

# LETTER HOME

## Exploring Volume with Addition and Subtraction

Dear Family Member:

Over 2000 years ago, the Greek scientist Archimedes discovered a clever way to find the volume of an object: sink the object in water and then measure the volume of water that is displaced by that object. This unit allows your child to follow in Archimedes' footsteps as he or she explores finding the volume of objects.

Your child will fill a graduated cylinder with a specific amount of water, place different objects in the water, and read the scale on the cylinder to determine the volume of the objects. This activity provides a real life context for practicing addition and subtraction of two-digit numbers. Students calculate the volume of the objects by subtracting the beginning scale reading from the reading after they submerge the objects. They also solve other problems about volume, again using addition and subtraction of two-digit numbers. You can reinforce these concepts by working with your child on a related homework assignment in which objects are immersed in a container of water.

Help your child at home by doing the following:

- **Interpreting Scales.** Create a problem for your child to solve using scales. Pour water and oil in a glass measuring cup. After the water and oil separate, ask your child to find the ounces of water, the ounces of oil, and the total amount of liquid in the cup.

### Math Facts and Mental Math

Students' fluency with the subtraction facts related to the addition facts in Group C will be assessed in this unit.

Group C:  $9 - 2$ ,  $9 - 3$ ,  $9 - 6$ ,  $9 - 7$ ,  $10 - 1$ ,  $10 - 2$ ,  $10 - 3$ ,  
 $10 - 4$ ,  $10 - 5$ ,  $10 - 6$ ,  $10 - 7$ ,  $10 - 8$ ,  $10 - 9$ ,  
 $11 - 2$ ,  $11 - 3$ ,  $11 - 4$ ,  $11 - 5$ ,  $11 - 6$ ,  $11 - 7$ ,  
 $11 - 8$ ,  $11 - 9$

You can help your child review these facts using the flash cards the teacher sent home or by making a set of flash cards from index cards or scrap paper. Study the facts in small groups each night. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

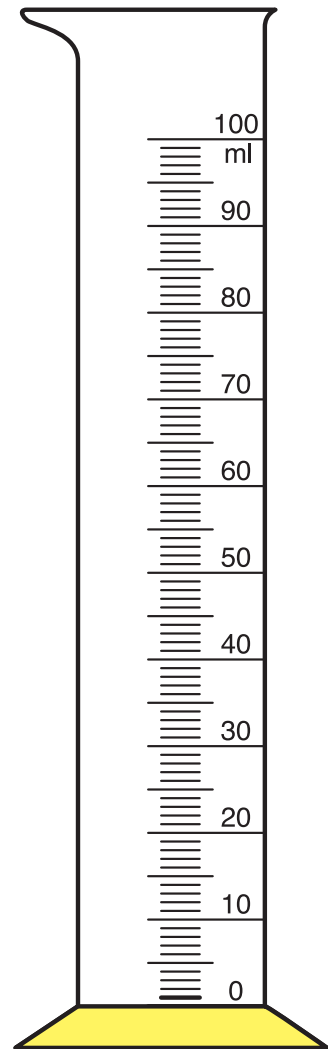
For Facts I Need to Learn, work on strategies for figuring them out.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use strategies to solve problems like these using mental math:  $90 - 20$  (practices  $9 - 2$ ),  $900 - 700$  (practices  $9 - 7$ ).

Thank you for your interest in your child's math. Your continued efforts at home make a difference.

Sincerely,



Your child will use a graduated cylinder to measure volume in cubic centimeters.

# Unit 11: Home Practice

## Part 1 Subtraction Flash Cards: Group C

Take home your Triangle Flash Cards: Group C. Ask a family member to choose one flash card at a time for you to solve. Sort the flash cards into three piles: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn. Update your *Subtraction Facts I Know* chart. Clip the cards in the Facts I Know Quickly pile together and place them back into the envelope. Practice the facts in the last two piles again.

## Part 2 Subtraction Practice with Tens and Hundreds

A.  $10 - 2 = \square$

D.  $\square = 10 - 4$

G.  $\square = 11 - 4$

B.  $100 - 20 = \square$

E.  $\square = 100 - 40$

H.  $\square = 110 - 40$

C.  $1000 - 200 = \square$

F.  $\square = 1000 - 400$

I.  $\square = 1100 - 400$

J. Show or tell how you would use addition to solve Question G.

**Part 3** Fact Families

1. Complete each fact family.

**A.**  $7 + 3 = \square$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**B.**  $6 + 5 = \square$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**C.**  $3 + 6 = \square$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**D.**  $10 - 5 = \square$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**E.**  $11 - 2 = \square$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**F.**  $9 - 7 = \square$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Tell if each number sentence is true or false. If it is false, rewrite the problem and make it true.

**A.**  $10 - 2 = 2 + 6$  \_\_\_\_\_

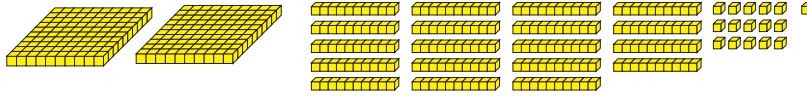
**B.**  $70 + 30 = 90 + 11$  \_\_\_\_\_

**C.**  $5 + 3 = 9 - 1$  \_\_\_\_\_

**D.** Show or tell how you solved Question B.

**Part 4** Name the Number

1. A. Write a number sentence for the base-ten pieces.



\_\_\_\_\_

B. What number is shown? \_\_\_\_\_

C. Show the number using the fewest pieces.

2. Find the number using the clues. Write a number sentence for each.

A. I am 19 more than 132. What number am I? \_\_\_\_\_

Number sentence \_\_\_\_\_

B. I am 42 less than 71. What number am I? \_\_\_\_\_

Number sentence \_\_\_\_\_

C. I am 56 doubled. What number am I? \_\_\_\_\_

Number sentence \_\_\_\_\_

D. I am half of 190. What number am I? \_\_\_\_\_

Number sentence \_\_\_\_\_

E. Explain how you found your answer for Question D.

**Part 5 Help Them Finish: Subtraction**

1. Three students started to solve these problems. Help them finish.

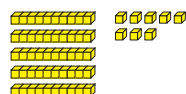
A.

$$\begin{array}{r} 71 \\ - 38 \\ \hline \end{array}$$



B.

$$\begin{array}{r} 58 \\ - 38 \\ \hline \end{array}$$



C.

$$\begin{array}{r} 65 \\ - 37 \\ \hline \end{array}$$

$$60 + 5$$

$$\begin{array}{r} 30 + 7 \\ \hline \end{array}$$

2. Choose your own strategy or method to solve. Use the *Subtraction Strategies Menu* in the *Student Activity Book* Reference section.

A.

$$\begin{array}{r} 92 \\ - 49 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 38 \\ - 29 \\ \hline \end{array}$$

**Part 6** Help Them Finish: Addition

Julia, Mark, Levi, and Emily started the problem below. Help the students finish the problem using their strategies. Use the *Addition Strategies Menu* in the *Student Activity Book* Reference section.

1.  $69 + 47 =$

Levi's method:

$$\begin{array}{r} 69 = 60 + 9 \\ + 47 = \underline{\quad\quad} \end{array}$$

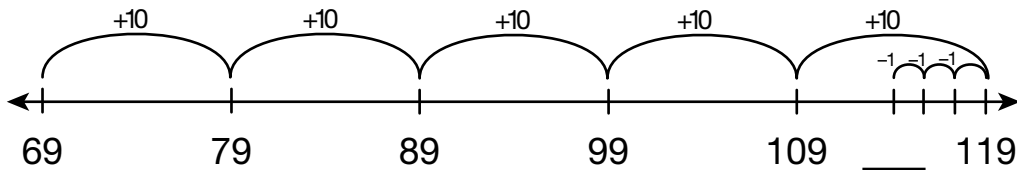
2.  $69 + 47 =$

Julia's method:

$$\begin{array}{r} \phantom{1} \\ 69 \\ + 47 \\ \hline \end{array}$$

3.  $69 + 47 =$

Emily's method:



Number sentence \_\_\_\_\_

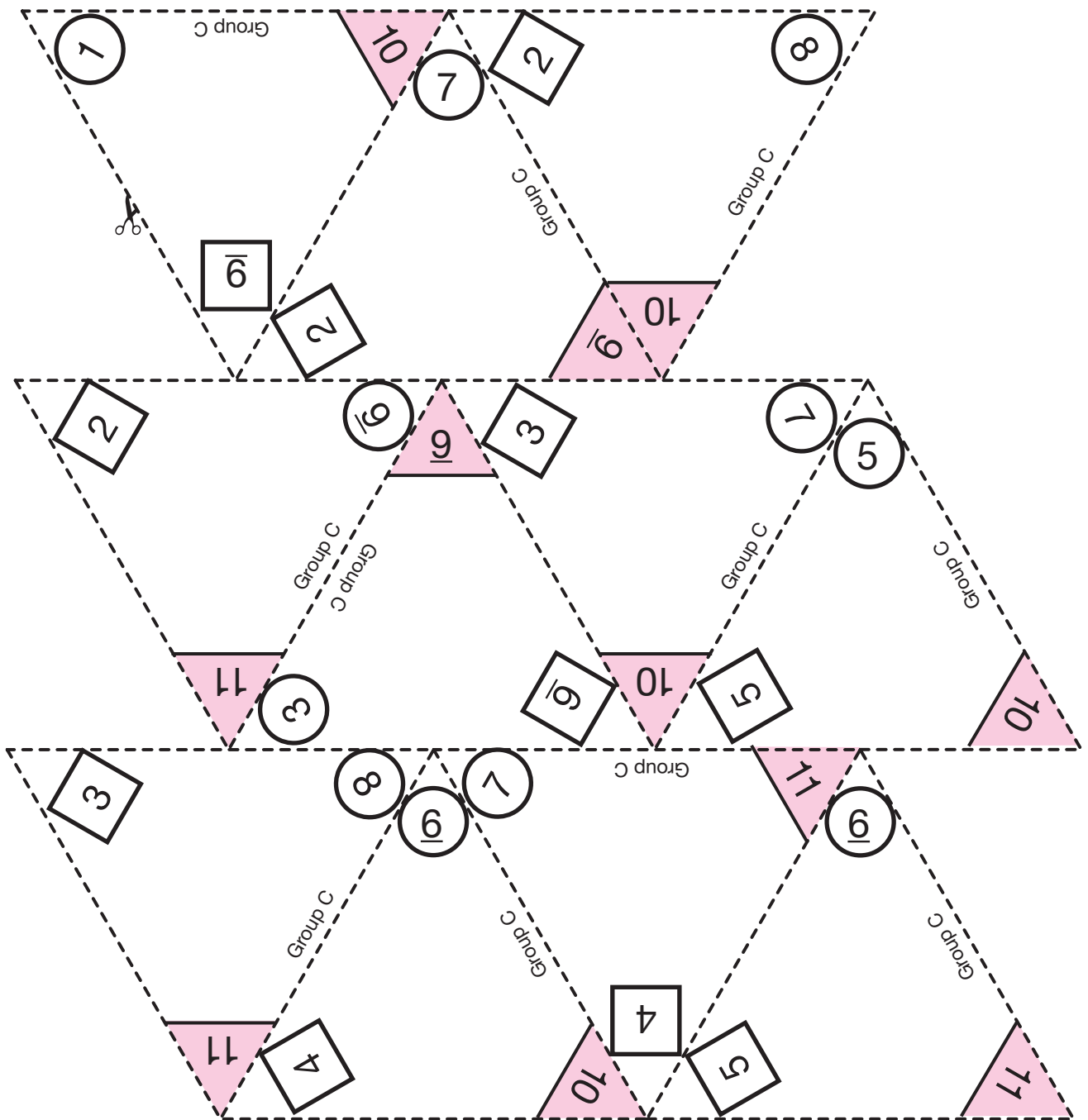
4.  $69 + 47 =$

Mark's method:

$$\begin{array}{r} 69 \\ + 47 \\ \hline 100 \\ + \underline{\quad\quad} \end{array}$$

# Triangle Flash Cards: Group C

- To practice an addition fact, cover the corner with the highest number. Add the two uncovered numbers.
- To practice a subtraction fact, cover one of the smaller numbers and subtract from the highest number.



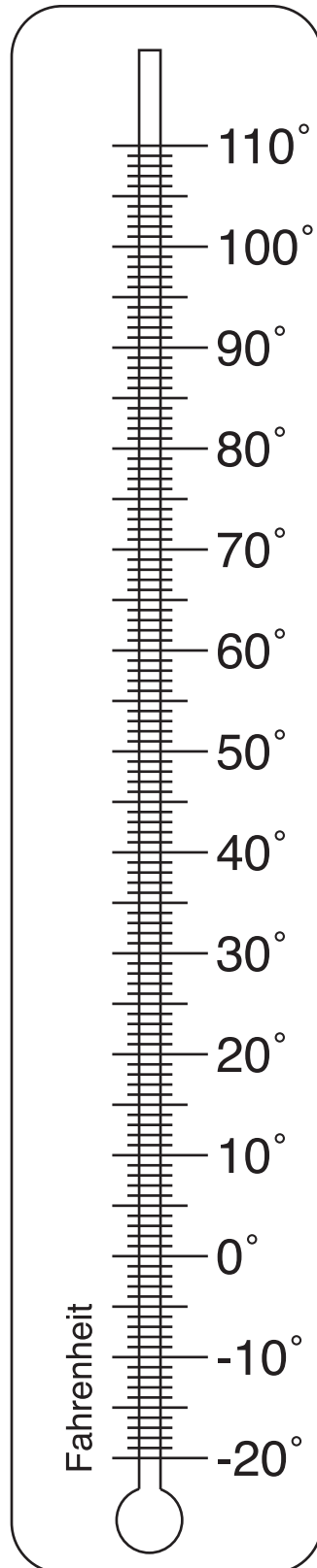
# Subtraction Facts I Know

**Circle the subtraction facts you know and can answer quickly.**

$\begin{array}{r} 0 \\ -0 \\ \hline 0 \end{array}$	$\begin{array}{r} 1 \\ -0 \\ \hline 1 \end{array}$	$\begin{array}{r} 2 \\ -0 \\ \hline 2 \end{array}$	$\begin{array}{r} 3 \\ -0 \\ \hline 3 \end{array}$	$\begin{array}{r} 4 \\ -0 \\ \hline 4 \end{array}$	$\begin{array}{r} 5 \\ -0 \\ \hline 5 \end{array}$	$\begin{array}{r} 6 \\ -0 \\ \hline 6 \end{array}$	$\begin{array}{r} 7 \\ -0 \\ \hline 7 \end{array}$	$\begin{array}{r} 8 \\ -0 \\ \hline 8 \end{array}$	$\begin{array}{r} 9 \\ -0 \\ \hline 9 \end{array}$
$\begin{array}{r} 1 \\ -1 \\ \hline 0 \end{array}$	$\begin{array}{r} 2 \\ -1 \\ \hline 1 \end{array}$	$\begin{array}{r} 3 \\ -1 \\ \hline 2 \end{array}$	$\begin{array}{r} 4 \\ -1 \\ \hline 3 \end{array}$	$\begin{array}{r} 5 \\ -1 \\ \hline 4 \end{array}$	$\begin{array}{r} 6 \\ -1 \\ \hline 5 \end{array}$	$\begin{array}{r} 7 \\ -1 \\ \hline 6 \end{array}$	$\begin{array}{r} 8 \\ -1 \\ \hline 7 \end{array}$	$\begin{array}{r} 9 \\ -1 \\ \hline 8 \end{array}$	$\begin{array}{r} 10 \\ -1 \\ \hline 9 \end{array}$
$\begin{array}{r} 2 \\ -2 \\ \hline 0 \end{array}$	$\begin{array}{r} 3 \\ -2 \\ \hline 1 \end{array}$	$\begin{array}{r} 4 \\ -2 \\ \hline 2 \end{array}$	$\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$	$\begin{array}{r} 6 \\ -2 \\ \hline 4 \end{array}$	$\begin{array}{r} 7 \\ -2 \\ \hline 5 \end{array}$	$\begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$	$\begin{array}{r} 9 \\ -2 \\ \hline 7 \end{array}$	$\begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array}$	$\begin{array}{r} 11 \\ -2 \\ \hline 9 \end{array}$
$\begin{array}{r} 3 \\ -3 \\ \hline 0 \end{array}$	$\begin{array}{r} 4 \\ -3 \\ \hline 1 \end{array}$	$\begin{array}{r} 5 \\ -3 \\ \hline 2 \end{array}$	$\begin{array}{r} 6 \\ -3 \\ \hline 3 \end{array}$	$\begin{array}{r} 7 \\ -3 \\ \hline 4 \end{array}$	$\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$	$\begin{array}{r} 9 \\ -3 \\ \hline 6 \end{array}$	$\begin{array}{r} 10 \\ -3 \\ \hline 7 \end{array}$	$\begin{array}{r} 11 \\ -3 \\ \hline 8 \end{array}$	$\begin{array}{r} 12 \\ -3 \\ \hline 9 \end{array}$
$\begin{array}{r} 4 \\ -4 \\ \hline 0 \end{array}$	$\begin{array}{r} 5 \\ -4 \\ \hline 1 \end{array}$	$\begin{array}{r} 6 \\ -4 \\ \hline 2 \end{array}$	$\begin{array}{r} 7 \\ -4 \\ \hline 3 \end{array}$	$\begin{array}{r} 8 \\ -4 \\ \hline 4 \end{array}$	$\begin{array}{r} 9 \\ -4 \\ \hline 5 \end{array}$	$\begin{array}{r} 10 \\ -4 \\ \hline 6 \end{array}$	$\begin{array}{r} 11 \\ -4 \\ \hline 7 \end{array}$	$\begin{array}{r} 12 \\ -4 \\ \hline 8 \end{array}$	$\begin{array}{r} 13 \\ -4 \\ \hline 9 \end{array}$
$\begin{array}{r} 5 \\ -5 \\ \hline 0 \end{array}$	$\begin{array}{r} 6 \\ -5 \\ \hline 1 \end{array}$	$\begin{array}{r} 7 \\ -5 \\ \hline 2 \end{array}$	$\begin{array}{r} 8 \\ -5 \\ \hline 3 \end{array}$	$\begin{array}{r} 9 \\ -5 \\ \hline 4 \end{array}$	$\begin{array}{r} 10 \\ -5 \\ \hline 5 \end{array}$	$\begin{array}{r} 11 \\ -5 \\ \hline 6 \end{array}$	$\begin{array}{r} 12 \\ -5 \\ \hline 7 \end{array}$	$\begin{array}{r} 13 \\ -5 \\ \hline 8 \end{array}$	$\begin{array}{r} 14 \\ -5 \\ \hline 9 \end{array}$
$\begin{array}{r} 6 \\ -6 \\ \hline 0 \end{array}$	$\begin{array}{r} 7 \\ -6 \\ \hline 1 \end{array}$	$\begin{array}{r} 8 \\ -6 \\ \hline 2 \end{array}$	$\begin{array}{r} 9 \\ -6 \\ \hline 3 \end{array}$	$\begin{array}{r} 10 \\ -6 \\ \hline 4 \end{array}$	$\begin{array}{r} 11 \\ -6 \\ \hline 5 \end{array}$	$\begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$	$\begin{array}{r} 13 \\ -6 \\ \hline 7 \end{array}$	$\begin{array}{r} 14 \\ -6 \\ \hline 8 \end{array}$	$\begin{array}{r} 15 \\ -6 \\ \hline 9 \end{array}$
$\begin{array}{r} 7 \\ -7 \\ \hline 0 \end{array}$	$\begin{array}{r} 8 \\ -7 \\ \hline 1 \end{array}$	$\begin{array}{r} 9 \\ -7 \\ \hline 2 \end{array}$	$\begin{array}{r} 10 \\ -7 \\ \hline 3 \end{array}$	$\begin{array}{r} 11 \\ -7 \\ \hline 4 \end{array}$	$\begin{array}{r} 12 \\ -7 \\ \hline 5 \end{array}$	$\begin{array}{r} 13 \\ -7 \\ \hline 6 \end{array}$	$\begin{array}{r} 14 \\ -7 \\ \hline 7 \end{array}$	$\begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$	$\begin{array}{r} 16 \\ -7 \\ \hline 9 \end{array}$
$\begin{array}{r} 8 \\ -8 \\ \hline 0 \end{array}$	$\begin{array}{r} 9 \\ -8 \\ \hline 1 \end{array}$	$\begin{array}{r} 10 \\ -8 \\ \hline 2 \end{array}$	$\begin{array}{r} 11 \\ -8 \\ \hline 3 \end{array}$	$\begin{array}{r} 12 \\ -8 \\ \hline 4 \end{array}$	$\begin{array}{r} 13 \\ -8 \\ \hline 5 \end{array}$	$\begin{array}{r} 14 \\ -8 \\ \hline 6 \end{array}$	$\begin{array}{r} 15 \\ -8 \\ \hline 7 \end{array}$	$\begin{array}{r} 16 \\ -8 \\ \hline 8 \end{array}$	$\begin{array}{r} 17 \\ -8 \\ \hline 9 \end{array}$
$\begin{array}{r} 9 \\ -9 \\ \hline 0 \end{array}$	$\begin{array}{r} 10 \\ -9 \\ \hline 1 \end{array}$	$\begin{array}{r} 11 \\ -9 \\ \hline 2 \end{array}$	$\begin{array}{r} 12 \\ -9 \\ \hline 3 \end{array}$	$\begin{array}{r} 13 \\ -9 \\ \hline 4 \end{array}$	$\begin{array}{r} 14 \\ -9 \\ \hline 5 \end{array}$	$\begin{array}{r} 15 \\ -9 \\ \hline 6 \end{array}$	$\begin{array}{r} 16 \\ -9 \\ \hline 7 \end{array}$	$\begin{array}{r} 17 \\ -9 \\ \hline 8 \end{array}$	$\begin{array}{r} 18 \\ -9 \\ \hline 9 \end{array}$
$\begin{array}{r} 10 \\ -10 \\ \hline 0 \end{array}$	$\begin{array}{r} 11 \\ -10 \\ \hline 1 \end{array}$	$\begin{array}{r} 12 \\ -10 \\ \hline 2 \end{array}$	$\begin{array}{r} 13 \\ -10 \\ \hline 3 \end{array}$	$\begin{array}{r} 14 \\ -10 \\ \hline 4 \end{array}$	$\begin{array}{r} 15 \\ -10 \\ \hline 5 \end{array}$	$\begin{array}{r} 16 \\ -10 \\ \hline 6 \end{array}$	$\begin{array}{r} 17 \\ -10 \\ \hline 7 \end{array}$	$\begin{array}{r} 18 \\ -10 \\ \hline 8 \end{array}$	$\begin{array}{r} 19 \\ -10 \\ \hline 9 \end{array}$

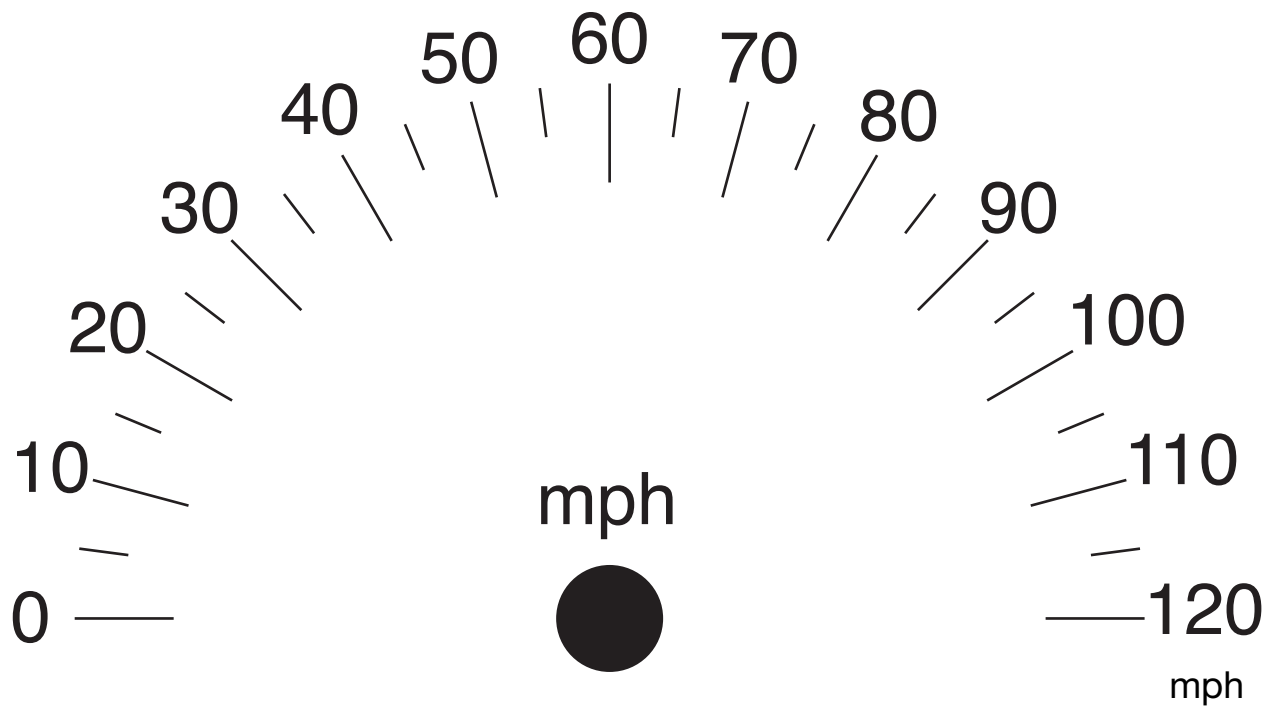


# Thermometer

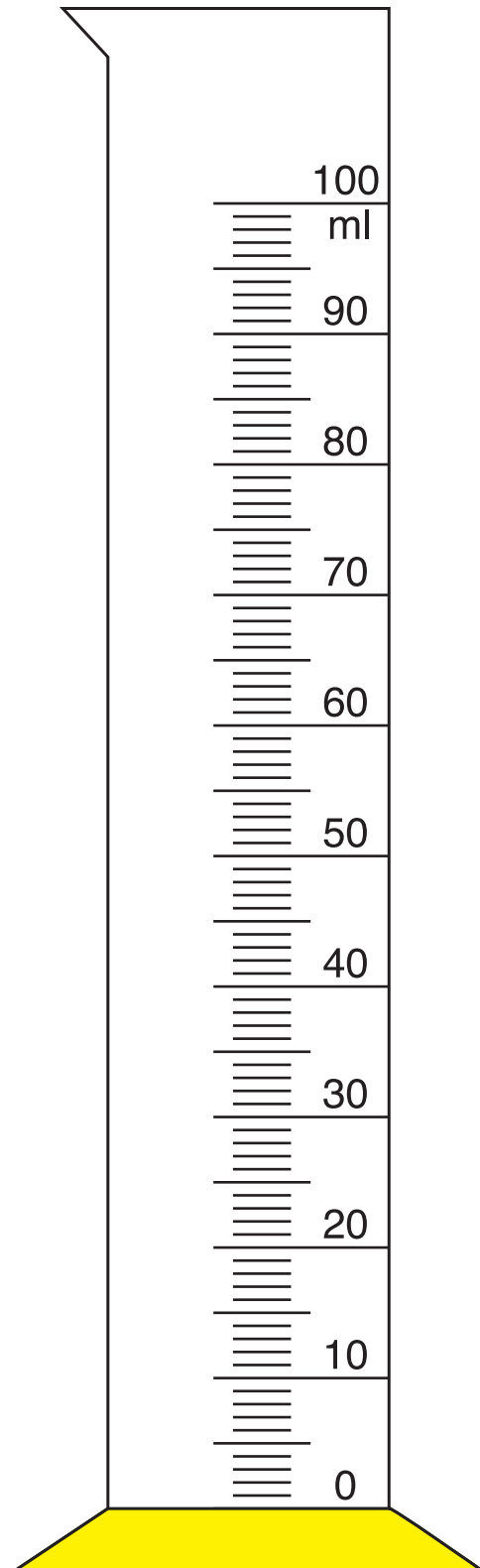


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# Speedometer

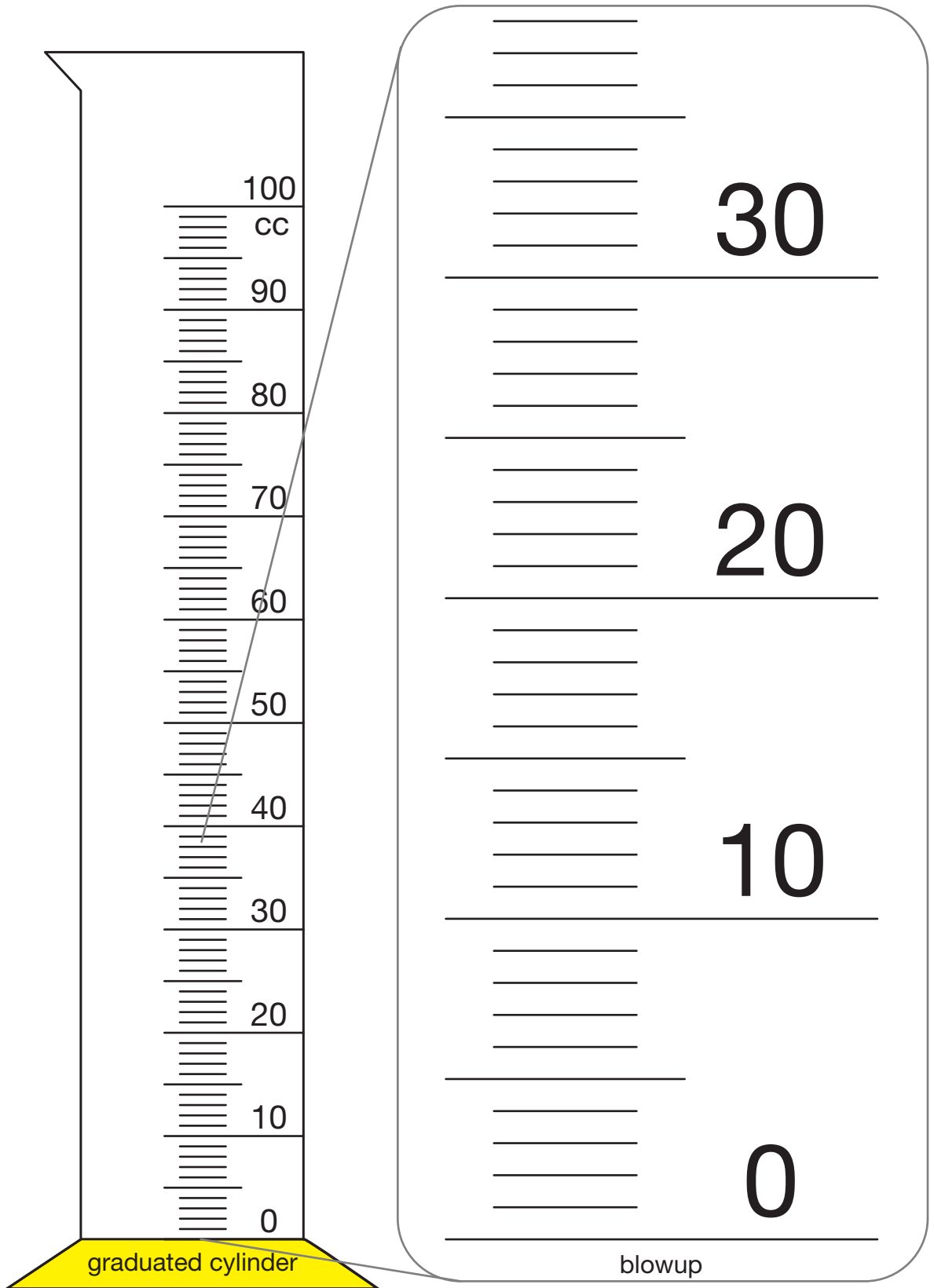


# Graduated Cylinder



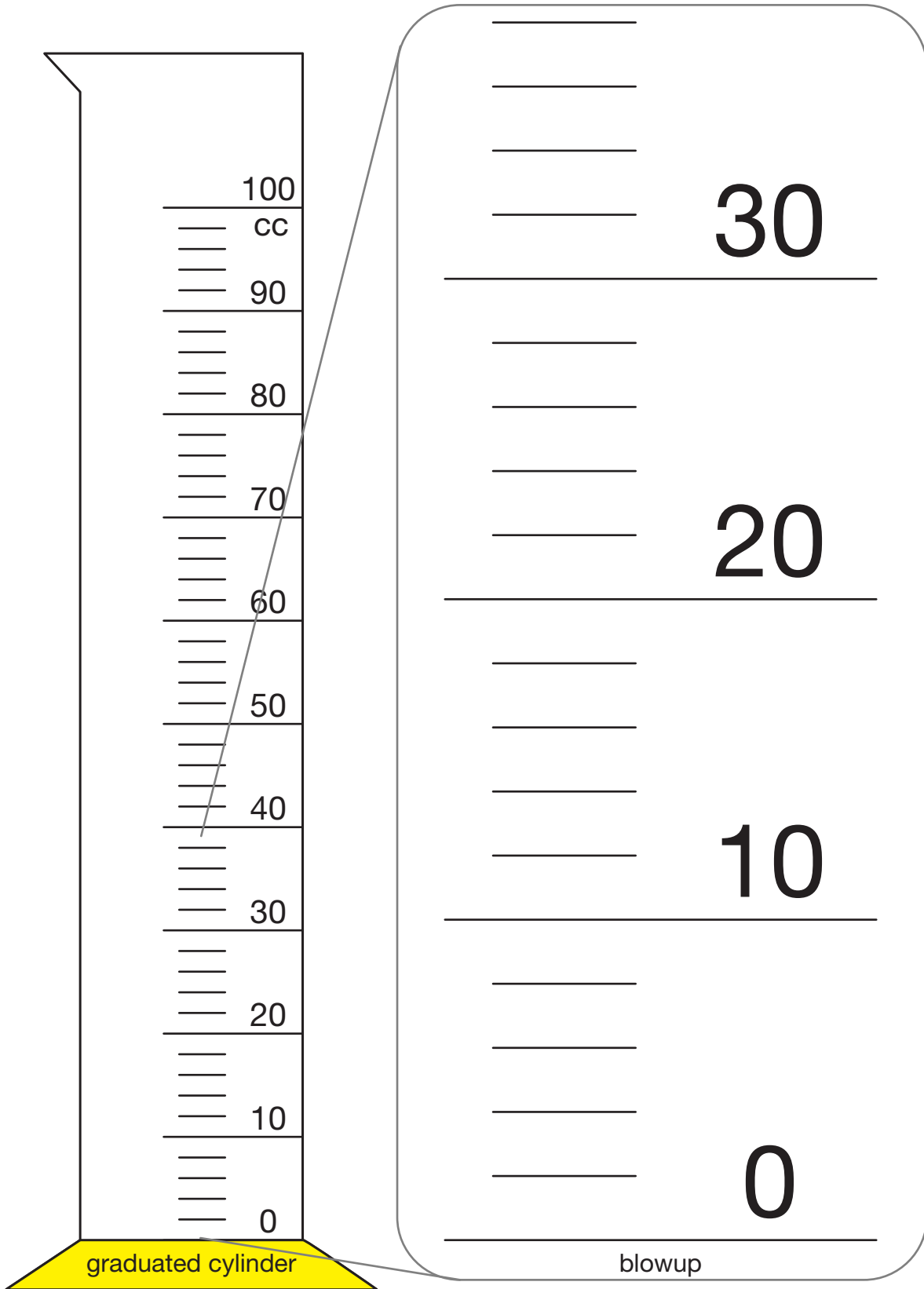
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# Scale 1 with Blowup



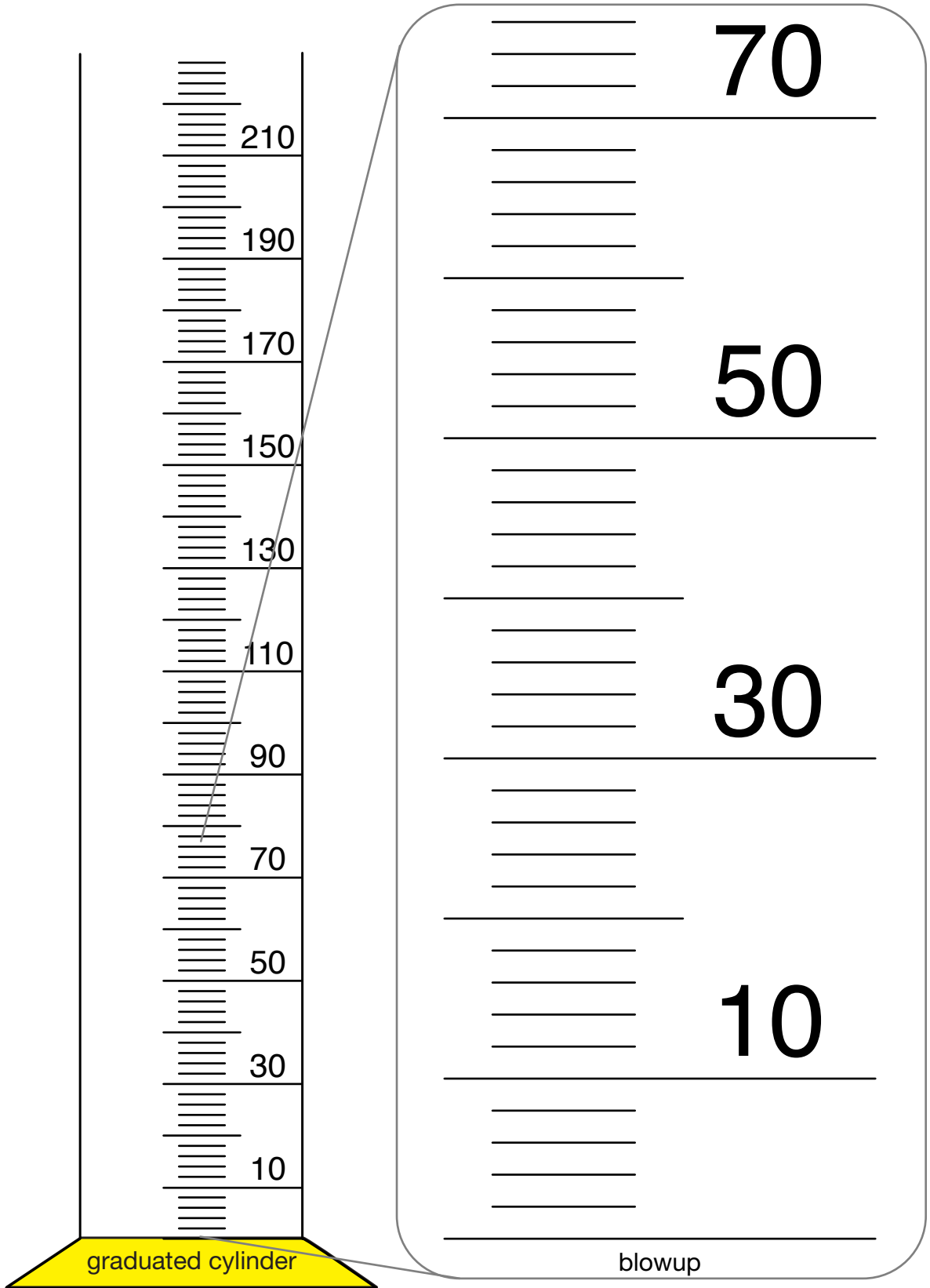
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# Scale 2 with Blowup



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# Scale 3 with Blowup



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# Reading Scales at Home



Dear Family Member:

In class we have been reading scales on tools such as thermometers, metersticks, and graduated cylinders. Please help your child determine how the scale is marked to find measurements (i.e. counting by two, fives, tens, etc.). Then help your child read scale on tools at home.

Thank you.

1. Read the graduated cylinder scale to the right. Write a number for each letter. Remember to label your answers.

A. \_\_\_\_\_

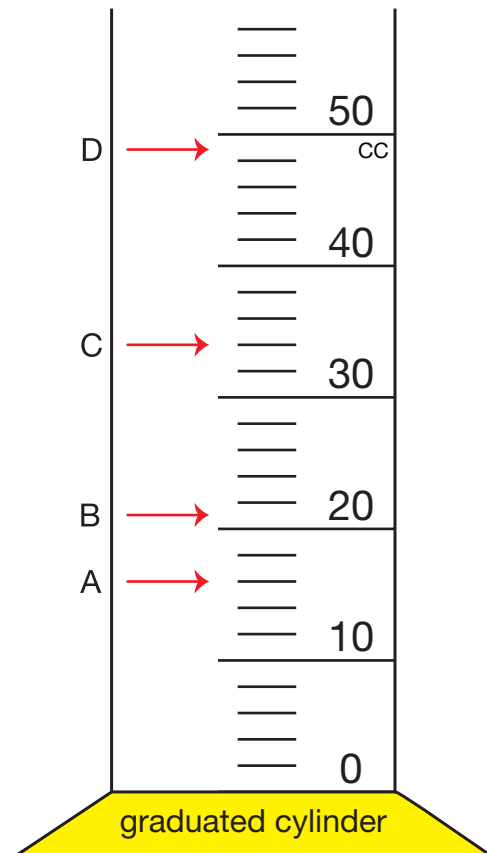
B. \_\_\_\_\_

C. \_\_\_\_\_

D. \_\_\_\_\_

E. Find 8. Mark it E →.

F. Find 41. Mark it F →.



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Add or subtract.

$$\begin{array}{r} 2. \quad 135 \\ + 27 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 168 \\ + 41 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 146 \\ - 9 \\ \hline \end{array}$$

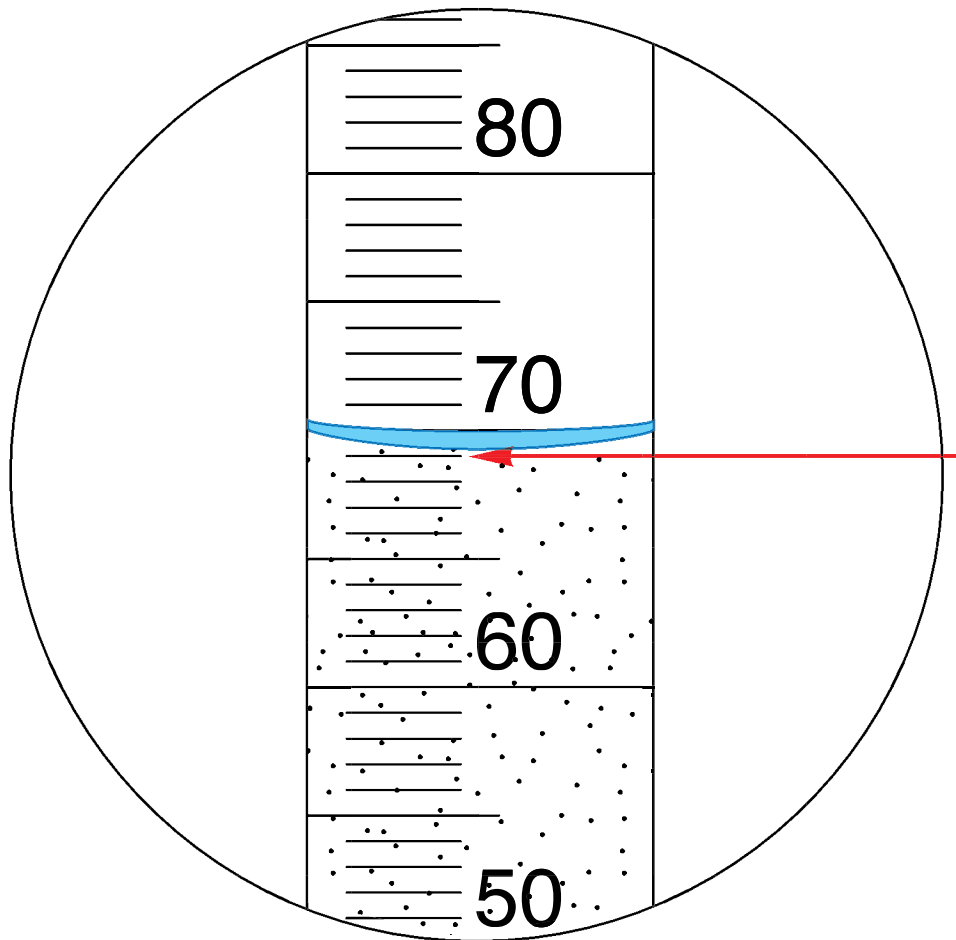
$$\begin{array}{r} 5. \quad 97 \\ - 18 \\ \hline \end{array}$$

6. Look for a scale in your home. (Suggested places could be on a radio, bathroom scale, glass measuring cups, refrigerator controls). Draw a picture of it below.

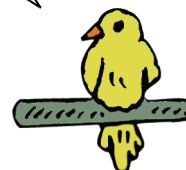
What does this scale measure? \_\_\_\_\_



# Meniscus



Read the volume from the bottom of the meniscus.

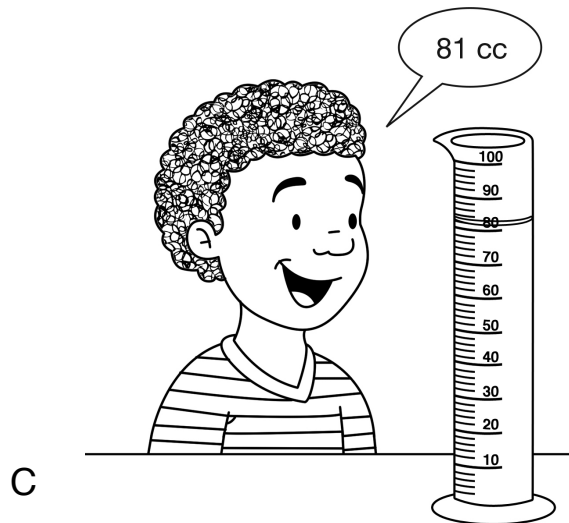
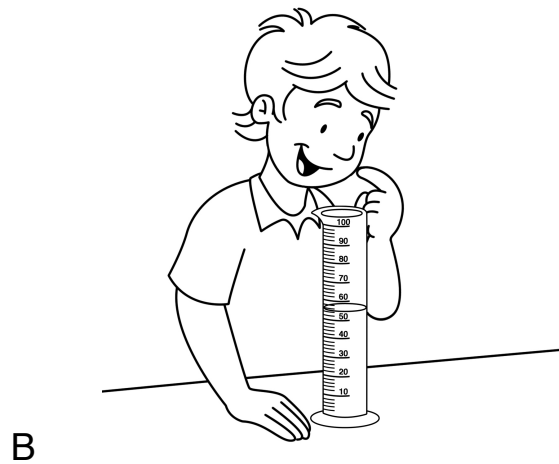
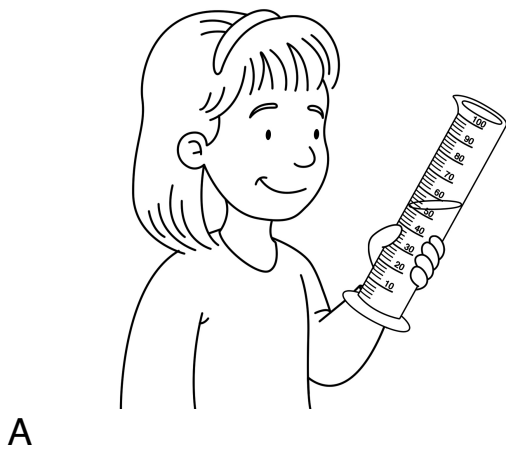


# Looking at the Graduated Cylinder

Ms. Gomez and her class are working with graduated cylinders for the first time. They are talking about things they have to remember when they measure volume using the graduated cylinder.

What do you see wrong in the pictures below?

What do you see that is correct?



# Cups and Cylinders



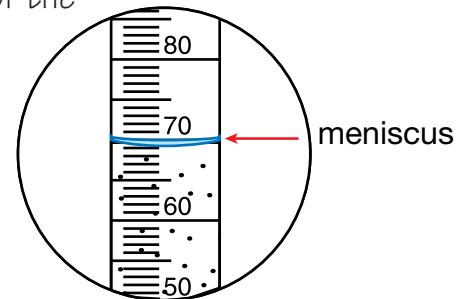
Dear Family Member:

In class we have been learning how to read scales to find the volume of a liquid and solving problems involving volume. Using the correct procedure and checking the scale on the measuring tool is important to finding the volume accurately.

At home you sometimes measure volume using a measuring cup with a scale on it. In school we have been using a scientific tool called the graduated cylinder. When you measure using a glass or plastic measuring cup, you may have noticed that the water creeps up the sides of the cup a small amount. This is called the meniscus. To get an accurate reading, you have to read the bottom of the meniscus.

Please help your child explain errors and correct procedure, then read the scales to solve problems in the following questions.

Thank you.



A graduated cylinder containing 69 cc

## Reading a 2-Cup Measure

1. Look at the three pictures. Each of the three children is trying to read the water level in a 2-cup measuring cup. Explain the correct and incorrect methods you see.

Picture A




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Picture B



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Picture C



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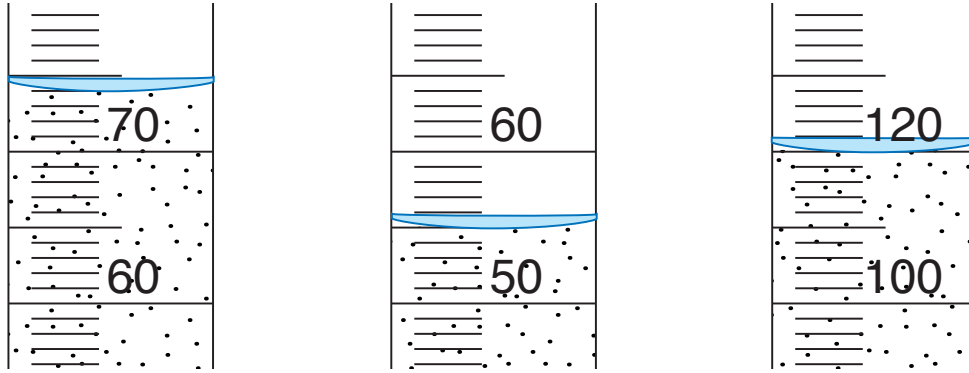
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## Volume Problems

2. Find the volume of water in the cylinders and solve the problems. Check the scale on each graduated cylinder. Then write the volume of the water in each. Remember to use labels.



A. \_\_\_\_\_ B. \_\_\_\_\_ C. \_\_\_\_\_

- D. How much more water is in Cylinder C than Cylinder B?

Number sentence \_\_\_\_\_

- E. Luis added 52 more cubic centimeters of water to Cylinder A. How much water is there now?

Number sentence \_\_\_\_\_

- F. Luis poured 37 cubic centimeters of water out of Cylinder C. How much water is left in the cylinder?

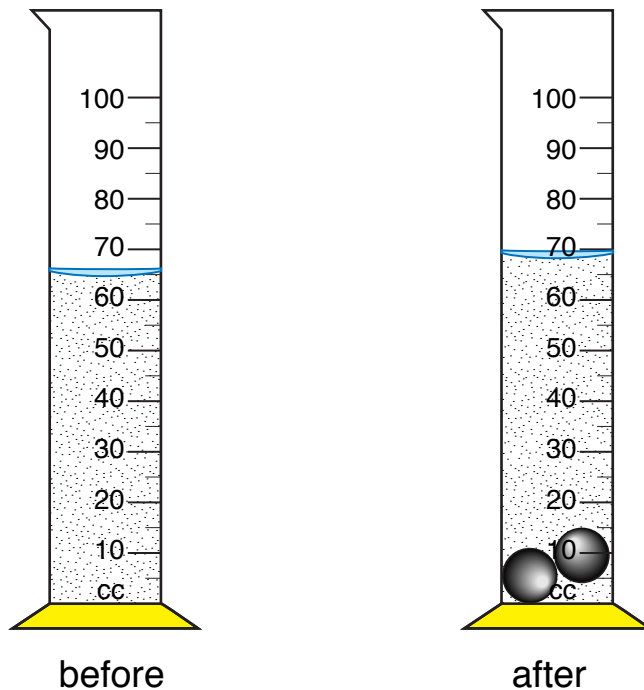
Number sentence \_\_\_\_\_



# Volume Math

Armando is getting ready to measure volume. His teacher wants him to think about ways to find the volume of different objects.

Armando begins by putting 65 cc of water in a graduated cylinder. He then drops two marbles into the graduated cylinder. The new volume is 68 cc. What is the volume of the two marbles?



To find the volume of the marbles, he counts down: 67, 66, 65. The marbles have a volume of 3 cc.

How can you find the answer another way?

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# Volume Varies



Dear Family Member:

Your child is measuring volume in class by finding the amount of water objects displace when they are placed in a graduated cylinder of water. Students also have been comparing volumes and solving addition and subtraction problems involving volume. Listen to your child's problem solving strategies as he or she solves each problem.

Thank you.

1. Josh has a container filled with 166 cc of water. He needs 300 cc in the container. How much more water does he need?

Number sentence \_\_\_\_\_

2. Emily poured 114 cc of water in a graduated cylinder. She added all the marbles from a small bag. The volume of the water and the marbles was 221 cc. What was the volume of the marbles? Show or tell how you found your answer.



3. Jason poured 52 cc of water in a graduated cylinder. He added three toy cars to the cylinder. Each car has a volume of 60 cc. What is the volume of the water and all the cars in the graduated cylinder?

Number sentence \_\_\_\_\_

4. Compare the volume of each student's graduated cylinder in the table.

Student	Volume of the Object and Water
Peter	225 cc
Liz	150 cc
Sam	179 cc
Kim	238 cc

A. Who has the cylinder with the greatest volume? \_\_\_\_\_

B. Who has the cylinder with the least volume? \_\_\_\_\_

C. Is the sum of the volume of Liz and Sam's cylinders greater or less than the volume of Peter's cylinder? Show or tell how you know.

Name \_\_\_\_\_ Date \_\_\_\_\_

## Measuring Volume Practice

O Set of Objects	Volume of Water in <u>          </u> <i>unit</i>	Volume of Water and Objects in <u>          </u> <i>unit</i>	V Volume of Set of Objects in <u>          </u> <i>unit</i>	Number Sentence
chain of _____ connecting cubes				

# Miguel's Volume Problem



Dear Family Member:

Your child is learning to read volumes on graduated cylinders. Students learned that centimeter connecting cubes are about 1 cc of volume each, so the volume of 12 cubes is 12 cc. Help your child complete the problem below.

Thank you.

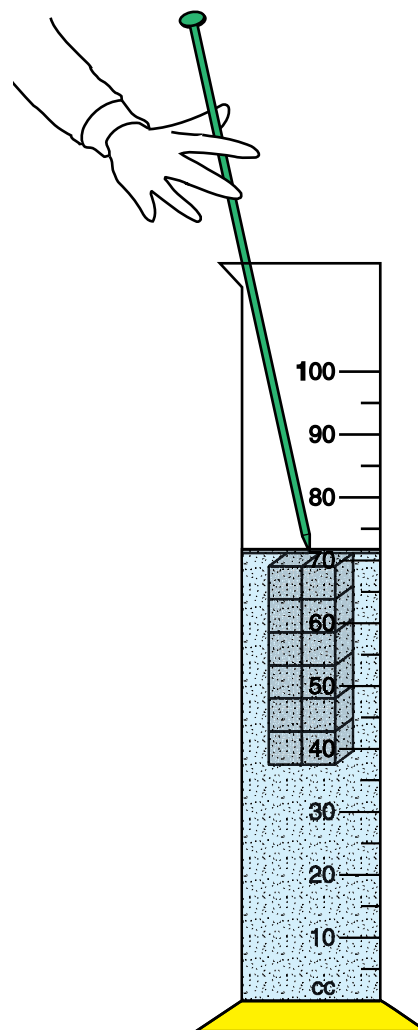
1. Miguel put 12 centimeter connecting cubes into water. The graduated cylinder reads 72 cc.

How much water is in the graduated cylinder? Write a number sentence to show how you got your answer.

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Number sentence \_\_\_\_\_

2. **A.**  $\begin{array}{r} 163 \\ +139 \\ \hline \end{array}$       **B.**  $\begin{array}{r} 262 \\ -171 \\ \hline \end{array}$       **C.**  $326 - 149 =$

**D.** Chose one problem from Question 2. Show how to solve it using a mental math strategy.

**E.** Show or tell how you know your answer to Question 2A is reasonable.