Guide* Reference section.

A. $87 \times 62 =$

B. $2.3 \times 52 =$

C. $1892 \div 5 =$

D. $3406 \div 27 =$

E. $4\frac{5}{6} + 3\frac{1}{5} =$

F. $\frac{11}{12} + 1\frac{2}{3} =$

G. $\frac{2}{3} \times 36 =$

H. $\frac{3}{5} \times \frac{5}{6} =$

I. $314.56 + .89 =$

J. $1089.23 - 17.9 =$

K. $58 - .36 =$

L. $173.4 + 38.65 =$

Part 4 Fractions to Decimals

For each pair of numbers write a number sentence using <, >, or =. (Hint: Use a calculator to change the fractions to decimals.)

A. $\frac{1}{6}$ and .30

B. .65 and $\frac{5}{8}$

C. $\frac{4}{9}$ and .46

D. 0.60 and $\frac{3}{5}$

E. 0.43 and $\frac{3}{7}$

F. $\frac{6}{15} = .4$

Name _____ Date _____

Part 5 Practice the Operations

Choose a strategy to solve each problem. Use the resources in the *Student Guide* Reference section.

A. $26 \times 73 =$

B. $3478 \div 7 =$

C. $471 \times 60 =$

D. $1823 \div 21 =$

E. $5077 \div 46 =$

F. $67.2 \times 0.6 =$

Try to solve the following in your head without paper and pencil. Explain your strategies for Questions G and I.

G. $14{,}034 + 160 =$

H. $1270 + 330 =$

I. $9099 - 100 =$

J. $0.5 \times 6400 =$

K. $0.10 \times 150 =$

L. $45 + 0.45 =$

M. $13 - 5.5 =$

N. $23 \times 200 =$

O. $1760 - 900 =$

Name _____ Date _____

Part 6 Measuring the Density of Rocks

You will need a piece of graph paper to complete these questions.

1. On a geology field trip, Blanca found three rocks made of the same type of material. She measured the mass and volume of each rock. Her data table is shown at the right. Plot the data on a piece of graph paper. Put Mass (*M*) on the vertical axis and Volume (*V*) on the horizontal axis. Scale your axes so that *M* goes up to 100 g and *V* goes up to 30 cc.

Rock Density Measurement Data

Rock	Volume (cc)	Mass (g)
A	3	8.5
B	5	15
C	21	60

2. Use a point on the line to find the ratio of mass to volume for this kind of rock.

3. Would you expect the rocks to sink or float in water? Why? Remember, the ratio of mass to volume of water is $\frac{1\text{ g}}{1\text{ cc}}$ (or 1 g/cc).

4. On the field trip, Blanca also found a bigger rock of the same material. This rock is too big to fit in the graduated cylinder. She knows the mass of the rock is 80 grams. Use your graph to find the volume of this rock.

5. A rock made of the same material has a volume of 15 cc. What is its mass? Explain how you found your answer.

6. If a rock made of the same material has a volume of 40 cc, what is its mass? Show your solution strategy.

Name _____ Date _____

Part 7 In Proportion

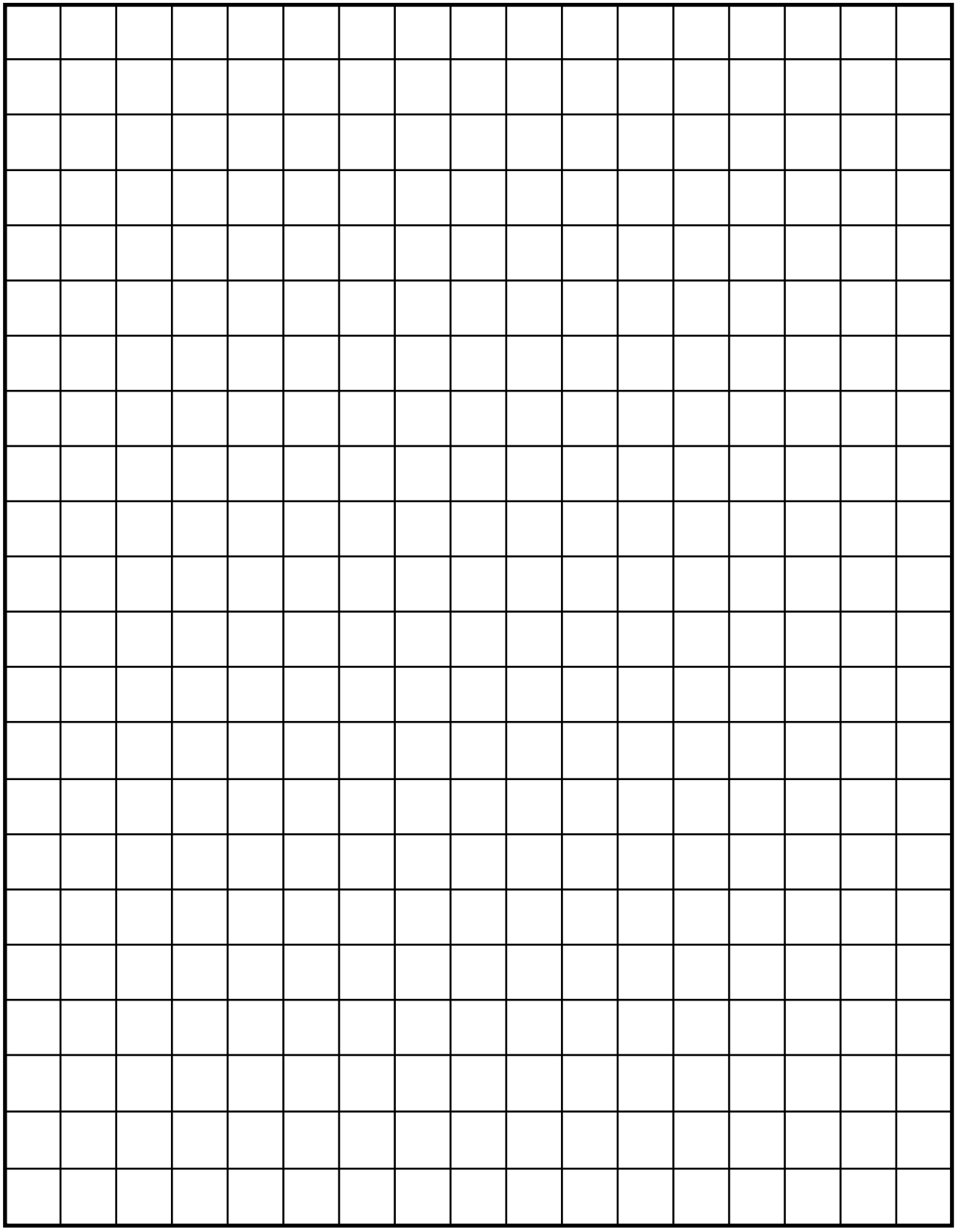
Solve the following problems using pencil and paper or a calculator.

1. David and Felicia both brought chocolate chip cookies for dessert with their lunches.
   - **A.** David counts 14 chips in his two cookies. What is the ratio of chips to cookies in David's lunch?
   - **B.** Felicia counts 35 chips in her 5 cookies. What is the ratio of chips to cookies in Felicia's lunch?
   - **C.** Who has the higher ratio of chocolate chips to cookies? Explain.

2. Notebooks are on sale for 3 for $1.29. Alexis's mother decides to stock up on them.
   - **A.** If she buys nine notebooks, how much will she spend on notebooks?
   - **B.** If she buys ten notebooks, how much will she spend? What does one notebook cost?

3. Candy bars come in packages of 5 for $2.00.
   - **A.** What is the price for 15 candy bars?
   - **B.** Give two different strategies you can use to solve the problem.

4. Arti is mixing some orange paint for the class mural. She mixes 3 squirts of yellow to 2 squirts of red and gets a beautiful orange color. Shannon put 9 squirts of yellow in her bowl. If she wants to get the same orange color as Arti, how many squirts of red should she use?



Name _____ Date _____

Ratios, Recipes, and Proportions
Check-In: Questions 21–25 Feedback Box

	Expec-tation	Check In	Comments
Represent the relationship between variables as a ratio. [Q# 21A–B, 25B]	E2		
Use ratios and proportions to solve problems. [Q# 22, 23, 25A]	E4		
Collect and organize data into a table and line graph to represent the relationship between variables. [Q# 24]	E10		
Make point graphs and draw best-fit lines to represent ratios and proportional relationships. [Q# 24]	E11		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 25]	E12		

Name _____ Date _____

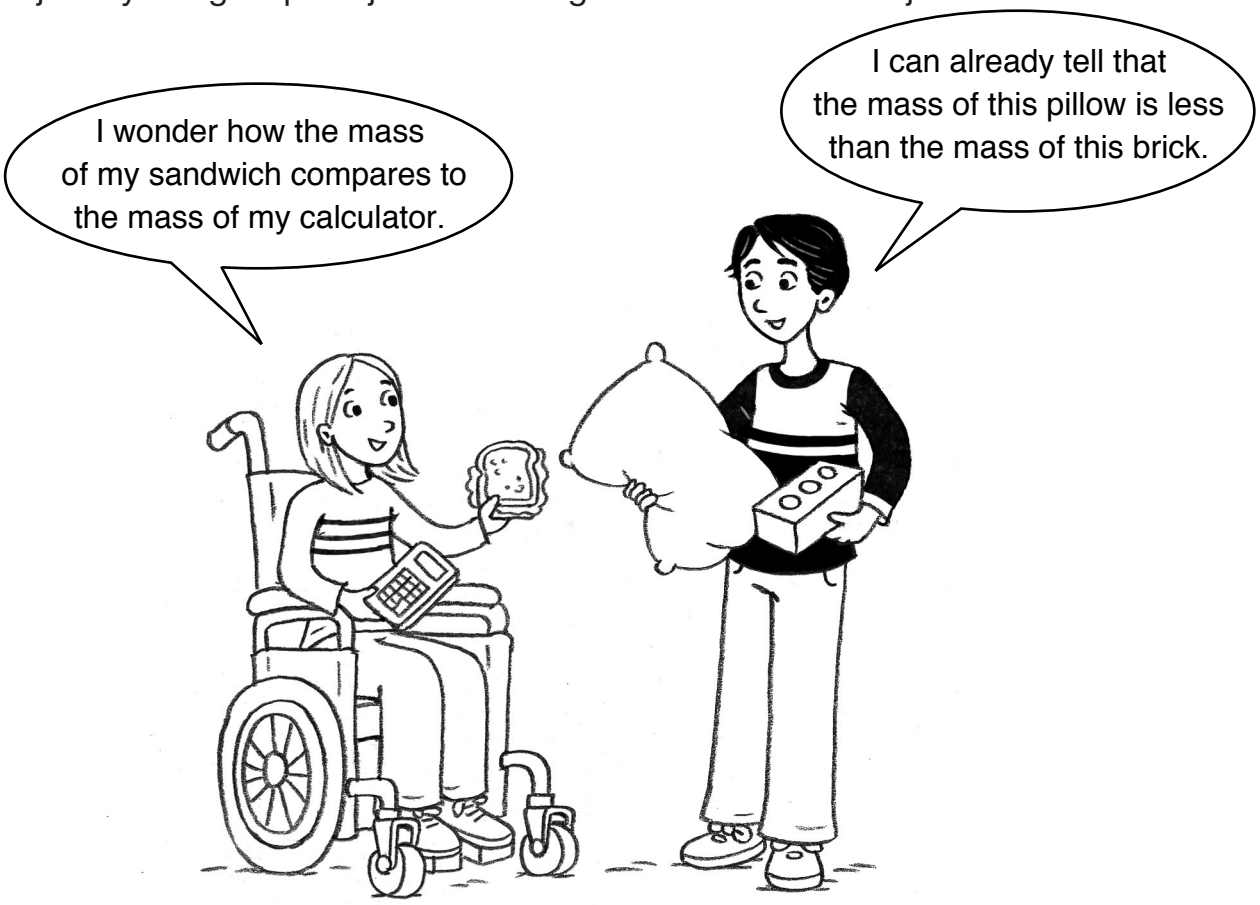
Variables in Proportion
Check-In: Questions 17–21 Feedback Box

	Expec-tation	Check In	Comments
Represent the relationship between variables as a ratio. [Q# 18, 20A]	E2		
Use ratios and proportions to solve problems. [Q# 17–21]	E4		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 17–21]	E12		

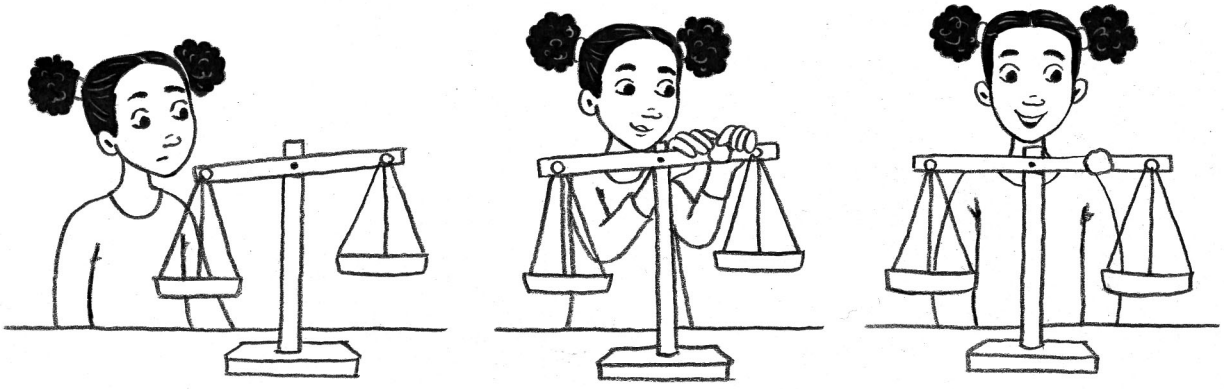
Mass Review

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. Objects that weigh more than other objects have more mass.

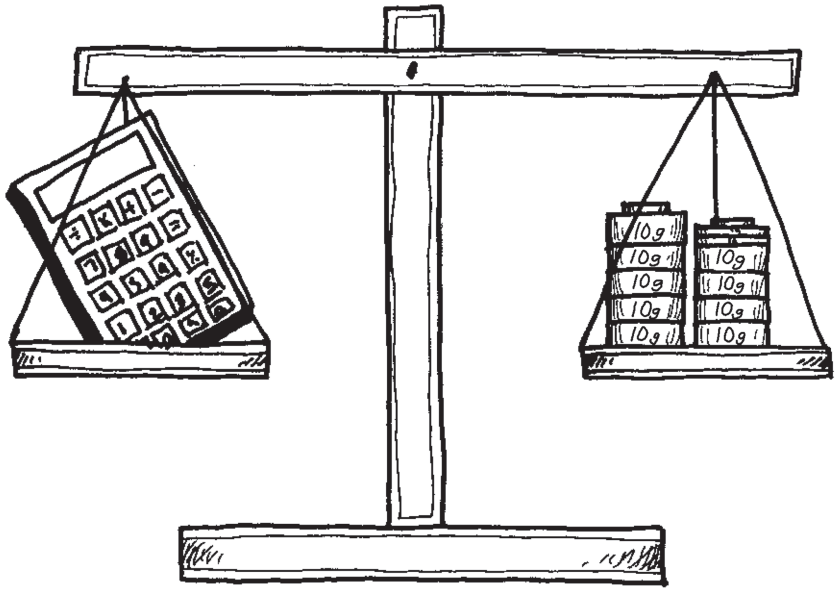


If we want to compare the mass of two things, we can use a two-pan balance. But before we use the balance, we should make sure it is level. You can use a small piece of clay to level your balance by placing it on the side that is higher.



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. So, we measure the mass of small objects in grams and the mass of large objects in kilograms.

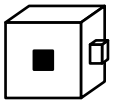
Michael used the two-pan balance to find the mass of his calculator. His standard masses have a mass of 1 gram and 10 grams.

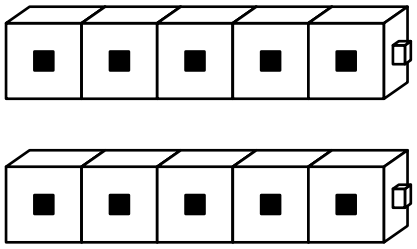


He found the mass was 92 grams. Can you see why?

Volume Review

The **volume** of an object is the amount of space it takes up. A common metric unit of volume is the **cubic centimeter (cc),** the volume of a cube that is one centimeter long on each side.

1 cubic centimeter 



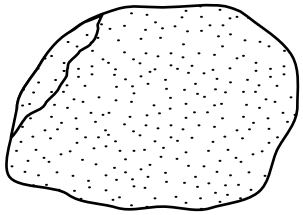
What is the total volume of these cubes?

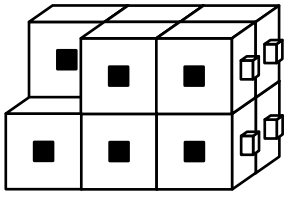
A **milliliter (ml)** is another metric unit of volume. It is the same as 1 cubic centimeter.

A **liter (l)** is a metric unit used to measure the volume of larger objects. One liter holds 1000 milliliters; it also holds 1000 cubic centimeters.

We can estimate the volume of a rock by making a model of the rock using centimeter connecting cubes and counting the cubes.

1. Estimate the volume of the rock in the picture by counting the cubes.





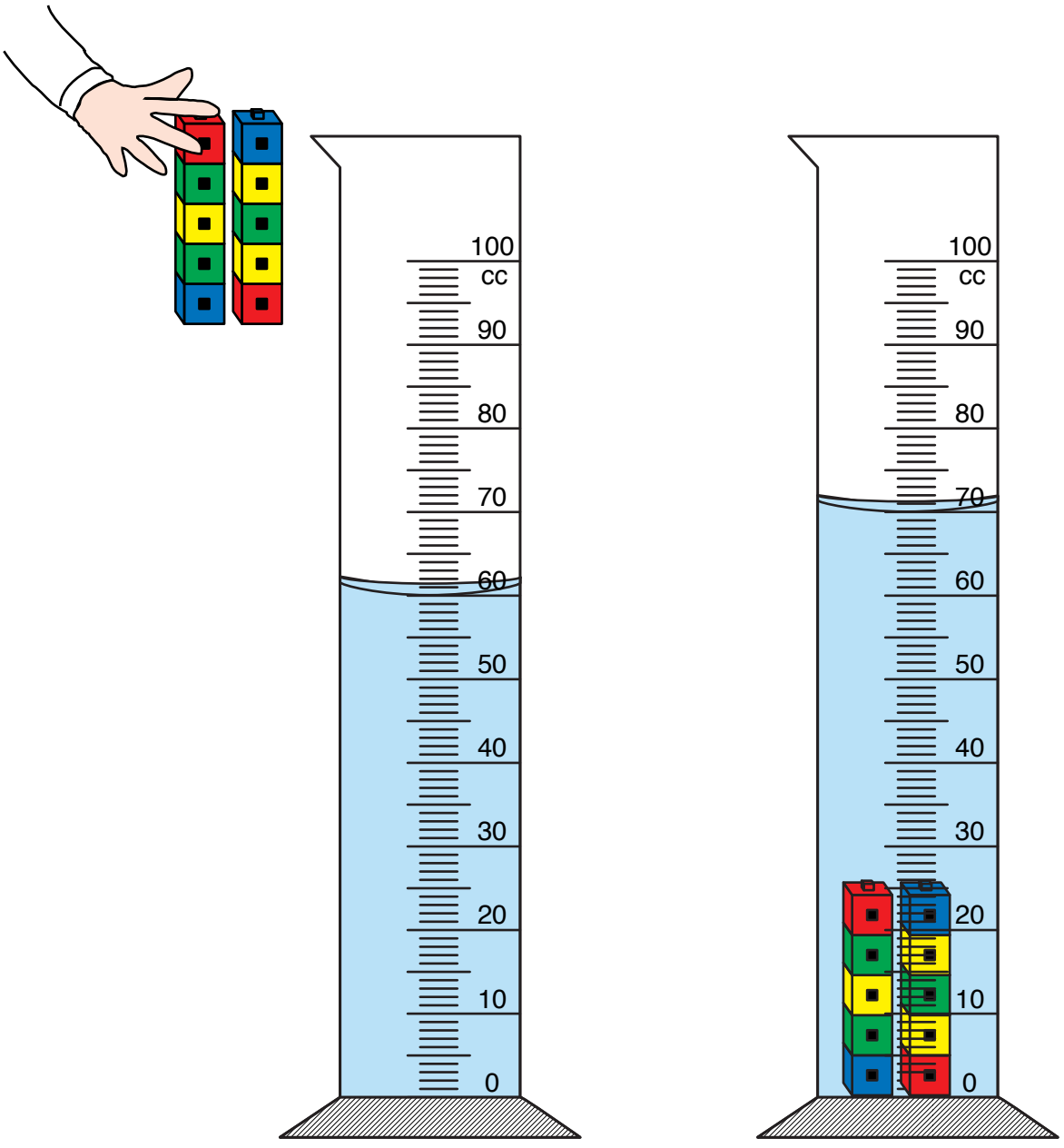
Measuring Volume by Displacement

We can also measure the volume of an object using a graduated cylinder. This method is called **measuring volume by displacement** because you find out how much water the object displaces or pushes away.

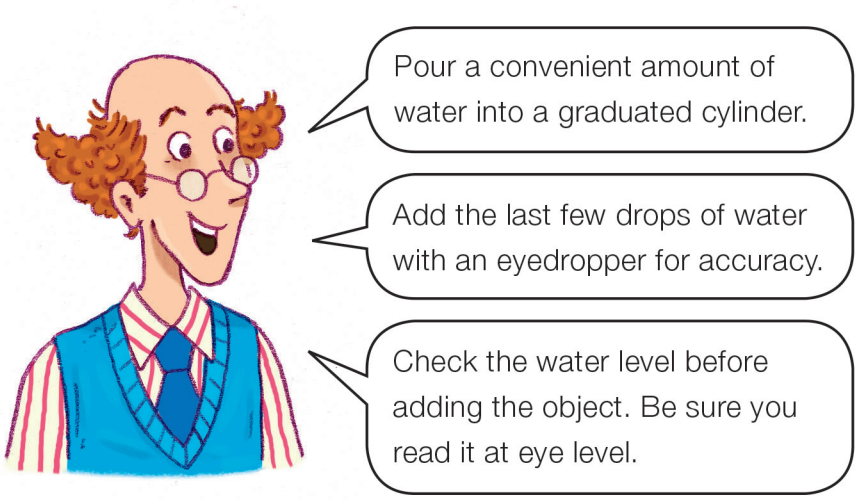
2. Look carefully at the scale of the graduated cylinder before the cubes are added.

A. How much water is in this graduated cylinder?

B. How much water did the cubes displace or push away?



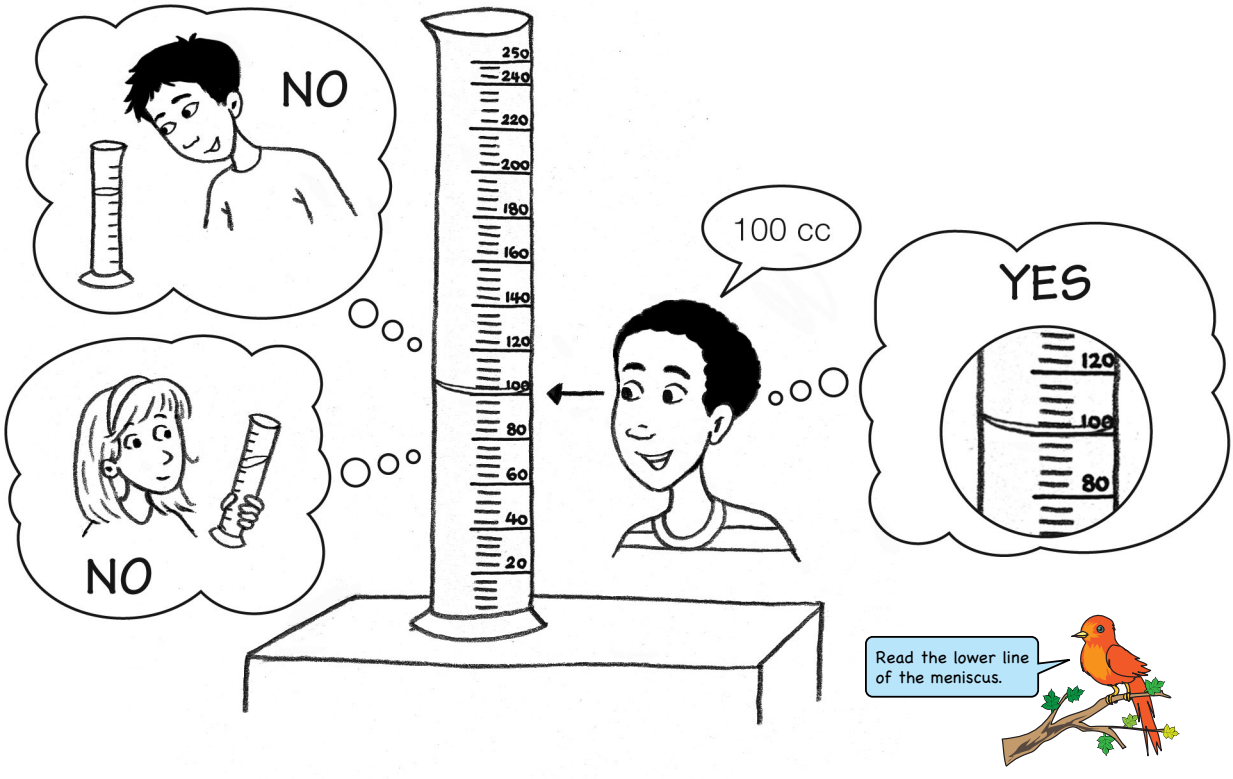
Professor Peabody shows Jerome how to accurately measure the volume of the rock by displacement.



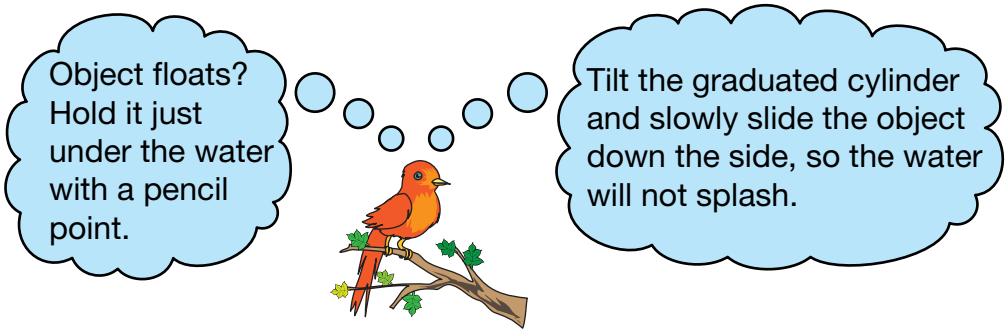
Jerome reads the graduated cylinder to check the water level. He tries to remember what he should do and what he should not do.

3. A. What should Jerome do?

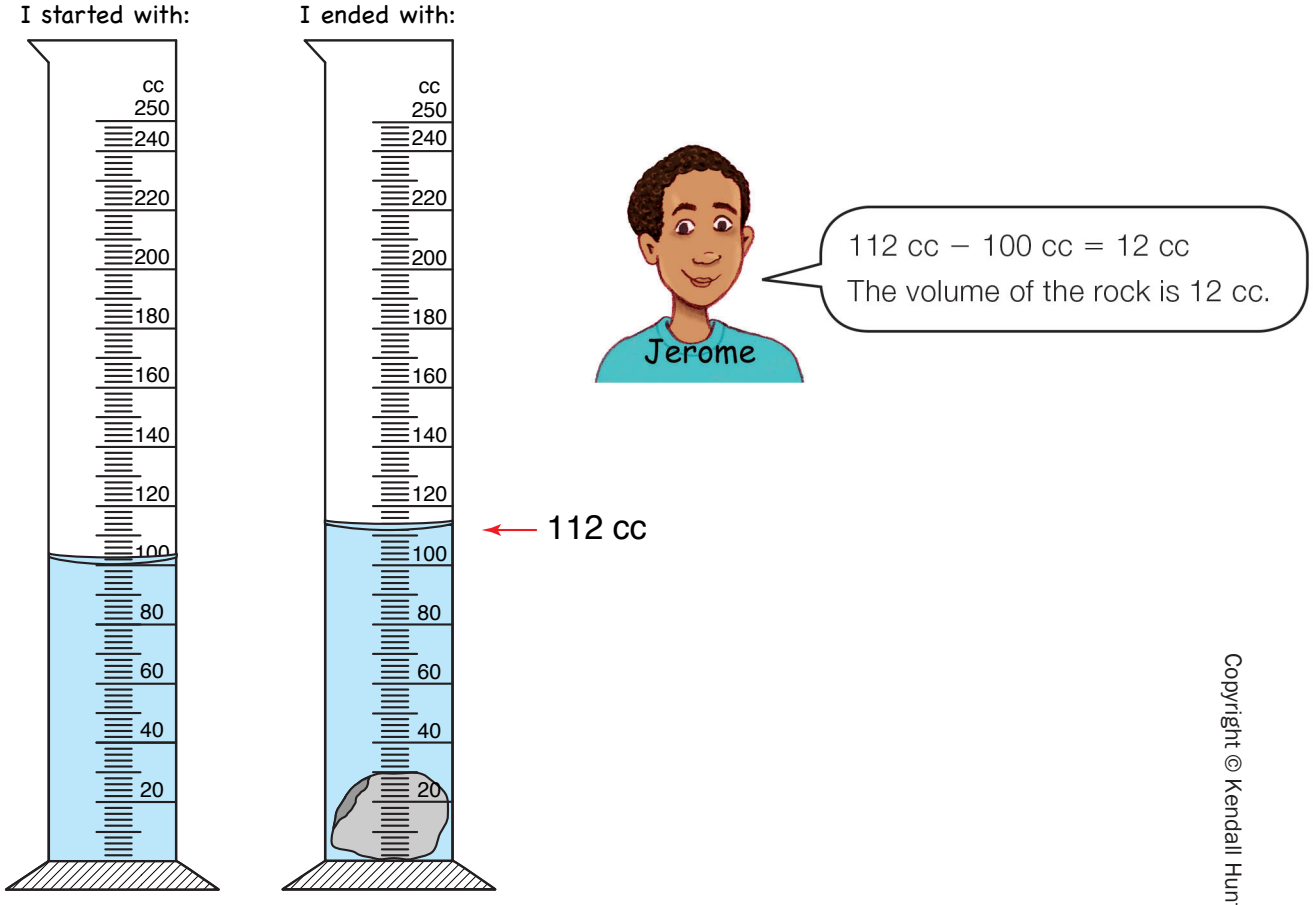
B. What should Jerome not do?



Jerome carefully added a rock to the graduated cylinder.



He then calculated the volume.



4. How can Jerome check the reasonableness of his volume measurement? [Hint: Use Question 1.]

Name _____ Date _____

Sink and Float
Check-In: Questions 16–20 Feedback Box

	Expec-tation	Check In	Comments
Represent the relationship between variables as a ratio. [Q# 16A–E]	E2		
Use ratios and proportions to solve problems. [Q# 17–18, 19B, 20]	E4		
Collect and organize data into a table and line graph to repre-sent the relationship between variables. [Q# 16A–E, 19A]	E10		
Make point graphs and draw best-fit lines to represent ratios and proportional relationships. [Q# 19A]	E11		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 16–19]	E12		

Name _____ Date _____

Mass vs. Volume: Proportions and Density Lab Feedback Box

	Expec-tation	Check In	Comments
Represent the variables and procedures of an investigation in a drawing. [Q #1] • Identify the variables as mass and volume (Drawing). • Show the procedure (Drawing). • Label the variables (Drawing).	E9		
Measure mass to the nearest tenth of a gram (Data Tables). [Q# 2–3]	E6		
Measure volume by displacement to the nearest tenth of a cc. (Data Tables). [Q# 2–3]	E7		
Collect and organize data into a table and line graph to represent the relationship between variables (Data Tables and Graph). [Q# 2–6]	E10		
Make point graphs and draw best-fit lines to represent ratios and proportional relationships (Graph). [Q# 4–6] • Make a point graph (Graph). • Draw a best-fit line (Graph).	E11		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 7–12]	E12		

Name _____ Date _____

Mass vs. Volume: Proportions and Density
Check-In: Questions 13–16 Feedback Box

	Expectation	Check In	Comments
Represent the relationship between variables as a ratio.	E2		
Find equivalent fractions and ratios using a variety of strategies (e.g., using models, using multiplication and division, using graphs and tables).	E3		
Use ratios and proportions to solve problems.	E4		
Use patterns in tables and line graphs to make predictions and solve problems.	E12		

	Yes . . .	Yes, but . . .	No, but . . .	No. . .
MPE1. Know the problem. I read the problem carefully. I know the questions to answer and what information is important.				
MPE2. Find a strategy. I choose good tools and an efficient strategy for solving the problem.				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking.				
MPE6. Use labels. I use labels to show what numbers mean.				

Name _____ Date _____

_____

Name _____ Date _____

_____

	Trial 1	Trial 2	Trial 3	Mean

Name _____ Date _____

Explore Circumference and Diameter Lab Feedback Box

	Expec-tation	Check In	Comments
Identify the parts of a circle.	E5		
Represent the variables and procedures of an investigation in a drawing. [Q# 6] • Identify the variables as mass and volume (Drawing) • Show the procedure (Drawing) • Label the variables (Drawing)	E9		
Measure circumference to the nearest tenth of a centimeter (Data Table). [Q# 7B]	E8		
Collect and organize data into a table and line graph to represent the relationship between variables (Data Table and Graph). [Q# 7–10]	E10		
Make point graphs and draw best-fit lines to represent ratios and proportional relationships (Graph). [Q# 10] • Make a point graph (Graph) • Draw a best-fit line (Graph)	E11		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 11–15]	E12		

Name _____ Date _____

Explore Circumference and Diameter Check-In: Questions 20–26 Feedback Box

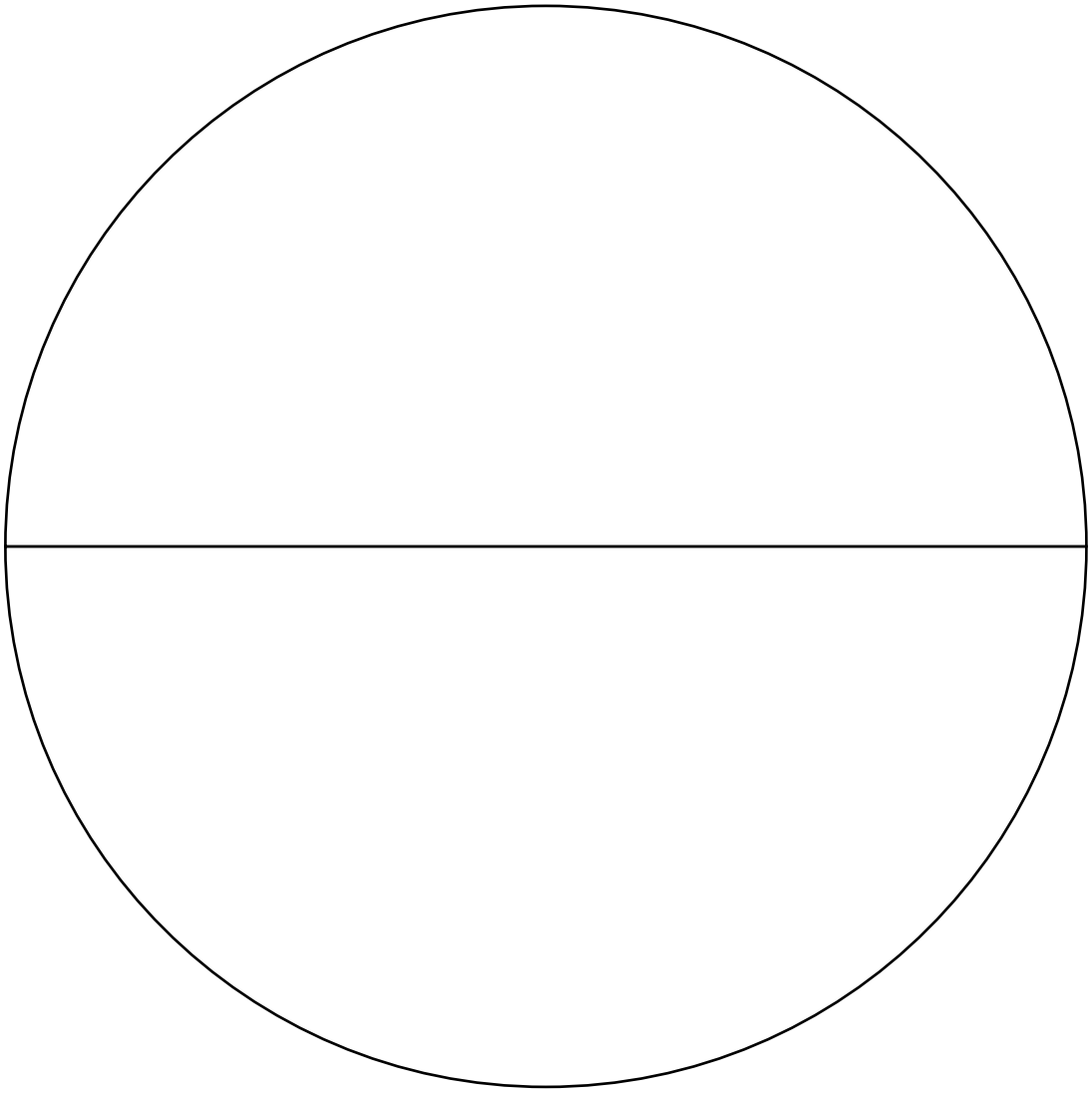
	Expectation	Check In	Comments
Represent the relationship between variables as a ratio. [Q# 20–26]	E2		
Find equivalent fractions and ratios using a variety of strategies (e.g., using models, using multiplication and division, using graphs and tables.) [Q# 20–26]	E3		
Use ratios and proportions to solve problems. [Q# 20–26]	E4		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 22]	E12		

	Yes . . .	Yes, but . . .	No, but . . .	No. . .
MPE1. Know the problem. I read the problem carefully. I know the questions to answer and what information is important. [Q# 20–21, 23–26]				
MPE6. Use labels. I use labels to show what numbers mean. [Q# 20–26]				

Name _____ Date _____

Gluing It Down

You will need glue, scissors, and string to complete this page. Cut several pieces of string that are the same length as the diameter of the circle below. Glue or tape the pieces of string around the circumference of the circle.

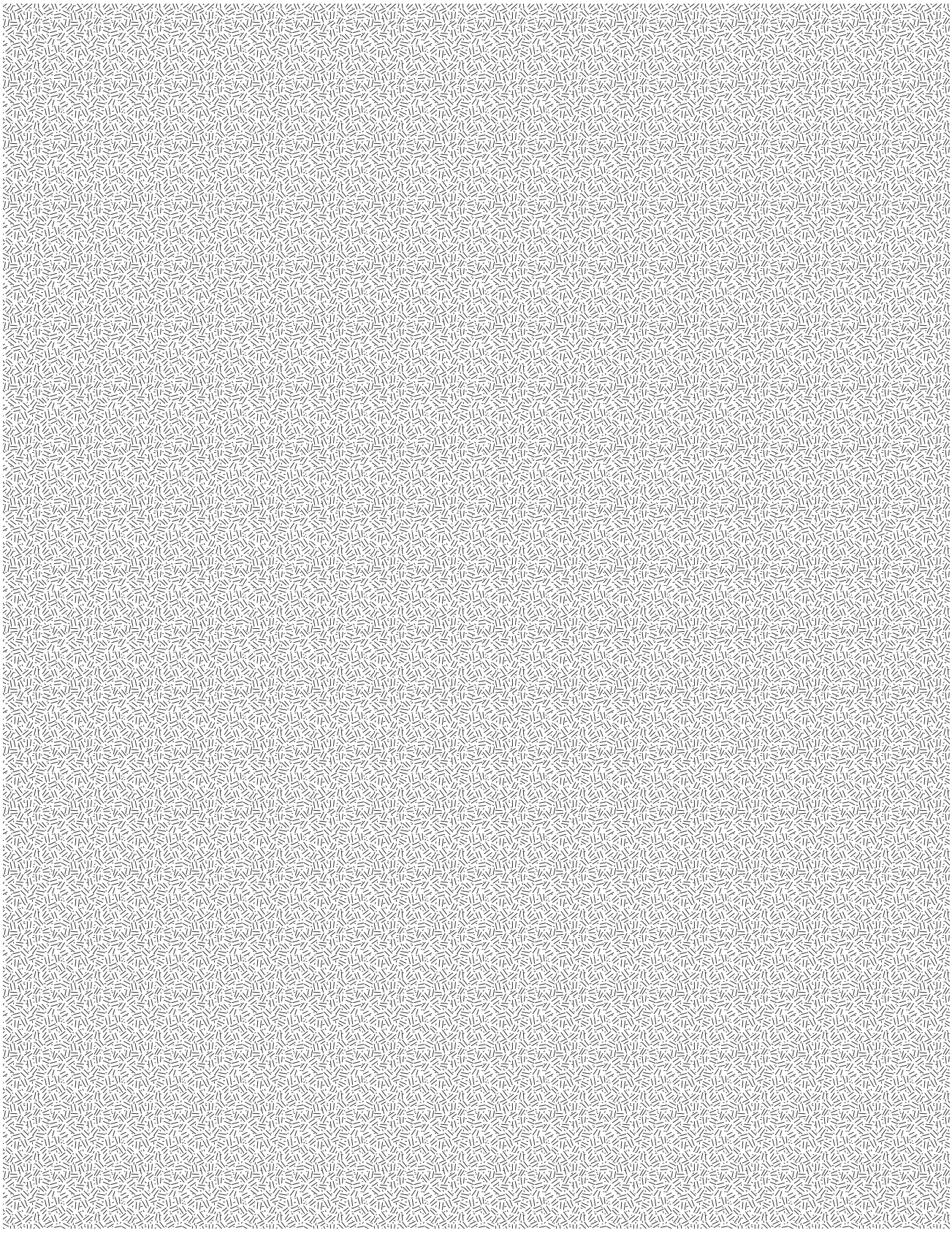


1. How many diameters are needed to fit around the circumference?
2. Lin did this activity with a smaller circle. She cut several pieces of string the length of the diameter of a smaller circle and glued them around the circumference of the smaller circle. How many pieces of string did Lin glue around her circle?

Name _____ Date _____

Digit Cards 0–9

0	5
1	6
2	7
3	8
4	9



Name _____ Date _____

Sampling and Proportion Questions 7–19 Feedback Box

	Expec-tation	Check In	Comments
Represent the variables and procedures of an investigation in a drawing. [Q# 7–10] • Identify the variables as tagged beans/bats and total number of beans/bats (Drawing) • Show the procedure (Drawing) • Label the variables (Drawing)	E9		
Collect and organize data into a table and line graph to represent the relationship between variables (Data Table and Graph). [Q# 11–12]	E10		
Make point graphs and draw best-fit lines to represent ratios and proportional relationships (Graph). [Q# 15] • Make a point graph (Graph) • Draw a best-fit line (Graph)	E11		
Use patterns in tables and line graphs to make predictions and solve problems. [Q# 13–14, 16–18]	E12		
Use ratios and proportions to solve problems. [Q# 19]	E4		

Name _____ Date _____

	Yes . . .	Yes, but . . .	No, but . . .	No. . .
MPE1. Know the problem. I read the problem carefully. I know the questions to answer and what information is important. [Q# 19B]				
MPE2. Find a strategy. I choose good tools and am efficient strategy for solving the problem. [Q# 19B]				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 19B]				
MPE6. Use labels. I use labels to show what numbers mean. [Q# 19B]				

Name _____ Date _____

End-of-Year Test

Part 1

Solve the problems in Part 1 without using a calculator. Use the pages in the *Student Guide* Reference section.

1. Solve the followings problems using the partial quotient method and one other method.

Partial Quotient	Second Method
A. $6\overline{)4206}$	
B. $7\overline{)2457}$	
C. $9\overline{)558}$	

D. Show or tell how you can use estimation to make sure your answer to Question 1A is reasonable.

E. Show how you can use multiplication to check your answer for Question 1C.

Name _____ Date _____

2. A. Lee Yah has 3278 marbles. She wants to share them with 6 firends. How many marbles will each person get? Show how you solved this.

B. Will there be any marbles left over? If so, how many?

3. A. The students at Bessie Colman School are going to see a play at the high school. There are 412 students and 15 adults attending. They will be traveling by bus. Each bus can hold 70 people in addition to the driver. How many buses will they need to make sure everyone can go on the trip? Show your work.

B. The teachers want everyone to sit together in the center section of the auditorium. There are 20 seats in each row. How many rows will they need for everyone? Show how you decided.

4. Estimate the answers to the following problems. Explain your strategy.

A. 497,000 ÷ 50 =

B. 215,000 ÷ 70 =

Name _____ Date _____

5. Irma and Keenya needed to solve 32,418 ÷ 8.

A. Irma started the problem this way. Finish it using her method.

$$\begin{array}{r|l} 8\overline{)32{,}418} & 4000 \\ \underline{32{,}000} & \\ 418 & 50 \\ \underline{400} & \\ 18 & \end{array}$$

B. Show where Irma got 4000 and the 50.

C. Keenya started to use a rectangle to solve the same problem. Complete his strategy by filling in the blanks.

32,418 ÷ 8 =

8	
8 × 4000 = 32000	4000
8 × 50 = _____	50
8 × 2 = _____	2

32,418
− 32,000
418
− ☐
☐
− 16
2

400 + ☐ + 2 = 452 R2

D. Compare Irma's and Keenya's methods. How are they alike? How are they different?

Name _____ Date _____

Part 2
You may use any of the tools you use in class. For example, you may use a ruler, calculator, hundredths circle, and pages in the *Student Guide* Reference section.

6. A. Complete the table. Write the fractions as decimals and using words.

Fraction	Decimal	Number in Words
$\frac{51}{100}$		
$\frac{6}{10}$		
$\frac{3}{50}$		
$\frac{965}{1000}$		

B. Write the decimals you wrote in the table in order from smallest to largest.

7. John solved the problem $1.5 + 2.15 = 2.30$. do you agree with John's solution? Explain why or why not. If you do not agree, make sure to show or tell how to find the correct solution in your explanation.

Name _____ Date _____

8. Choose a strategy to solve each problem. Show your solution strategy.

A. $3.56 + 1.4 =$

B. $14.3 + 7.92 =$

C. $8.64 - 4.26 =$

D. $29.053 - 11.5 =$

E. Show or tell how you used estimation to make sure your answer to Question 8B is reasonable.

F. Round your answer for Question 8A to the nearest whole number.

G. Round your answer to Question 8D to the nearest tenth.

9. Jacob used the rectangle model to solve 3.6×5.4.

	5	0.4
3	$3 \times 5 =$ _____	$3 \times 0.4 =$ _____
0.6	$0.6 \times 5 =$ _____	$0.6 \times 0.4 =$ _____

Complete Jacob's work. Find the product by first finding each partial product.

Name _____ Date _____

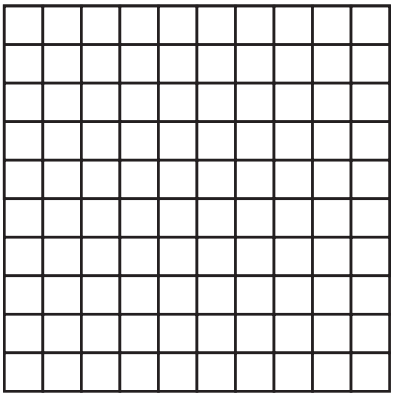
10. A. Estimate the answer for 5.24×3.2. Show or tell how you made your estimate.

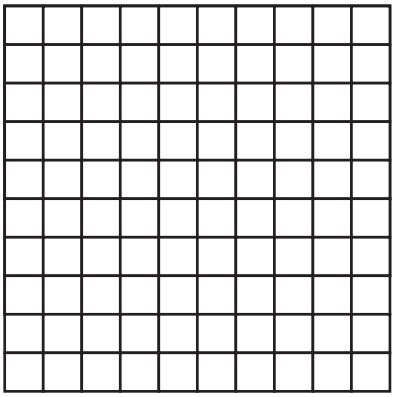
B. Use a paper-and-pencil method to find an exact answer for 5.24×3.2. Show your work.

11. $1.8 \div 0.09$

A. Estimate the quotient. Will it be greater than or less than 1.8?

B. Solve $1.8 \div 0.09$ using the grids below.





Name _____ Date _____

12. For each problem, circle the better estimate. Do not find the exact answer.

A.	$\frac{1}{6} + \frac{1}{3} =$	less than 1	more than 1
B.	$\frac{2}{8} + \frac{4}{5} =$	less than 1	more than 1
C.	$\frac{7}{10} + \frac{8}{15} + \frac{5}{12} =$	less than 2	more than 2
D.	$1\frac{2}{3} - \frac{5}{6} =$	less than 1	more than 1
E.	$2\frac{3}{4} - \frac{7}{10} =$	less than 2	more than 2
F.	$\frac{2}{3} \times 2 =$	less than 1	more than 1
G.	$\frac{3}{4} \times \frac{1}{3} =$	less than 1	more than 1
H.	$\frac{1}{2} \div 4 =$	less than 1	more than 1
I.	$6 \div \frac{1}{2} =$	less than 1	more than 1

13. Choose a strategy to solve each problem. Write each answer in simplest form.

A. $\frac{3}{5} + \frac{5}{8} =$

B. $1\frac{7}{10} + 5\frac{2}{3} =$

C. $\frac{9}{10} - \frac{3}{4} =$

D. $3\frac{3}{4} - 2\frac{1}{12} =$

E. Show or tell how you used estimation to make sure your answer to Question 13B is reasonable.

Name _____ Date _____

14. Choose a strategy to solve each problem. Write each answer in simplest form.

A. $4 \times \frac{3}{4} =$

B. $\frac{1}{2} \times \frac{5}{8} =$

C. $7 \div \frac{1}{6} =$

D. $\frac{1}{2} \div 5 =$

E. Draw a picture to show how you solved Question 14D.

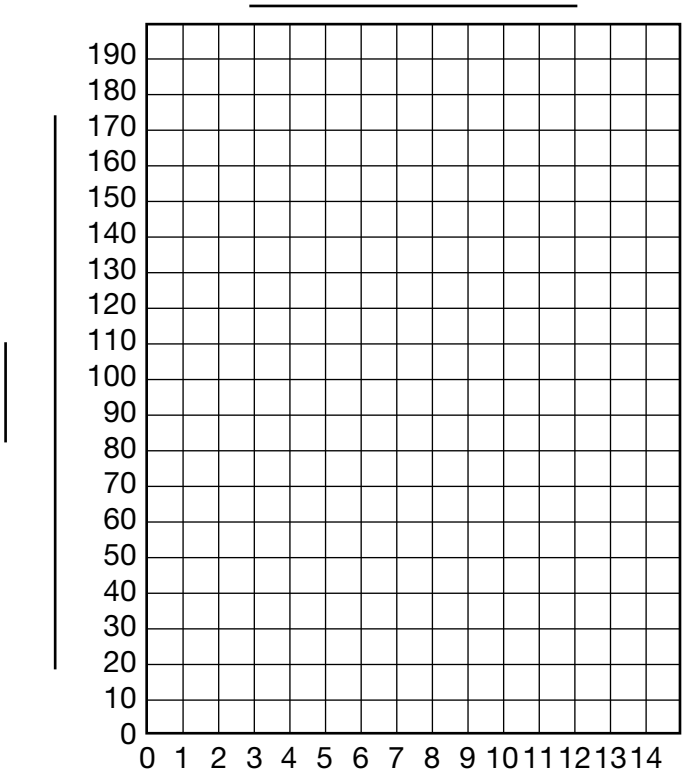
Name _____ Date _____

15. The students at Bessie Coleman Elementary School started a paper recycling project. Each week, the students collect the used paper from each classroom. They weigh the paper and then take it to a recycling center. The students made a data table showing the total amount of paper they recycled so far. Here is their data table after 4 weeks.

Paper Recycling

T **Time in Weeks**	***N*** **Total Number of Pounds Recycled**
1	37
2	78
3	
4	154

Use the data table to make a graph showing the total number of pounds of paper the students have recycled. Draw a best-fit line on your graph. Use your best-fit line to estimate the number of pounds recycled after three weeks. Add this number to your data table.



Name _____ Date _____

16. Use your graph and data table from Question 15 to solve the following problems.

A. If, after four weeks, the students recycled a total of 154 pounds of paper, about how many pounds of paper are they recycling per week? Show or tell how you found your answer.

B. Choose a point on the line and use it to write a fraction to show the ratio of the number of pounds of paper recycled to time in weeks.

C. For every 117 pounds of paper students recycle, they can save one average-size tree. About how many weeks will students have to recycle to save one tree? Show or tell how you found your answer.

D. If there are 36 weeks in a school year, about how many trees can students save in one school year? Show how you solved this problem.

Name _____ Date _____

End-of-Year Test Feedback Box

	Yes . . .	Yes, but . . .	No, but . . .	No. . .
MPE1. Know the problem. I read the problem carefully. I know the questions to answer and what information is important. [Q# 4–5, 16]				
MPE2. Find a strategy. I choose good tools and am efficient strategy for solving the problem. [Q# 1A–C, 2–4, 8A–E, 13–14]				
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# 1D, 8E, 10–12, 13E)				
MPE4. Check my calculations. If I make mistakes I correct them. (Q# 1E)				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 2–4, 7, 16]				
MPE6. Use labels. I use labels to show what numbers mean. [Q# 2–3, 16]				