

- Show them that the side of a dime is about 1 mm so they will have a reference.
- Have the students take out Let's Measure with the Metric System and practice measuring objects in **mm**.
- Have the students take out How long?. Have the students practice drawing millimeter lines with rulers individually. Complete section B.

### **Meters (m)**

- Introduce the meter stick. Point out that there are 100 cm in a meter. Refer to the Units of Length - The Metric System. Tell them that a meter is used to measure longer objects like a room, a dolphin, and a car. Tell them we abbreviate **meters** with an **m**.
- Have the students measure objects in the classroom with the meter stick, giving the length to the nearest meter. Students can also measure each other's height with the meter stick.
- To give the students a sense of what a meter is have them count how many of their footsteps make up one meter.
- Point out that the doorknob is about 1 meter from the floor so they will have a reference.

### **Kilometers (km)**

- Introduce the kilometer. Ask students if it is a good idea to measure the distance from their home to school in centimeters. What about meters? (Neither is practical.) Tell them that we need an even longer unit to measure the distance from our house to the school. Tell them that we will use kilometers to measure long distances. Point out 1 kilometer = 1000 meters. Tell them we abbreviate **kilometers** with a **km**.
- Discuss the things you would measure in kilometers. (How tall a mountain is, how far away Washington, D.C. is, how far a running race is - 10K , etc.)

### **Summary**

- Ask the students to recall the units of the Metric system. Write these in the space provided in the Metric System Units section of the overhead What Would You Use? Ask the students which metric unit they would use to measure each picture? Depending on the language of the students you can discuss why they chose that unit of measurement.

## **3. Standard Units of Measurement - The Customary Units**

- To introduce **customary units** tell the the students that while we have been measuring in metric units, in this country we also measure using another set of units called **customary units**. Show them the Units of Length - Customary Units chart.

### **Inches (in)**

- Tell them that objects measured in **centimeters** can also be measured in inches. Using a ruler which has both markings show them an **inch**. Note that 1 inch is **about 2.5 centimeters**.

- Model measuring using inches and have students practice measuring various items in inches (desk, textbook, pencils, pens, etc.)
- Pass out the activity sheet An Inch. Make an overhead for yourself.
- Explain to them what the  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$  inch marks are using the graphics on An Inch. Go over the problems together. Practice measuring various items to the nearest  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$  inch. Review with student the concept of “in between” - for example  $1\frac{1}{2}$ ” is between 1” and 2”.
- Pass out Measuring in Inches. Do 1 from each section as an example for students.

### **Foot (ft)**

- Introduce the **foot** as a customary unit of measure. Have them look at their rulers and ask them how many inches are on their ruler. Elicit 12. Tell them that 12 inches = 1 foot.
- Have the students measure their own foot. Tell them that their foot may not be exactly 12 inches but the foot on the ruler is always 12 inches long.
- Have the students measure the height of the door, their height, and the length of a room to the nearest foot.

### **Yard (yd)**

- Draw 3 lines on the board: 1 foot long, 3 feet long, and 1 meter long. Label them (1 foot, 3 feet, and 1 meter) Tell them that 3 feet = 1 yard. Write 1 yard next to the 3 feet on the board.
- Have them look at the yard and the meter line. Tell them that 1 meter is just a little longer than a yard so they have a reference. Measure the room in yards. Ask if they know how many yards an American football field is. (100 yards) Tell them we measure cloth or fabric for sewing in yards.

### **Mile (mi)**

- Introduce the **mile** by comparing it to the kilometer. Tell students that we use miles and kilometers to measure long distances. A mile is a larger unit than a kilometer. 1 kilometer is slightly farther than  $\frac{1}{2}$  mile.
- Refer back to your discussion with the kilometer about things you would measure in kilometers. Tell them that you can use miles to measure the same things.

## **4. Summary**

- Ask the students to recall the customary units. Write these on the overhead What Would You Use? Use a different color marker than used with the Metric units. Then ask the students which customary unit they would use to measure the items listed and complete What Would You Use?
- Again depending on the language of the students you can discuss why they chose that unit of measurement.
- Measuring Review Sheets are provided for further practice.

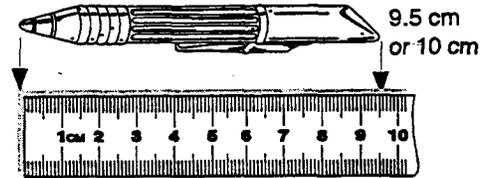
**Culminating Activity - A Scavenger Hunt.**

- Have the students complete the chart on the top of Can You Find...? You can do this as a class. This information will help them on the scavenger hunt.
- Have the students get into pairs. Hand them the Can You Find...? and a ruler with centimeters and inches. Give them an allotted amount of time, about 5 -10 minutes. Tell them they are to find 5 things in the room that are about a millimeter, centimeter, inch, foot, yard, and meter long. Write them on the spaces provided. If they do not know the names, they can draw a picture of the object.

Name: \_\_\_\_\_

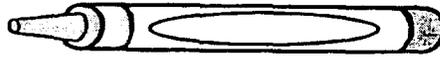
## Let's Measure With The Metric System

- To measure:
1. Line up the left end of the object with the left end of the ruler.
  2. Look at the right end of the ruler and find the closest cm/ mm mark.



Use your ruler to measure.

1. \_\_\_\_\_ cm  
\_\_\_\_\_ mm



2. \_\_\_\_\_ cm  
\_\_\_\_\_ mm



3. \_\_\_\_\_ cm  
\_\_\_\_\_ mm



4. \_\_\_\_\_ cm  
\_\_\_\_\_ mm



5. \_\_\_\_\_ cm  
\_\_\_\_\_ mm



6. \_\_\_\_\_ cm  
\_\_\_\_\_ mm



Name: \_\_\_\_\_

## How Long?



A. Using your ruler draw centimeter (cm) lines.

2.5 cm

5 cm

8 cm

6.5 cm

B. Using your ruler draw millimeter (mm) lines.

10 mm

5 mm

15 mm

20 mm



What's longer 5 cm or 5 mm?

Name: \_\_\_\_\_

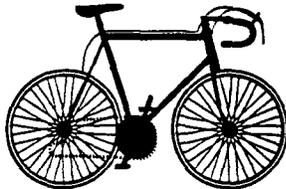
## What Would You Use?

Complete each chart.

<b>Metric System Units</b> millimeters - mm _____ _____ _____
---

<b>Customary System Units</b> inches - in _____ _____ _____
---

Which units would you use to measure these? (In real life - not this little picture!!)



Metric System

Customary System

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

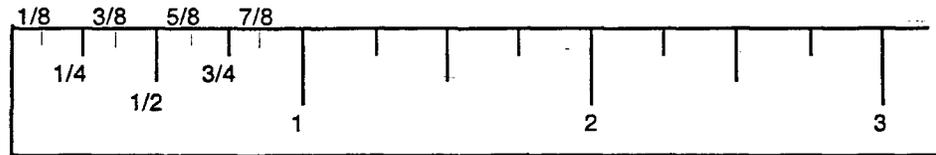
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# An Inch

Your ruler has markings for an inch, 1/2 inch, 1/4 inch, and 1/8 inch.



<b>1 inch</b>							
<b>1/2 inch</b>				<b>1/2 inch</b>			
<b>1/4 inch</b>		<b>1/4 inch</b>		<b>1/4 inch</b>		<b>1/4 inch</b>	
<b>1/8 inch</b>							

Measure the items below to the nearest inch, 1/2 inch, 1/4 inch, and 1/8 inch.

1.



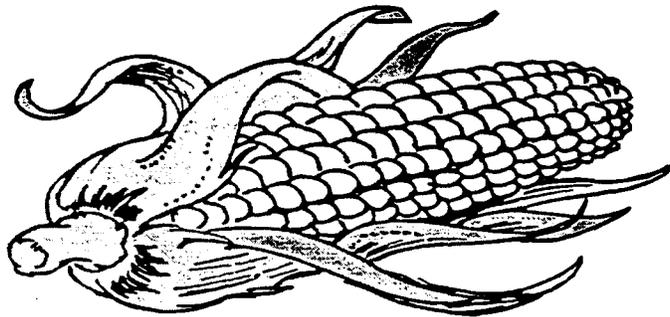

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2.




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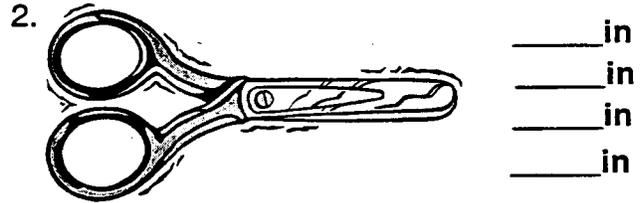
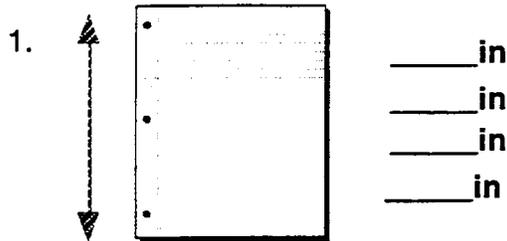
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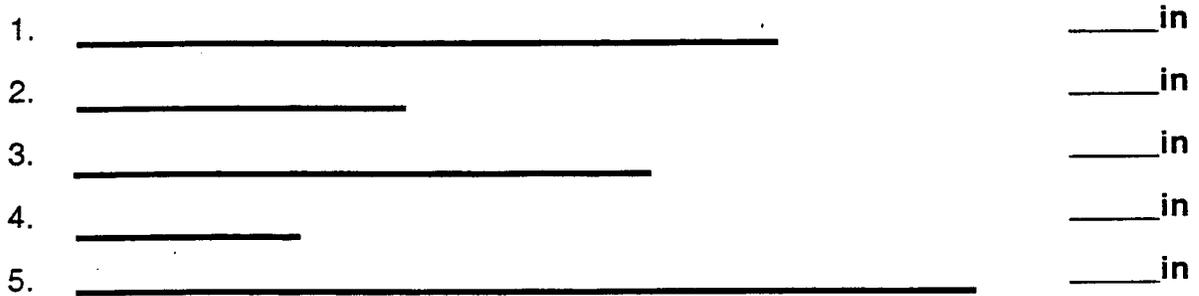
Name: \_\_\_\_\_

# Measuring in Inches

A. Measure the objects below to the nearest inch, 1/2 inch, 1/4 inch and 1/8 inch.

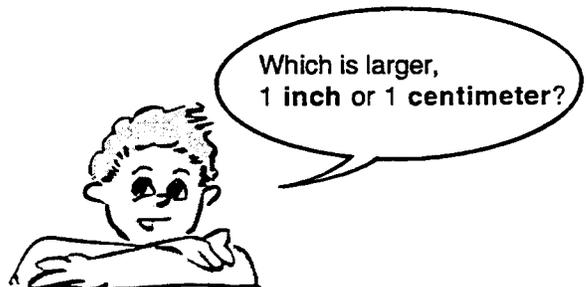


B. Measure the lines below to the nearest 1/2 inch.



C. Using a ruler, draw lines in inches.

1. 5 inches
2. 1 1/4 inch
3. 8 1/8 inches
4. 2 1/2 inches
5. 3 inches



Name: \_\_\_\_\_

## Measuring Review Sheets

People use units of measurement every day in their jobs.

Match the person with the unit of measurement he or she would use.

- |                      |  |   |
|----------------------|--|---|
| 1) A runner          |   | A) The flowers are planted 30 <b>centimeters</b> apart.         |
| 2) A carpenter       |   | B) Marco ran a 25 <b>kilometer</b> race.                        |
| 3) A football player |   | C) Jae Song ran 40 <b>yards</b> down the field .                |
| 4) Man sewing        |   | D) Mr. Patel needs 6 <b>foot</b> boards to build the house.     |
| 5) A gardener        |  | E) We need 3 <b>yards</b> of cotton material to make the shirt. |

Remember: A measurement is a number with a unit.

We can measure with **nonstandard** and **standard** units of measurement.

These are **nonstandard** units of length:

your shoe



a crayon



a peanut



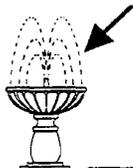
Can these nonstandard things be used as units of length? Write yes or no. Tell why ?

computer disk



\_\_\_\_\_

water



\_\_\_\_\_

clip



\_\_\_\_\_

idea



\_\_\_\_\_

candy



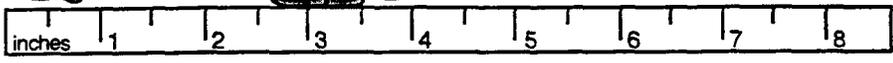
\_\_\_\_\_

Customary units of length	
_____	(in)
_____	(ft)
_____	(yd)
_____	(mi)

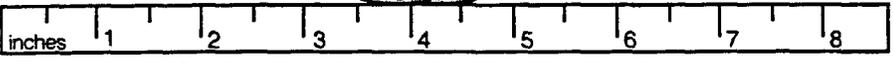
Metric units of length	
_____	(mm)
_____	(cm)
_____	(m)
_____	(km)

Write the words for each unit of length in the blank.

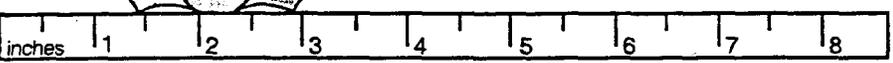
Measure to the nearest inch:



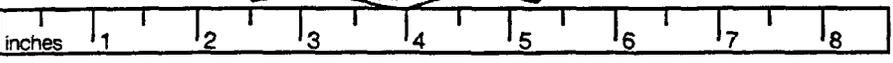
- About 4 in.
- About 5 in.



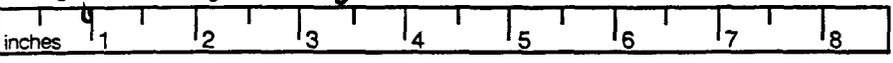
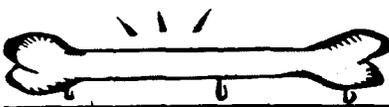
- About 6 in.
- About 7 in.



- About 4 in.
- About 5 in.

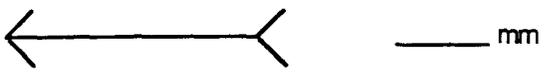


- About 7 in.
- About 8 in.



- About 3 in.
- About 4 in.

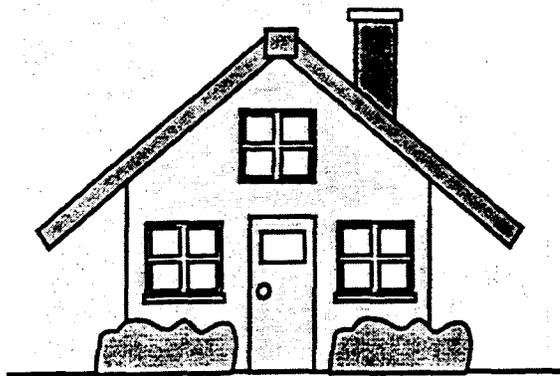
Which horizontal line is longer? Measure these lines in millimeters.



Are you surprised?? Why??

# Measuring Review Sheets

Measure the house with your centimeter ruler.

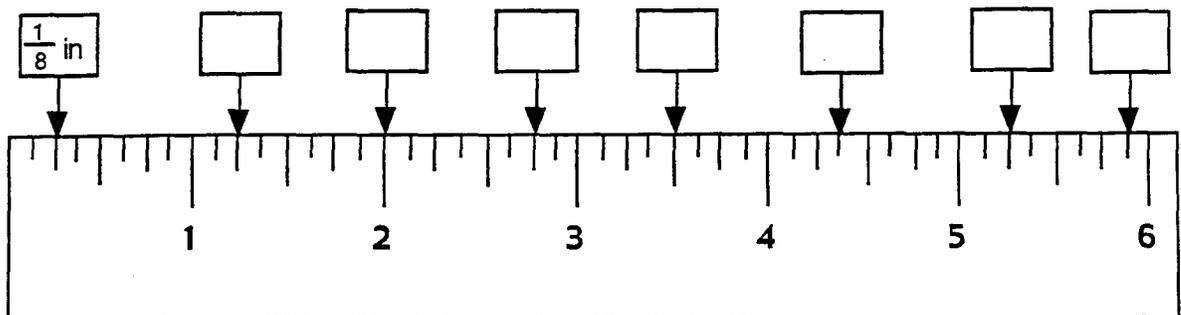


- 1) The house is about \_\_\_\_\_ cm high.
- 2) The house is about \_\_\_\_\_ cm wide.
- 3) The door is about \_\_\_\_\_ cm high.
- 4) The window is about \_\_\_\_\_ cm wide.
- 5) The chimney is about \_\_\_\_\_ cm high.

Circle which unit would be best used to measure these objects. Estimate, then use rulers to measure these objects in your classroom.

<u>OBJECT</u>	<u>ESTIMATE</u>	<u>MEASURE</u>
1) a paper clip meter or centimeter <div style="text-align: right; margin-top: 10px;"> </div>	about _____	_____
2) the chalkboard meter or kilometer <div style="text-align: right; margin-top: 10px;"> </div>	about _____	_____
3) an eraser inches or feet <div style="text-align: right; margin-top: 10px;"> </div>	about _____	_____
4) the classroom door yards or miles <div style="text-align: right; margin-top: 10px;"> </div>	about _____	_____

Give the name in inches for each mark on the ruler.



# Can You Find?

Fill in the chart with estimates.



## Metric System

1 mm = side of a dime

1 cm =

1 m =

1 km =

## Customary System

1 in = regular paper clip

1 ft =

1 yd =

1 mi =

Find 5 things that are about 1 mm long.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Find 5 things that are about 1 in long.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Find 5 things that are about 1 yd long.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Find 5 things that are about 1 cm long.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Find 5 things that are about 1 ft long.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Find 5 things that are about 1 m long.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

**Answer Key**  
**Measurement - Obj. 3**

**Let's Measure with the Metric System** ( answers will be approximate)

- 1) 6 cm ; 60 mm
- 2) 8.5 cm ; 85 mm
- 3) 9.6 cm ; 96 mm
- 4) 12 cm ; 120 mm
- 5) 7 cm; 70 mm
- 6) 14.5 cm; 145 mm

**What Would You Use?**

United States	kilometers - miles
crayon	centimeters - inches
coin	millimeters - inches
bike	meters - inches or feet
jeep	meters - yards or feet

**An Inch** ( answers will be approximate)

carrot ( with greens!) = 3 in ; 2 1/2 in; 2 3/4 in ; 2 5/8 in.  
corn = 3 in; 3 1/2 in; 3 1/4 in; 3 3/8 in

**Measuring in Inches** ( answers will be approximate)

- 1) paper 1 in; 1 in; 1 1/4 in; 1 2/8 in (1 1/4)
- 2) scissors 2 in; 2 in; 2 1/4 in; 2 1/8 in

**B) Measure line to nearest 1/2 inch**

- 1) 3 1/5 in 2) 2 in (round up) 3) 3 in 4) 1 in 5) 5 in (round up)

**Measuring Review Sheets**

**Page 1:** Match : 1-b 2- d 3- c 4- e 5- a

Can these be used as units of length?

computer disk - yes - It has length.

water - no - It has no length.

clip - yes - It has length.

idea - no - It has no length. It is an abstract, nothing concrete.

candy - yes - It has length.

## Measuring Review Sheets

### **Page 2:**

Customary units of length : inch,  
foot  
yard  
mile

Metric units of length : millimeter  
centimeter  
meter  
kilometer

### Measure to the Nearest Inch

5 in ; 7 in; 4 in; 8 in; 4 in

### Which Line is Longer?

They are all the same - 33 mm - The arrow marks trick your eye. The bottom arrows draw your eyes out and make the line appear longer. The second arrows appear to shorten the line.

### **Page 3:**

#### Measure the House with Your Centimeter Ruler

- 1) 4 1/2 ( from roof peak to ground)
- 2) 4 cm wide (from wall to wall)
- 3) 2 cm
- 4) 1 cm
- 5) 5 cm ( from top to ground)

#### Circle, Estimate, Measure

- 1) centimeter; ans will vary; about 3 cm for a small paper clip
- 2) meter ; ans will vary, ans will vary depending on size of board
- 3) inches ; ans will vary , usually about 6 in.
- 4) yards; ans will vary ; about 2 1/3 yards

#### Give the Name in Inches for Each Mark on the Ruler

1 1/4 in; 2 in; 2 3/4 in; 3 1/2 in; 4 3/8 in; 5 1/4 in; 5 7/8 in

Can You Find? Answers will vary.



**Objective 4:** Identify the most appropriate unit for measuring length of given objects. Compare and convert units of measure for length within the customary and metric system.

### Vocabulary

convert  
metric units  
customary units  
millimeter  
centimeter  
meter  
kilometer  
inch  
foot, feet  
yard  
mile

### Language Foundation

1. Review metric and customary units of measurement.
2. Explain to students that they will be comparing units of measurement. They will learn how to **convert** or change one unit of measurement to another. For example, they will learn how to change from one metric unit to another such as millimeters to centimeters and from one customary unit to another such as feet to inches.

### Materials

ruler  
yard stick  
meter stick  
piece of ribbon  
construction paper  
tape

Transparencies

Tables of Measurement for Length

Converting Metric Units: Larger to Smaller Units

Converting Metric Units: Smaller to Larger Units

Comparing Customary and Metric Units

Student Copies

Selecting Metric Units

Selecting Customary Units for Length

Converting Metric Units - Practice

Converting Customary Units of Length

Units of Length - Customary and Metric

More About Length

## Mathematics Component

1. Identify the most appropriate unit for measuring length using the metric system.
  - Ask the students to recall the Metric system's units for measuring length. (mm, cm, m, km) Write them on the board for reference. [millimeter (mm), etc.]
  - Show them a chair and ask them, "If I want to know how tall this chair is, which unit (point to the units on the board) would be easiest to use?" Elicit a meter. Show them how a **mm** and a **cm** would take a lot of units and a **km** would be too big.
  - Show them a chalkboard eraser and ask them, "If I want to know how wide this eraser is, which unit (point to the units on the board) would I use?" Elicit a centimeter. Show them how a **m** and a **km** would be too big. Explain that you could measure in **mm** but **cm** would be preferable. It is usually easier to use the largest possible unit - measuring in centimeters will result in the fewest *number of units*.
  - Show them a coin and ask them, "If I want to know the thickness of this coin, which units (point to the units on the board) would be easiest to use?" Elicit millimeters. Show them how **cm**, **m**, and **km** would be too big. You can be more exact and precise with the smaller unit to measure a small object.
  - Now ask the students, "If I wanted to know the distance from your house to this school, what would be the easiest unit of measurement to use?" Elicit a kilometer. Ask for volunteers to explain why **mm**, **cm**, and **m** would not be the best. (There would be too many small units.)
  - Pass out Selecting Metric Units. Do the first problem together. Have students complete individually or in pairs.
2. Identify the most appropriate unit for measuring length - Customary units
  - Ask the students to recall the Customary units for measuring length. (in, ft, yd, mi) Write them on the board for reference. [inch (in), etc.]
  - Instead of a chair, an eraser, and a coin, use a bookcase or file cabinet, a small poster, and a large paper clip. Follow the same format as above with inches, feet, yards, and a mile. Ask students, "Which customary unit would we use to measure how tall the bookcase is?" Elicit a yard. A mile is too big and inches or feet, while a possibility, would give us a lot of small units. The paper clip would be a better choice to be measured in inches. Ask students which customary unit would be best to measure the poster. Elicit a foot (12 in ruler). Inches are a possibility, but not the largest unit of measurement. Give students several other examples and have them choose the best customary unit of measurement. For example, a soccer or football field (yards), the distance home or to a certain city (miles).

Note: It should be noted that with customary measurement in the U.S., many items are usually measured simply in inches - TV screens, curtain length, etc.
  - Pass out Selecting Customary Units for Length. Do the first 2 problems together. Have students complete individually or in pairs.

### 3. Comparing and Converting Within the Metric System

- Pass out copies of the Tables of Measurement for Length, calculators, and rulers with centimeters. Students should already be familiar with the terms on the handout. Have students keep this copy as a reference.
- On the board write the problem: **How many millimeters in 5 centimeters?** Underneath write **\_\_\_\_\_ mm = 5 cm**. This way they can see the different ways the same problem can be written.
- Model for the students how to find  $1 \text{ cm} = 10 \text{ mm}$  by referring to the tables. A centimeter ruler or the overhead Millimeters and Centimeters from Obj. 3 can be used to demonstrate this fact. Students can also count the millimeters in 5 cm on their rulers
- Ask students, "If  $1 \text{ cm} = 10 \text{ mm}$ , then how many millimeters would be in 5 centimeters? To help them see this write  $1 \text{ cm} = 10 \text{ mm}$  in a column 5 times.

$$\begin{array}{r} 1 \text{ cm} = 10 \text{ mm} \\ \hline 5 \text{ cm} = 50 \text{ mm} \end{array}$$

- Tell students we can add, but there is a shorter way to do this problem. What would we need to do? (multiply  $10 \times 5$ )
- Again, model how you would need to enter  $10 \times 5$  on your calculator because the problem asks how many **mm** in **5 cm**.
- Ask the students for the final answer. (50 mm)
- Work with them to find the number of **mm** in 25 cm, 3 cm, 32 cm, etc. ( $25 \text{ cm} = 25 \times 10$ ,  $3 \text{ cm} = 3 \times 10 \dots$ )
- Now write the problem: **\_\_\_\_\_ cm = 2 m**
- Model for the students how to find  $1 \text{ m} = 100 \text{ cm}$  by referring to the tables.
- Ask students, "If 1 m is 100 cm, then 2 m would equal how many centimeters? (200 cm)
- Have students use the meter stick to verify that there are indeed 100 cm in a meter.
- Model how you would need to enter  $2 \times 100$  on your calculator because we need to multiply by 100 to find how many centimeters in **2 m**.
- Ask the students for the final answer. (200 m)
- Work with students to find the number of **cm** in 8 m, 10 m, etc. ( $8 \times 100 \text{ cm} = 800 \text{ cm}$ ), ....)
- Ask students to try to figure out how many millimeters are in one meter. Lead them to see that if there are 10 mm in each centimeter, and 100 cm in each meter, that we can multiply  $10 \times 100$  and get 1,000 mm in a meter. Point out the millimeters on the meter stick.
- Repeat the process with the problem: **\_\_\_\_\_ m = 4 km**.  
Ask students to use the table to find the number of meters in 1 kilometer. ( $1,000 \text{ m} = 1 \text{ km}$ )  
Tell students if there are 1,000 meters in each km, then how many meters do we have in 4 km?  
To help them answer this question, make a chart (next page) as a visual reference.

- How could we do this problem in a simpler way? (Multiply 1,000 x 4)
 

1,000 m = 1 km
4,000 m = 4 km
- Point out that when we need to find the **smaller** unit, we **multiply**. Show students that we needed to find millimeters in the first problem - the **smaller** unit. Then we needed to find centimeters, a centimeter is **smaller** than a meter. In the last problem, we needed to find meters, again the **smaller** unit.
- Explain to students that to find a **larger** unit we need to **divide**. Write the following problem on the board: **300 cm = \_\_\_\_\_m**. Tell students "Meters are **larger** than centimeters so we will need to divide."
- Ask students how many **cm** in 1 **m**? (100) Show them how we get this by referring to the charts.
- Tell them since we need to find **m**, the **larger** unit, we will need to divide 300 by 100.
- Measure and draw a line 300 cm (3 meters) long on the board with the meter stick. You can also demonstrate by cutting a piece of ribbon this length and taping it to the wall. Tell students, "There are 300 cm in the line. Let's measure with the meter stick and see how many meters we get."
- Ask the students for the final answer. (3 meters) Point out that we are dividing the larger line into smaller sections. We are dividing all the smaller units ( centimeters) into a larger unit - meters.
- As a class do the following problems. **200 mm = \_\_\_\_\_cm**; **8,000 m = \_\_\_\_\_km**.
- To help you to further review the concept, pass out Converting Metric Units for students to review as you explain using a copy on the overhead.
- Practice with Converting Metric Units - Practice. Students can work in pairs. Allow them to use calculators.

#### 4. Comparing and Converting within the Customary Units

- Show the students a yardstick and a ruler. Place the ruler on the yardstick to cover 1 foot. Show 13" is equal to 1'1"; 14" is equal to 1'2"; etc.
- Cut 1 inch, 1 foot, and 1 yard strips of construction paper. Choose a different color for each one. You may want to laminate these so they will last longer. Each pair of students should have: 72 one inch strips, 6 one foot strips and 3 one yard strips.
- Call out a measure; have students show you the strips. For example, "Show me 6 inches; show me 10 inches; show me 1 foot; show me 1 yard."
- Then ask students questions such as "How many inches fit on a one foot strip? How many feet can you fit on a one yard strip?"
- After the students feel comfortable manipulating the strips, write on the board:
 

**Take 15 inches -- add 2 feet -- subtract 20 inches = \_\_\_\_\_ inches**
- Have the students use their inch strips to solve the problem. Practice several more problems of this type using the strips. For example: Take 1 yd - subtract 2 feet - add 3 inches = \_\_\_\_\_ ft
- Remind students to look at the unit of measurement required in the answer.

- When they are ready, ask for volunteers to solve the problem without the strips. Model for them how to come up with the answer. For example, “We need to get our answer in inches, so let’s change all our measurements to inches. There are 12 inches in 1 foot. How many inches in 2 ft?” Elicit 24 in. “Now we have 15 in + 24 in - 20 in. Are we adding all the same units? (yes- inches) Who can do the computation?” Have a student add 15 + 24 to get 39, then subtract 20 to get 19 in. Ask students what they would do to get the answer in feet. Lead them to see that if there are 12 inches in 1 ft, they need to divide 12 into 19. Using the strips, model the division for them: 19 in = \_\_\_\_ ft \_\_\_\_ in. (1 ft with 7 inches left)
- Give the students a few more problems like this one to work on. Practice with students how to convert from larger to smaller units without using their strips. Remind them when converting from a larger unit to a smaller unit - we multiply.
- Put this problem on the board: 5 yards = \_\_\_\_\_ ft. Ask students which is larger, a yard or a foot. Point out that we are converting from a larger unit to a smaller unit. Ask students “How many feet in one yard?” Elicit 3 ft in one yard. “If there are 3 feet in one yard, how many feet would we have in 5 yards? (15) Make a chart for students to help see this :

1 yard = 3 feet
5 yards = 15 feet

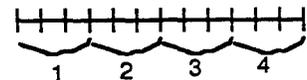
Ask students if there is a quicker way to get 15.

(Yes, multiply 3 x 5). Practice 10 yards = \_\_\_\_\_ ft; 2 ft = \_\_\_\_\_ in.

- Practice with students converting smaller to larger units.

Remind them that when converting from smaller to larger units - we divide.

Put this problem on the board: 12 feet = \_\_\_\_ yards. Ask students “Which unit is smaller, feet or yards?” (feet) Ask students “How many feet are there in one yard?” (3 ft = 1 yd) “If 3 ft equal 1 yard then how many yards are in 12 feet?” Draw a line representing 12 feet on the board. Mark off 3 feet sections. Have students tell how many yards are formed. (4)



Ask students what you did to the 12 feet?

(divided it into equal sections) Point out again that when converting from smaller units to larger units, they should divide. Practice a few more conversions of this type. 40 in = \_\_\_\_\_ ft, etc.

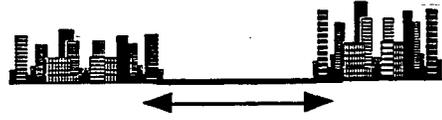
- Pass out the Converting Customary Units of Length activity sheet to provide additional practice in converting units of length. Students can work with a partner on this activity.
  - After they’ve finished, go over their answers. Ask for volunteers to use strips or to write on the board to explain how they got their answers.
5. Pass out Units of Length - Customary and Metric and More About Length as extra practice.
6. Option: If you feel the students have grasped converting within the Metric and Customary systems, then you can compare the 2 systems. Ask them questions like which is larger a **km** or a **mile**, an **inch** or a **centimeter**, a **yard** or a **meter**? Have the yard sticks, meters sticks, etc. out to show them. Pass out Comparing the Metric and Customary Systems. Go over this activity together on the overhead.

Name: \_\_\_\_\_

## Selecting Metric Units

Write the best unit of measurement : millimeters (mm) centimeters (cm),  
(Use the short form of the word) meters (m), or kilometers (km).

1. The distance between 2 towns is 20\_\_\_\_\_.



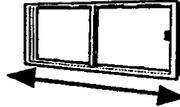
2. A school is 9\_\_\_\_\_ tall.



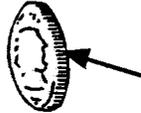
3. The pencil is 15\_\_\_\_\_ long.



4. A window is 1\_\_\_\_\_ wide.



5. The coin is 3\_\_\_\_\_ thick.



6. A finger is 7\_\_\_\_\_ long.



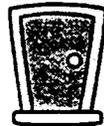
7. Jae Song runs 2\_\_\_\_\_ to school.



8. A bus goes 80\_\_\_\_\_ in one hour.



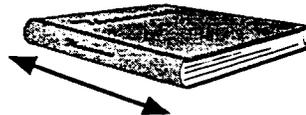
9. The door is 2\_\_\_\_\_ tall.



10. The plant grows 5\_\_\_\_\_ every day.

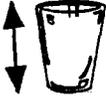
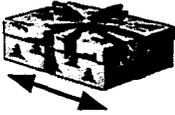
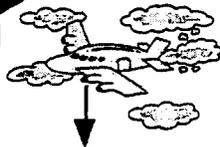


11. The book is 22\_\_\_\_\_ long.



# Selecting Metric Units

What do you think is the best unit of measure to use?

- 1) The distance around the stadium  a) 500 cm    b) 500 m    c) 500 km
- 2) The height of a drinking glass  a) 14 mm    b) 14 cm    c) 14 km
- 3) The length of a gift box  a) 20 mm    b) 20 cm    c) 20 m
- 4) The width of the antenna on the phone  a) 5 mm    b) 5 cm    c) 5 m
- 5) The distance from the jet to the ground  a) 4 cm    b) 4 m    c) 4 km

Write 3 things you could measure in these metric units.

<u>Millimeters</u>	<u>Centimeters</u>	<u>Meters</u>	<u>Kilometers</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Matching:

- |  |               |
|--|---------------|
| 1) The smallest metric unit of length                        | A) Meter      |
| 2) The largest metric unit of length                         | B) Centimeter |
| 3) Used to measure the distance from New York to Los Angeles | C) Millimeter |
| 4) Used to measure medium lengths                            | D) Kilometer  |
| 5) The next unit larger than a millimeter                    |               |

Name: \_\_\_\_\_

## Selecting Customary Units for Length

Write the correct unit: inch, foot, yard or mile?

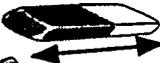
1. A car is 5 \_\_\_\_\_ tall. 

6. A book is 12 \_\_\_\_\_ wide. 

2. A glass is 6 \_\_\_\_\_ tall. 

7. A river is 8 \_\_\_\_\_ long. 

3. A flower is 10 \_\_\_\_\_ tall. 

8. An eraser is 2 \_\_\_\_\_ long. 

4. The road is 4 \_\_\_\_\_ wide. 

9. A boy is 4 \_\_\_\_\_ tall. 

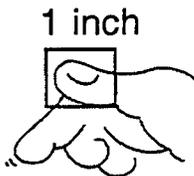
5. A bed is 2 \_\_\_\_\_ long. 

10. It is 6 \_\_\_\_\_ to the beach. 

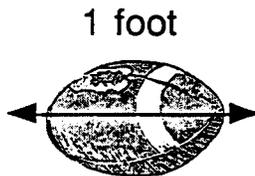
### Estimating Customary Units of Measurements

Before measuring a length, it is always good to have an idea of how long an object is. To do this, you can use an **estimate**, or a reasonable guess.

The objects below will help you estimate customary units of measure.



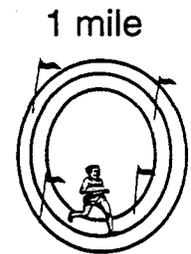
The tip of your thumb



The length of a football



The length of a baseball bat

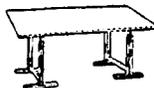


4 times around the track

Is this a reasonable estimate? Check YES or NO

1) The height of the pin is about 4 in. 

YES or  NO

2) The height of the table is about 2 1/2 feet. 

YES or  NO

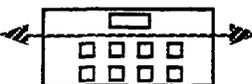
## Selecting Customary Units for Length

- 3) The length of the football field is 100 yards.   YES or  NO
- 4) The length of the ship is 1 mile.   YES or  NO
- 5) The height of the basketball goal is 10 yards.  YES or  NO 

Draw a circle around the best estimate

- 1) the length of a shoe  a) 10 in    b) 10 ft    c) 10 yds
- 2) the length of a marathon race  a) 26 ft    b) 26 yd    c) 26 mi
- 3) the depth of a swimming pool  a) 8 mi    b) 8 yd    c) 8 ft
- 4) the width of the kite  a) 2 in    b) 2 ft    c) 2 yd
- 5) the height of the child  a) 4 in    b) 4 ft    c) 4 yd

Write your own estimate for each length. Measure with a ruler or yardstick.  
Was your estimate close?

- 1) The length of your shoe is about \_\_\_\_\_ inches. Actual measure \_\_\_\_\_ in.  
 Was your estimate close? \_\_\_\_\_ 
- 2) The height of the classroom door is about \_\_\_\_\_ feet. Actual measure \_\_\_\_\_ ft.  
 Was your estimate close? \_\_\_\_\_ 
- 3) The length of the classroom floor is about \_\_\_\_\_ yards. Actual measure \_\_\_\_\_ yd  
 Was your estimate close? \_\_\_\_\_ 
- 4) The length of your pencil is about \_\_\_\_\_ inches. Actual measure \_\_\_\_\_ in  
 Was your estimate close? \_\_\_\_\_ 

## TABLES OF MEASUREMENT FOR LENGTH

### METRIC SYSTEM

1 centimeter (cm)	=	10 millimeters (mm)
1 meter (m)	=	1,000 millimeters (mm) 100 centimeters (cm)
1 kilometer (km)	=	1,000 meters (m)

### CUSTOMARY UNITS

1 foot (ft)	=	12 inches (in)
1 yard (yd)	=	36 inches (in) 3 feet (ft)
1 mile (mi)	=	5,280 feet (ft) 1,760 yards (yd)

# Converting Metric Units

Transparency

## LARGER TO SMALLER UNITS

To change from a larger unit to a smaller unit, multiply by a power of 10.

A shortcut is to count the number of zeros. (10 has 1 zero, 100 has 2 zeros.....)

Move the decimal point to the right the same number of places.

Example:

$$5 \text{ km} = \underline{\quad} \text{ m}$$

$$1 \text{ km} = 1,000 \text{ m}$$

Multiply by 1,000

$$5 \text{ km} = 5 \times 1,000 = 5,000 \text{ m}$$

OR move the decimal point 3 places to the right.

$$5.000 \longrightarrow 5,000.$$

Larger Units		Smaller Units
kilometers	→	millimeters (x 1,000,000) centimeters (x 100,000) meters (x 1,000)
meters	→	millimeters (x 1,000) centimeters (x 100)
centimeters	→	millimeters (x 10)

# Converting Metric Units

## SMALLER TO LARGER UNITS

To change from a smaller unit to a larger unit, divide by a power of 10.

A shortcut is to count the number of zeros.

Move the decimal point to the left the same number of places.

Example:

$$8,000 \text{ m} = \underline{\quad} \text{ km}$$

$$1,000 \text{ m} = 1 \text{ km} \quad \text{Divide by 1,000}$$

$$8,000 \text{ m} = 8,000 \div 1,000 = 8 \text{ k}$$

Or move the decimal point 3 places to the left

$$8,000 \longrightarrow 8.000$$

Smaller Units	Larger Units
millimeters	centimeters ( $\div 10$ ) meters ( $\div 1,000$ ) kilometers ( $\div 1,000,000$ )
centimeters	meters ( $\div 100$ ) kilometers ( $\div 100,000$ )
meters	kilometers ( $\div 1,000$ )



**Complete the following. Use your conversion charts to help you.**

1)  $9 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

2)  $9 \text{ m} = \underline{\hspace{2cm}} \text{ cm}$

3)  $9 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$

4)  $10 \text{ m} = \underline{\hspace{2cm}} \text{ cm}$

5)  $4000 \text{ m} = \underline{\hspace{2cm}} \text{ km}$

6)  $44 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

7)  $20 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

8)  $2000 \text{ mm} = \underline{\hspace{2cm}} \text{ m}$

9)  $70 \text{ mm} = \underline{\hspace{2cm}} \text{ cm}$

10)  $4 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$

Name: \_\_\_\_\_

### Converting Customary Units of Length

1 ft = \_\_\_\_\_ in      1 yd = \_\_\_\_\_ in      1 yd = \_\_\_\_\_ ft

#### Multiply to change larger units into smaller units

1) 2 ft = \_\_\_\_\_ in

4) 3 yds = \_\_\_\_\_ in

2) 5 yd = \_\_\_\_\_ ft

5) 10 yds = \_\_\_\_\_ ft

3) 20 ft = \_\_\_\_\_ in

#### Divide to change smaller units into larger units

1) 12 ft = \_\_\_\_\_ yd

4) 216 in = \_\_\_\_\_ yd

2) 36 in = \_\_\_\_\_ ft

5) 60 in = \_\_\_\_\_ ft

3) 6 ft = \_\_\_\_\_ yd

#### Multiply or divide - look at the units in each problem.

1) 21 ft = \_\_\_\_\_ yd

3) 7 yd = \_\_\_\_\_ in

2) 120 in = \_\_\_\_\_ ft

4) 18 ft = \_\_\_\_\_ yd

## Converting Customary Units of Length

p.2

Sometimes you might want to use only inches to measure length.

To do this multiply the number of feet by 12 and add on the extra inches.

1) 2 ft = \_\_\_\_\_ in

2 ft 4 in = \_\_\_\_\_ in

2) 5 ft = \_\_\_\_\_ in

5 ft 10 in = \_\_\_\_\_ in

3) 3 ft 7 in = \_\_\_\_\_ in

4) 8 ft 2 in = \_\_\_\_\_ in

5) 4 ft 9 in = \_\_\_\_\_ in

Sometimes you might want to change inches to feet.

To do this divide the number of inches by 12.

If there is a remainder, that is the number of inches left over.

1) 24 in = \_\_\_\_\_ ft

4) 55 in. = \_\_\_\_\_ ft \_\_\_\_\_ in

2) 29 in = \_\_\_\_\_ ft \_\_\_\_\_ in

5) 16 in = \_\_\_\_\_ ft \_\_\_\_\_ in

3) 48 in = \_\_\_\_\_ ft

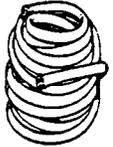
### Problem Solving: Which is the Best Deal??

Which item will give you more? Compare their lengths to find out.

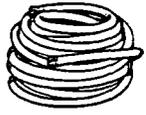
Multiply to change larger units into smaller units. Put a box around the answer.

Hint:  
 Change yd to ft.  
1 yd = 3 ft  
Multiply by 3.

200 yds



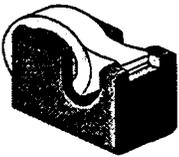
400 ft



10 yds



500 ft



10 ft

135 in



Name: \_\_\_\_\_

## Units of Length - Customary and Metric

EXAMPLE: Take 16 ft -- add 1 yd -- subtract 5 ft = \_\_\_\_\_ ft

Remember: 1 yd = 3 ft

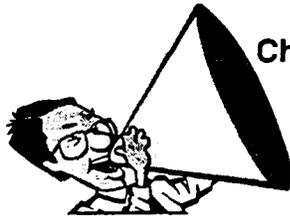
Think: 16 ft + 3 ft - 5 ft = 14 ft

### Customary Units

1. Take 2 yds -- add 12 ft -- subtract 3 yds = \_\_\_\_\_ ft
2. Take 6 ft -- subtract 1 yd -- add 12 ft = \_\_\_\_\_ ft
3. Take 15 in -- add 2 ft -- subtract 20 in = \_\_\_\_\_ in
4. Take 6 ft -- subtract 20 in -- add 4 ft = \_\_\_\_\_ in
5. Take 15 in. -- add 1 yd -- subtract 2 ft = \_\_\_\_\_ in
6. Take 3 yds -- add 2 ft -- subtract 3 ft = \_\_\_\_\_ ft
7. Take 2 yds -- subtract 1 ft -- add 5 in = \_\_\_\_\_ in
8. Take 4 ft -- add 2 yds -- subtract 1 ft = \_\_\_\_\_ yds

**Metric Units**

9. Take 4 km - - add 750 m = \_\_\_\_\_m
10. Take 350 m - - add 2 km = \_\_\_\_\_m
11. Take 2 km - - subtract 500 m = \_\_\_\_\_m
12. Take 340 cm - - subtract 2 m = \_\_\_\_\_cm
13. Take 3 m - - add 250 cm = \_\_\_\_\_cm
14. Take 2 m - - subtract 100 cm = \_\_\_\_\_cm
15. Take 50 mm - - add 3 cm = \_\_\_\_\_mm

**Challenge !!!!**

- \*16. Take 1 mm - - add 1 cm - - add 1 m - - add 1 km = \_\_\_\_\_mm

Name: \_\_\_\_\_

# More About Length

Write in the missing number.

1. 1,000 m = \_\_\_\_\_ km

2. 100 cm = \_\_\_\_\_ m

3. 4 km = \_\_\_\_\_ m

4. 2 cm = \_\_\_\_\_ mm

5. 9 m = \_\_\_\_\_ cm

6. 2 yds = \_\_\_\_\_ in

7. 2 ft = \_\_\_\_\_ in

8. 4 yds = \_\_\_\_\_ ft

9. 36 in = \_\_\_\_\_ ft

10. 24 ft = \_\_\_\_\_ yds

11. 2 mi = \_\_\_\_\_ ft

## METRIC UNITS

1 cm = \_\_\_\_\_ mm

1 m = \_\_\_\_\_ mm

1 m = \_\_\_\_\_ cm

1 km = \_\_\_\_\_ m

## CUSTOMARY UNITS

1 ft = \_\_\_\_\_ in

1 yd = \_\_\_\_\_ in

1 yd = \_\_\_\_\_ ft

1 mi = \_\_\_\_\_ ft

1 mi = \_\_\_\_\_ yds

## REMEMBER...

To change from a larger to smaller unit  
- **MULTIPLY.**

To change from a smaller to larger unit  
- **DIVIDE.**

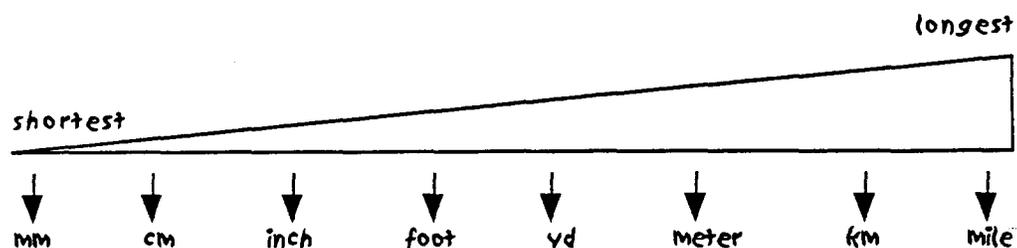
## Comparing Customary and Metric Units

1 inch  $\longrightarrow$  about 2.5 centimeters

1 meter  $\longrightarrow$  little longer than a yard

1 mile  $\longrightarrow$  slightly farther than 1.5 kilometers

1 kilometer  $\longrightarrow$  slightly farther than 1/2 mile



**Answer Key  
Measurement - Obj. 4**

**Selecting Metric Units**

Page 1

- |       |        |
|-------|--------|
| 1) km | 7) km  |
| 2) m  | 8) km  |
| 3) cm | 9) m   |
| 4) m  | 10) mm |
| 5) mm | 11) cm |
| 6) cm |        |

Page 2

- 1) b
- 2) b
- 3) b
- 4) a
- 5) c

Write three things you could measure.  
Answers will vary.

- Matching
- |      |      |
|------|------|
| 1) C | 4) A |
| 2) D | 5) B |
| 3) D |      |

**Selecting Customary Units for Length**

Page 1

- |           |           |
|-----------|-----------|
| 1) feet   | 6) inches |
| 2) inches | 7) miles  |
| 3) inches | 8) inches |
| 4) yards  | 9) feet   |
| 5) yards  | 10) miles |

Is this a reasonable estimate?

- 1. No
- 2. Yes
- 3. Yes
- 4. No
- 5. No

Page 2

Draw a circle around the best estimate.

- |      |      |
|------|------|
| 1) a | 4) b |
| 2) c | 5) b |
| 3) c |      |

Write your own estimate.

Answers will vary.

**Converting Metric Units - Practice**

Page 1

- 1)  $300 \div 3 = 3\text{ m}$  (divide)
- 2)  $300 \times 10 = 3000\text{ mm}$  (multiply)
- 3)  $450 \div 10 = 45\text{ cm}$  (divide)
- 4)  $5 \div 1000 = .005\text{ km}$  (divide)
- 5)  $9 \times 100 = 900\text{ cm}$  (multiply)
- 6)  $12 \times 100 = 12,000\text{ m}$  (multiply)

Page 2

- |         |           |
|---------|-----------|
| 1) 90   | 6) 440    |
| 2) 900  | 7) 20,000 |
| 3) 9000 | 8) 2      |
| 4) 1000 | 9) 7      |
| 5) 4    | 10) 4000  |

**Converting Customary Units of Length**

Page 1:      1 ft = 12 in      1 yd = 36 in      1 yd = 3 ft

Multiply.

- |       |        |       |
|-------|--------|-------|
| 1) 24 | 3) 240 | 5) 30 |
| 2) 15 | 4) 108 |       |

Divide.

- |      |      |       |
|------|------|-------|
| 1) 4 | 3) 2 | 5) .5 |
| 2) 3 | 4) 6 |       |

## Converting Customary Units of Length

Page 1:            1 ft = 12 in        1 yd = 36 in        1 yd = 3 ft

Multiply.

- 1) 24
- 2) 15

- 3) 240
- 4) 108

- 5) 30

Divide.

- 1) 4
- 2) 3

- 3) 2
- 4) 6

- 5) 5

Page 2:

Sometimes you might want to use only inches to measure length.

- 1) 24, 28
- 2) 60, 70

- 3) 43
- 4) 98

- 5) 57

Sometimes you might want to change inches to feet.

- 1) 2
- 2) 2 ft, 5 in

- 3) 4
- 4) 4 ft, 7 in

- 5) 1 ft, 4 in

Problem Solving: Which is the Best Deal??

200 yds

500 ft

135 in

## Units of Length - Customary and Metric

Customary Units

Metric Units

- 1) 9
- 2) 15
- 3) 19
- 4) 100
- 5) 27
- 6) 8
- 7) 65
- 8) 3

- 9) 4750
- 10) 2350
- 11) 1500
- 12) 140
- 13) 550
- 14) 100
- 15) 80
- 16) 1,001,011

## More About Length

- 1) 1
- 2) 1
- 3) 4000
- 4) 20
- 5) 900
- 6) 72

- 7) 24
- 8) 12
- 9) 3
- 10) 8
- 11) 10,560

## Objective 5: Estimate and measure weight/mass of objects using nonstandard, customary, and metric units.

### Vocabulary

scale  
weight, weigh  
pound  
heavier  
lighter  
ounce  
ton  
kilogram  
gram  
milligram

### Materials

scales - bathroom, kitchen, balance  
styrofoam cup  
beans  
pound of margarine  
envelope  
paper clips  
various objects to weigh

Transparencies

Weight

Scales

Ounces and Pounds

Tables of Measurement for Weight

Student Copies

Estimate and Weigh

Let's Weigh with Beans

Weighing with Pounds

Weighing with Ounces

Tables of Measurement for Weight

Estimating Weight in Ounces and Pounds, and

Tons

More Practice with Customary Units of Weight

Estimating Weight in Grams and Kilograms

More Practice with Metric Measurement

Problem Solving with Weight

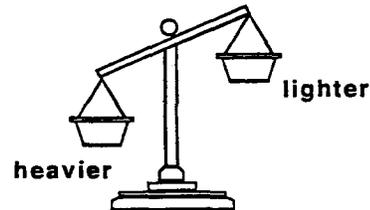
Language Practice

Writing about Weight

### Language Foundation

1. Discuss the word scale with students. Point out that this word has several meanings in English. Students may be familiar with scales in music or the scales found on the skin of fish or snakes. Explain that in this lesson students will be using scales to weigh objects. Point out the various scales brought into the classroom to weigh objects. Brainstorm with students other kinds of scales they are familiar with. Have them explain what each scale is used for.

2. Review the words **weigh**, **weight**, **light**, **lighter**, **heavy**, and **heavier** which students learned in Objectives 1 and 2. Draw a picture of a balance scale on a transparency or on the board. Point out to students that when students weigh objects using a balance scale, the heavier object will be lower and the lighter object, higher. Explain to students that in this lesson they will be weighing objects using nonstandard, customary, and metric units.



3. Explain that students will use **grams** and **kilograms** when they weigh objects using the metric system. Write both words on the board. Point out the root word gram. Ask students if they remember what the prefix kilo means. Explain that since the prefix kilo means 1000, kilogram means 1000 grams. For Spanish speakers, explain that a **kilogram** in English is equal to the word kilogramo in Spanish.

4. In addition to describing objects as heavier or lighter, remind students of other expressions they can use to compare the weight of different objects such as "weighs more than," "weighs the same as," or "equals the weight of." Have students complete the activity page Writing about Weight for more practice using these expressions.

## Mathematics Component

### Customary Units

#### 1. Explore weight

- Gather several scales (a balance scale, a kitchen scale, a bathroom scale, etc.).
- Ask the students if they remember what **weight** is. Remind students that weight describes how **heavy** or **light** things are. Place the transparency Weight on the overhead. Go over Part I with the class.
- Show students a large styrofoam cup and a large bolt or other fairly small metal item that weighs more than the cup. Talk about the question in Part 2 of the overhead. Have students brainstorm with a partner, then come up and draw pictures of two objects where the bigger item is lighter than the smaller one.
- Ask students, “What can we use to measure **weight**?” Elicit scales.
- Place the transparency Scales on the overhead.
- Show students the different scales and tell them when and where we use the scales. For example, “The kitchen scale is used to weigh foods. We see scales a lot at the supermarket.”
- Hold up the real scales and have the students tell what kind of scale each is.
- Place students in groups of three or four. Give each student a copy of Estimate and Weigh. (You will need 4 of each item on the list, one per group.) Give each group a balance scale. Have the groups first estimate which item they think is heavier, and then put each of the two items in a different dish on the balance. Point out that the heavier item will be lower on the balance. Working in groups, students should first estimate then measure, circling their estimates and also the actual heavier item on their sheet. Go over answers with the class. Some groups may have different answers depending upon the weight and size of some items such as the rocks, apples, and watches.

#### 2. Measuring weight in nonstandard units

- Have students work in groups of three or four. Each group will need a balance scale, bean weights (plastic bags with beans), objects to weigh, and the activity sheet Let's Weigh with Beans.
- Prepackage the bean weights for each group. Each group should have several bags each of 5 beans, 10 beans, 25 beans, and 50 beans. Label each bag with its bean count “weight”.
- Model the first object to be weighed for the class. Show students how to place each object on one side of the balance. Have students first estimate how many beans they think it will take to level the balance and record this estimate on their sheet. Then, use the bean weights and the balance to see how much each object “weighs” in beans. Have students record the closest measurement using the prepackaged beans.
- Have students choose other objects in their possession or around the room to measure. Have them estimate, weigh, and record answers on their activity sheets. Students can share how much

their objects weighed in beans, and compare their findings with other groups.

### 3. Exploring customary units - Pounds

- Find several objects that weigh a pound (a pound of margarine), less than a pound (a pencil), and more than a pound (a heavy book). Try to find at least two objects for each weight group.
- Have the students hold the objects that weigh a *pound*. Tell them that these objects weigh the same - 1 pound. Place them on a scale. Identify the markings for a pound on the scale.
- Tell students that the abbreviation, or short form of the word pound is **lb**. Write 4 pounds = 4 lbs.
- Now give the students some objects weighing *less than a pound*. Have the students determine if these objects are **heavier** or **lighter** than the first set of objects. Do not use the scales yet.
- After they have determined that these are lighter, show students this fact on a balance scale. Remind the class that the heavier item is lower and the lighter object is higher on the scale.
- Now let the students hold some objects weighing *more than a pound*. Have the students determine if these objects are **heavier** or **lighter** than the first set of objects. Do not use the scales yet.
- After they have determined that these are heavier, demonstrate on the balance scale.
- Have the students estimate the weight of several other objects and compare them to the objects weighing a pound. Have students make a chart labeled: "object," "estimate," "result." (See chart below.) Use a scale to check students' estimates. This activity can be done together as a class.

Compare to: \_\_\_\_\_ (This object weighs a pound)

<u>Object</u>	<u>Estimate</u>	<u>Result</u>
pencil _____	less than 1 pound _____	_____ _____

- Under "result" have students enter less than a pound or more than a pound for now. They do not need the exact weight yet.
- Have students complete the activity sheet Weighing with Pounds. Students can use objects around the classroom. You might also need to provide apples, keys, and paperback books.

### 4. Exploring customary units- Ounces

- Find objects that weigh about an ounce (an envelope, a slice of cheese), less than an ounce, and more than an ounce.
- Have the students hold the objects weighing an ounce. Tell them these objects weigh 1 ounce. Show students on the scale what an ounce marking is. Explain that some scales show only ounces; some show only pounds; and other scales show both pounds and ounces. Place the transparency Ounces and Pounds on the overhead. Point out to students the markings on the scale that show ounces and pounds.

- Tell students that the short form of ounces is **oz**. Write  $5 \text{ ounces} = 5 \text{ oz}$ .
- Now have a student hold the 1 pound objects in one hand and the 1 ounce objects in their other hand. Ask which is lighter? (ounce)
- Tell students that  $16 \text{ ounces (oz)} = 1 \text{ pound (lb)}$ . Write this on the board.
- Using a balance scale show them how 16 objects weighing an ounce weigh the same as a 1 pound object. (You might be able to borrow ounce and pound measures from a science teacher.)
- Using the objects you gathered, have the students weigh them again, this time telling their exact weight. Demonstrate for students how to read the weight in pounds and ounces. Each scale may be different. Use the kitchen scale first until they grasp the concept, then show them how to read other scales.
- Have students take out their charts from the first activity. Under "result" they should write the exact weight. Students can work in pairs to complete the chart.
- Tell students that we use **ounces** to weigh very light objects like paper clips and paper. We use **pounds** to weigh heavier items like books, animals, and people.
- Have students complete the activity sheet Weighing with Ounces.

#### 5. Exploring customary units - Tons

- Gather pictures of objects that weigh a ton or more than a ton (trucks, a tank....)
- Show students some pictures of cars. Have them estimate how many pounds these weigh. Students might give a wide range of answers here. (You may even want to reward the one who gets the closest.)
- Tell the class that these cars weigh about 2,000 pounds.  $2,000 \text{ pounds} = 1 \text{ ton (T)}$ . Write this on the board. Tell students the abbreviation or short form for ton is **T**. Write  $6 \text{ tons} = 6 \text{ T}$ .
- Ask students to name other objects that could be measured in tons. (an elephant, for example). Show them pictures of things we can weigh in tons.
- Explain that we measure very heavy objects in tons. Tell students that the classroom scales do not measure tons. "Tons are VERY HEAVY."
- Tell students that we use **ounces**, **pounds**, and **tons** to weigh objects in this country. These are called **customary units of measurement for weight**.
- Pass out the Tables of Measurement for Weight. This will be a reference guide for students. Again, point out the abbreviations for ounce, pound, and ton,
- Pass out Estimating Weight in Ounces and Pounds and Tons. Go over an example together first. Then have students complete the activity.

### Metric System

#### 6. Exploring kilograms

- Gather objects that weigh 1 kilogram, less than 1 kilogram, and more than 1 kilogram. A large

book, for example would be about 1 kilogram.

- Tell the students that the ounce, pound, and ton are customary units used in the U.S. However, the rest of the world uses the metric system. Point out the metric system units (milligrams, grams, kilograms) and their abbreviations on the Tables of Measurement for Weight.
- Have the students hold the objects that weigh *a kilogram*. Tell them that these objects all weigh the same - 1 kilogram. Show students this weight on the scale. Identify the markings on the different scales.
- Now give the students some objects weighing *less than a kilogram*. Have the students determine if these objects are **heavier** or **lighter** than the first set of objects. Have students estimate first.
- After they have determined that these are *lighter*, demonstrate on the scale. A balance scale would be useful. Explain to students again that the heavier item is lower and the lighter object is higher.
- Now give the students some objects weighing *more than a kilogram*. Have the students determine if these objects are **heavier** or **lighter** than the first set of objects. Have students estimate first.
- After students have determined that these objects are *heavier*, demonstrate on the scale.
- Have the students estimate the weights of several other objects and compare them to the objects weighing 1 kilogram. Have students make a chart labeled: "object," "estimate," "result." See chart below.

Object to be compared: \_\_\_\_\_ (This object weighs a kilogram)

<u>Object</u>	<u>Estimate</u>	<u>Result</u>
pencil _____	less than 1 kg _____	_____ _____

- Under "result" have students enter *less than a kilogram* or *more than a kilogram* for now.

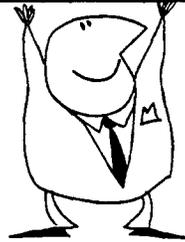
## 7. Exploring grams

- Find objects that weigh about a gram ( a paper clip), less than a gram, and more than a gram.
- Have a student hold the objects weighing a gram. Say, " These objects weigh 1 gram." Show them on the scale what a gram marking is.
- Now have a student hold the 1 kilogram object in one hand and the 1 gram object in their other hand. Ask which is lighter? (gram)
- Tell the class that 1,000 grams (g) = 1 kilogram (kg). Write this on the board.
- Using a balance scale have the students place small objects on the scale one at a time. After each placement, demonstrate how to read the scale. Point out 1 kilogram when there are enough objects on the scale to equal 1 kilogram. This will give the class an idea of how much it takes to make a kilogram.

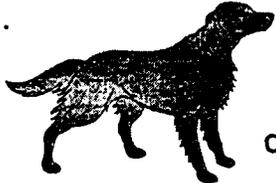
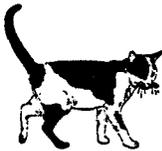
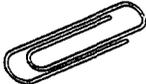
- Have students take out their charts from above. Students can work in pairs to complete the chart. Give a scale to each pair. Under “result” write the exact weight to the nearest gram or kilogram.
- Tell students that we use **kilograms** to measure the weight of heavier items like books, animals, and people. We use **grams** to measure the weight of light objects like paper clips and paper. Explain that there is an even smaller unit of metric measurement called a **milligram** that is used to measure very light objects such as a pin or a tiny bug.
- Pass out Estimating Weight in Grams and Kilograms. Go over an example together and have students complete the activity.
- The activity sheet More Practice with Metric Measurement is provided for further practice.
- Problem Solving with Weight provides extra practice with customary and metric measurement.

# WEIGHT

The **weight** of an object tells how heavy or light it is.

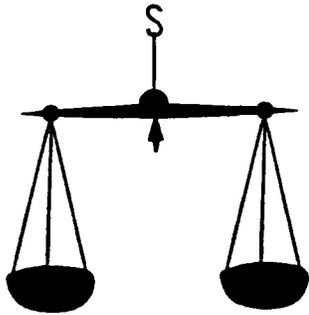


Part 1 Which object do you think weighs more? Put a check in the box.

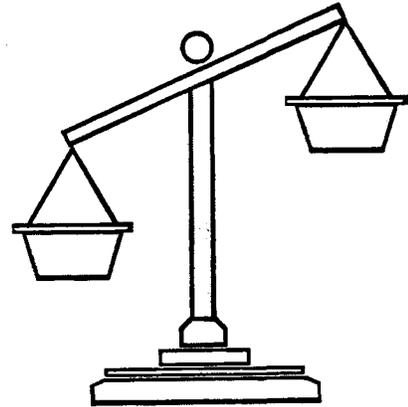
1.  or  Dog <input type="checkbox"/> Cat <input type="checkbox"/>	2.  or  Chair <input type="checkbox"/> Table <input type="checkbox"/>
3.  or  Cookie <input type="checkbox"/> Cake <input type="checkbox"/>	4.  or  Paper clip 1 <input type="checkbox"/> Paper clip 2 <input type="checkbox"/>
5.  or  Sneaker <input type="checkbox"/> Shoe <input type="checkbox"/>	6.  or  Soccer Ball <input type="checkbox"/> Baseball Bat <input type="checkbox"/>

Part 2 Will a larger object always weigh more than a smaller object? Can you explain why or why not? Draw some examples to help explain your thinking.

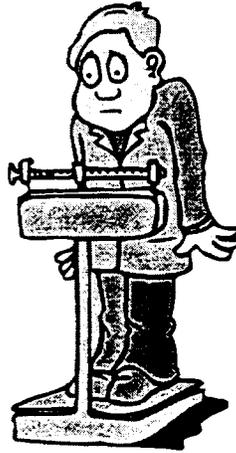
# Scales



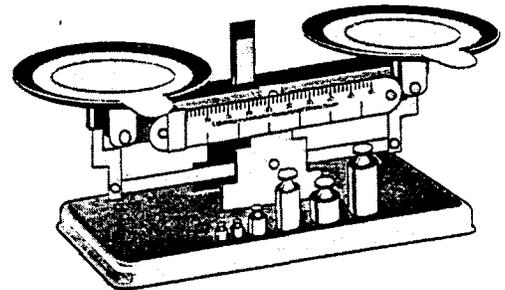
**Balance Scale**



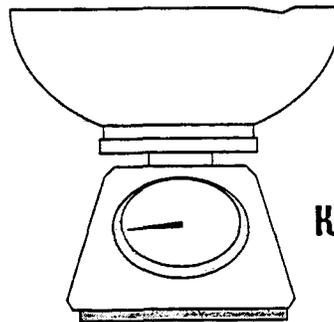
**Balance Scale**



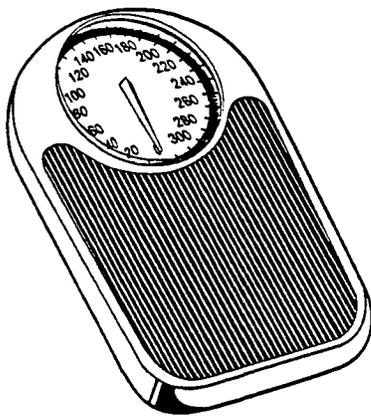
**Postal Scale  
Digital Scale**



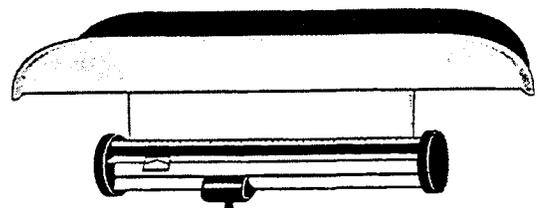
**Scientific Scale  
Lab Scale**



**Kitchen Scale**



**Bathroom  
Scale**



**Baby Scale**

Name: \_\_\_\_\_

# Estimate ? Estimate and Weigh

Weigh



Which object do you think is heavier?

Use a balance scale to measure which is heavier.

1) pair of big scissors or 10 disks



2) stapler or orange



3) wrist watch or 5 pens



4) apple or small cup of rice



5) blackboard eraser or small pad of Post-It Notes



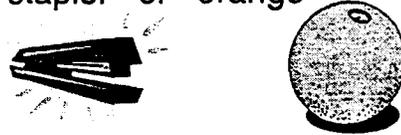
6) rock or box of paper clips



1) pair of big scissors or 10 disks



2) stapler or orange



3) wrist watch or 5 pens



4) apple or small cup of rice



5) blackboard eraser or small pad of Post-It Notes



6) rock or box of paper clips



Name: \_\_\_\_\_

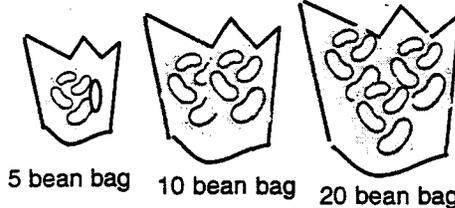
## Let's Weigh with Beans

Each group will need:

- balance scale to weigh



- plastic bags of bean weights



- things



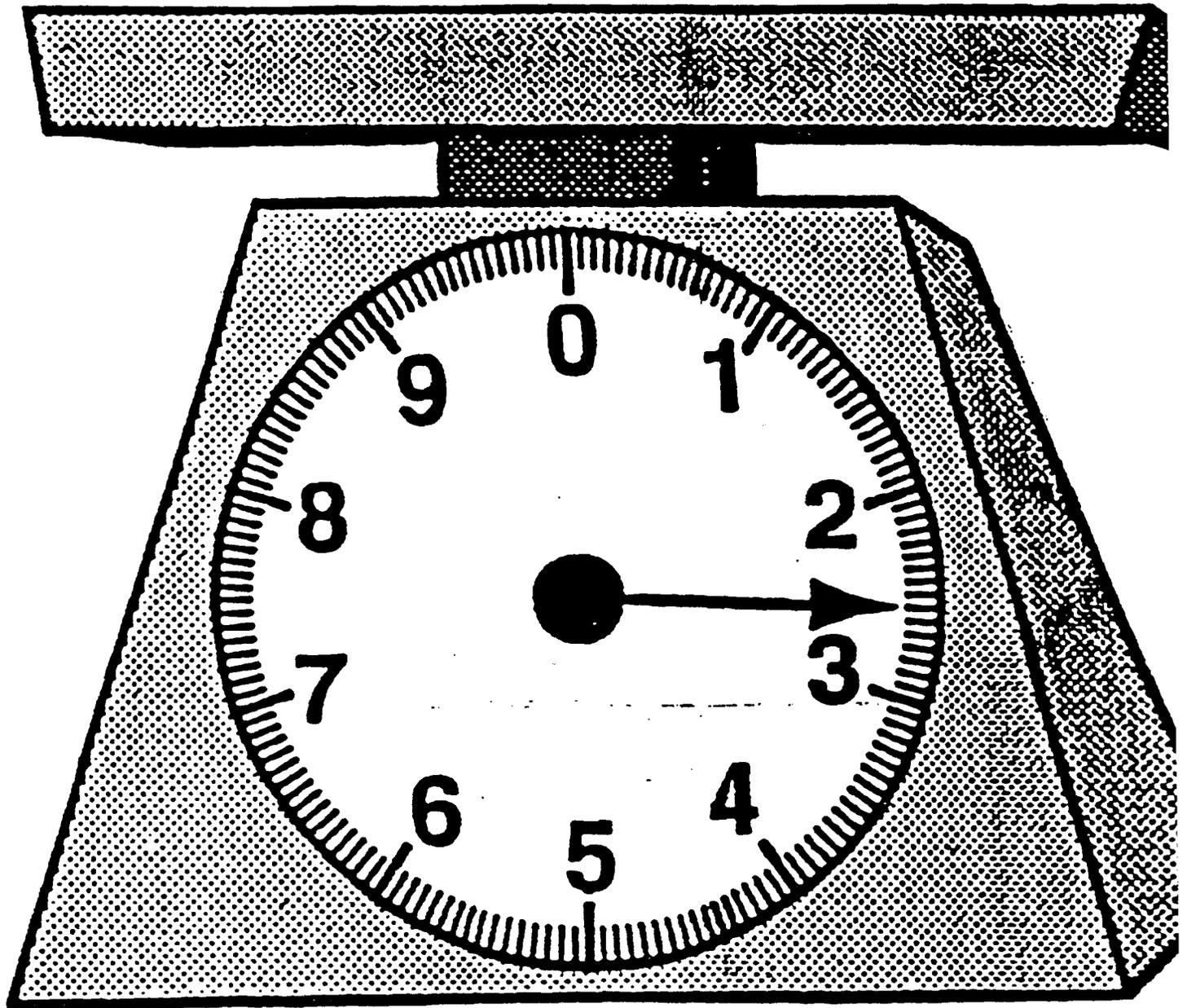
- 1) Put each object on the balance scale.
- 2) Estimate how many beans it will take to balance the scale.
- 3) Use the bean weights to get the actual weigh in beans.
- 4) Write your estimate and the actual measurement on the chart.

Object	Estimate	Weight in Beans
Banana		
Workbook		
Scissors		
7 Hershey Kisses		
10 pencils		
Small Drinking Glass		
Pack of chewing Gum		

Find 4 other objects to estimate and weigh in beans. Complete the chart.

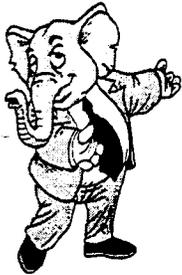
Object	Estimate	Weight in Beans

# OUNCES and POUNDS



Name: \_\_\_\_\_

## Weighing with Pounds



- Find an object that you estimate weighs each amount given below.
- Use a scale to see how much the object weighs.
- Write the name of the object and how much it weighs on the chart.

Weight	Object	Actual Weight
0 - 2 lbs		
3 - 4 lbs		
5 - 7 lbs		
8 - 10 lbs		

- **Estimate** the number of items needed to equal the weight given in each problem.
- Use a **scale** to check your answers .



1) How many shoes weigh 3 lbs? Estimate \_\_\_\_\_ Actual number of shoes \_\_\_\_\_



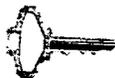
2) How many books weigh 2 lbs? Estimate \_\_\_\_\_ Actual number of books \_\_\_\_\_



3) How many apples weigh 2 lbs? Estimate \_\_\_\_\_ Actual number of apples \_\_\_\_\_



4) How many text books weigh 7 lbs? Estimate \_\_\_\_\_ Actual number of books \_\_\_\_\_



5) How many keys weigh 1 lb? Estimate \_\_\_\_\_ Actual number of books \_\_\_\_\_

Name: \_\_\_\_\_

## Weighing with Ounces



- Find an object that you estimate weighs each amount given below.
- Use a scale to see how much the object weighs.
- Write the name of the object and how much it weighs on the chart.

Weight	Object	Actual Weight
0 - 3 oz		
4 - 7 oz		
8 - 11 oz		
12 - 15 oz		

- Estimate the number of items needed to weigh the amount in each problem.
- Use a scale to check your answers .



1) How many stones weigh 3 oz? Estimate \_\_\_\_\_ Actual number of stones \_\_\_\_\_



2) How many dimes weigh 4 oz? Estimate \_\_\_\_\_ Actual number of dimes \_\_\_\_\_



3) How many pens weigh 5 oz? Estimate \_\_\_\_\_ Actual number of pens \_\_\_\_\_

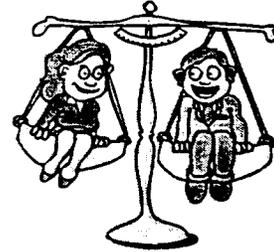


4) How many sheets of paper weigh 1 oz? Estimate \_\_\_\_\_ Actual number of sheets \_\_\_\_\_



5) How many earrings weigh 10 oz ? Estimate \_\_\_\_\_ Actual number of earrings \_\_\_\_\_

# TABLES OF MEASUREMENT FOR WEIGHT



## CUSTOMARY UNITS

1 pound (lb)	=	16 ounces (oz)
1 ton (T)	=	2,000 pounds (lb) 32,000 ounces (oz)

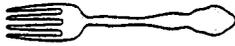


## METRIC SYSTEM

1 gram (g)	=	1,000 milligrams (mg)
1 kilogram (kg)	=	1,000 grams (g) 1,000,000,000 mg

Name: \_\_\_\_\_

## Estimating Weight in Ounces, Pounds, and Tons



about 1 ounce (oz)



about 1 pound (lb)



about 1 ton ( T )

1 pound = 16 ounces

1 ton = 2,000 pounds

### A. Circle the best estimate of the weight given.

1. about 1 ounce



2. about 1 pound



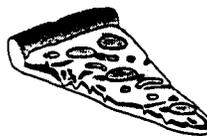
### B. Circle the best unit for measuring the weight of each object.

1.



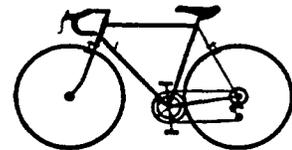
ounce      pound

2.



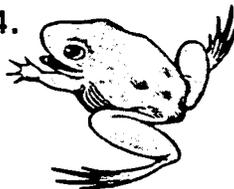
ounce      pound

3.



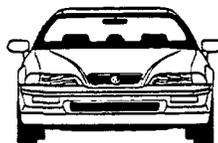
pound      ton

4.



ounce      pound

5.



pound      ton

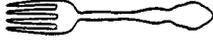
6.



ounce      pound

# Estimating Weight in Ounces and Pounds and Tons

(Continued)



about 1 ounce (oz)



about 1 pound (lb)



about 1 ton (T)

**Remember:**      1 lb = 16 oz  
                           1 T = 2,000 lbs

**C. Circle the most reasonable estimate of weight.**

1.



- 1 oz
- 1 lb
- 1 T

2.



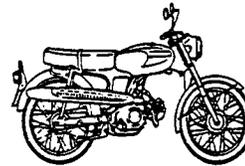
- 3 oz
- 3 lb
- 3 T

3.



- 150 oz
- 150 lb
- 1 T

4.



- 300 oz
- 300 lb
- 3 T

5.



- 3 oz
- 3 lb
- 3 T

6.



- 1 oz
- 1 lb
- 1 T

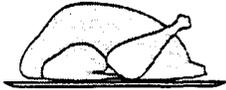


Name: \_\_\_\_\_

## More Practice with Customary Units of Weight

Estimate the weight of these objects and decide which unit of measure you would use to weigh these items? Write the word ounce, pound, or ton for each.

1)



\_\_\_\_\_

2)



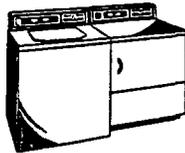
\_\_\_\_\_

3)



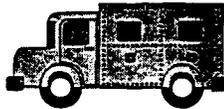
\_\_\_\_\_

4)



\_\_\_\_\_

5)



\_\_\_\_\_

6)



\_\_\_\_\_

Estimate the weight of these objects and decide which unit of measure you would use to weigh these objects. Write *oz*, *lb*, or *T*

1)



\_\_\_\_\_

2)



\_\_\_\_\_

3)



\_\_\_\_\_

4)



\_\_\_\_\_

5)



\_\_\_\_\_

6)



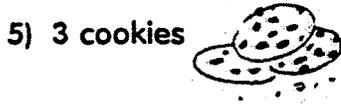
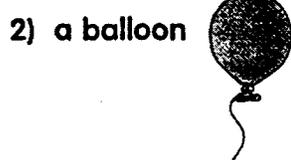
\_\_\_\_\_



Remember : An envelope with a letter inside weighs about 1 ounce



Estimate which objects weigh more than 1 ounce. Draw a box around the words.

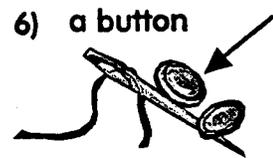
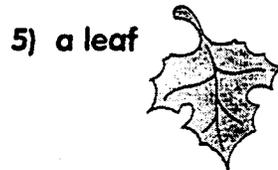
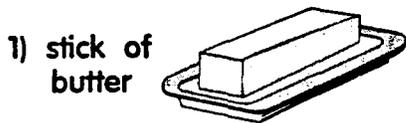


How did you make your estimates for guessing the weights of the objects?

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Estimate which objects weigh less than 1 ounce. Draw a box around the words.



How did you make your estimates for guessing the weights of the objects?

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Name: \_\_\_\_\_

## Estimating Weight in Grams and Kilograms



about 1 gram (g)

1 gram = 1,000 milligrams

1 kilogram = 1,000 grams



about 1 kilogram (kg)

### A. Circle the best estimate.

1. about 1 kilogram



2. about 1 gram



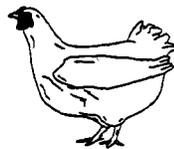
### B. Circle the best unit for measuring weight.

1.



gram      kilogram

2.



gram      kilogram

3.



gram      milligram

4.



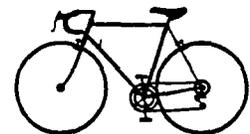
gram      kilogram

5.



gram      kilogram

6.



gram      kilogram

# Estimating Weight in Grams and Kilograms (Continued)



about 1 gram (g)

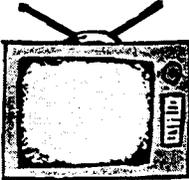
1 kilogram = 1,000 grams



about 1 kilogram (kg)

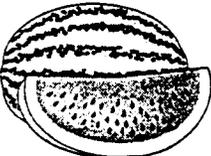
## C. Circle the most reasonable estimate of weight.

1.  3 g  
3 kg

5.  20 g  
20 kg

2.  2 g  
2 kg

6.  12 g  
12 kg

3.  2 g  
2 kg

7.  3 g  
3 kg

4.  130 g  
130 mg

8.  6 g  
6 mg



Name: \_\_\_\_\_

## More Practice with Metric Measurement

Which unit would you use to weigh each item? Write milligram, gram, or kilogram.

a crayon



\_\_\_\_\_

a chair



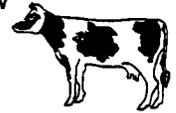
\_\_\_\_\_

a spider



\_\_\_\_\_

a cow



\_\_\_\_\_

Write two items that can be best weighed with each unit of metric measurement.

Milligrams

\_\_\_\_\_  
\_\_\_\_\_

Grams

\_\_\_\_\_  
\_\_\_\_\_

Kilograms

\_\_\_\_\_  
\_\_\_\_\_

Draw a box around each object that you estimate weighs less than 1 kilogram.



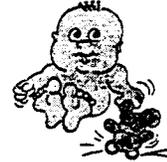
a chili pepper



two  
pineapples



five  
balloons



a baby



a pretzel

Complete each sentence with the words milligrams, grams, or kilograms.

1) My puppy  weighs about 12 \_\_\_\_\_.

2) My puppy's 2 dog biscuits  are about 140 \_\_\_\_\_.

3) A push pin  weighs about 250 \_\_\_\_\_.

4) My dad  weighs about 85 \_\_\_\_\_.

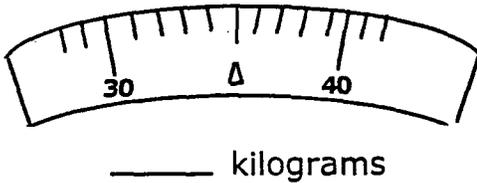
Name: \_\_\_\_\_

# Problem Solving with Weight

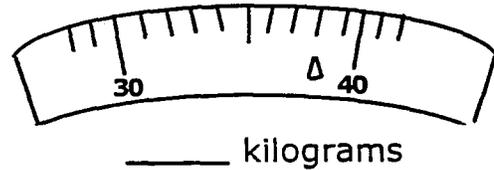
## PART 1

Write the weight shown on each scale. Then, answer the question.

Khalid's Weight Last Year



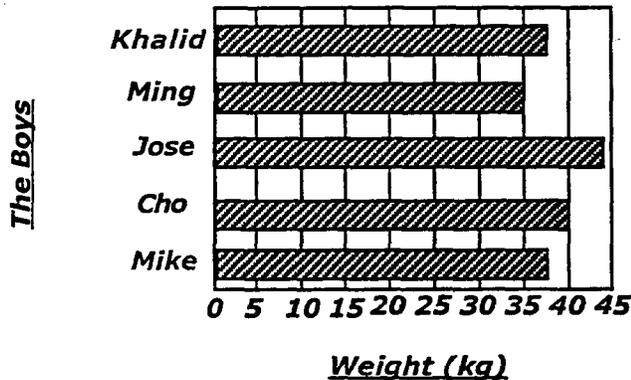
Khalid's Weight This Year



How many kilograms did Khalid gain ? He gained \_\_\_\_\_ kilograms.

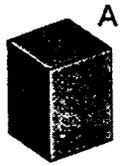
## PART 2

Weight of Khalid and His Friends



- 1) Which boy weighs the most? \_\_\_\_\_
- 2) Which boy weighs the least? \_\_\_\_\_
- 3) Which boys weigh the same? \_\_\_\_\_
- 4) How much does Cho weigh? \_\_\_\_\_
- 5) How much does Jose weigh? \_\_\_\_\_

**Part 3**



5 kg



2 kg



1 kg



500 g



200 g



100 g



50 g

Choose the weights you would use to balance each of these bags of money. Can you find more than one way to balance? (You will need to use some weights more than once.)



750 g

\_\_\_\_\_

\_\_\_\_\_



1,050 g

\_\_\_\_\_

\_\_\_\_\_



2450 g

\_\_\_\_\_

\_\_\_\_\_



12 kg

\_\_\_\_\_

\_\_\_\_\_



7950 g

\_\_\_\_\_

\_\_\_\_\_



8 kg

\_\_\_\_\_

\_\_\_\_\_

Now, find the total weight in **GRAMS!**

1) Weights E and G \_\_\_\_\_

2) Weights E, F, G \_\_\_\_\_

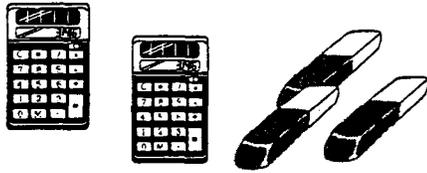
3) Weights B, D, E, G \_\_\_\_\_

**Part 4**

**How Much Does It Weigh??**

Use your math skills to find the missing weights.

1)



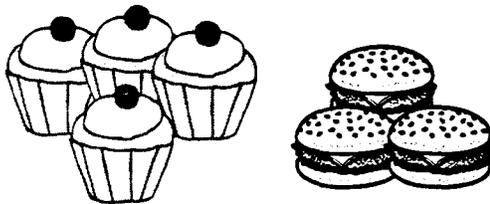
Show how you solve the problem here.

Total Weight of these objects: 14 oz

Each calculator weighs 4 oz.

Each eraser weighs \_\_\_\_\_

2)



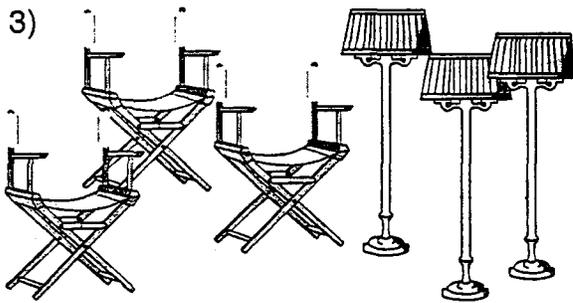
Show how you solve the problem here.

Total Weight of these objects: 27 oz

Each cupcake weighs 3 oz.

Each hamburger weighs \_\_\_\_\_

3)



Show how you solve the problem here.

Total Weight of these objects: 93 lbs.

Each lamp weighs 20 lbs.

Each chair weighs \_\_\_\_\_

Name \_\_\_\_\_

## Language Practice

**Part I. Analogies** are comparisons between similar things. In an analogy, you compare one pair of objects with another pair. Look at the following example:

wing : airplane                      as                      pages : book

The relationship between the examples shows that a wing is part of an airplane in a similar way that pages are part of a book.

Complete each comparison below. Make sure that the first pair shows the same relationship as the second pair.

1. oz : lb                                      as                      \_\_\_\_\_ : kg

2. \_\_\_\_\_ : lighter                      as                      10 pounds : 5 pounds

3. pounds : ounces                      as                      \_\_\_\_\_ : grams

4. milligrams : \_\_\_\_\_                      as                      lighter : heavier

5. lighter : heavier                      as                      a pound : \_\_\_\_\_

**Part II.** Complete the following chart. Draw or list the names of items you would measure using each of the scales in the chart.



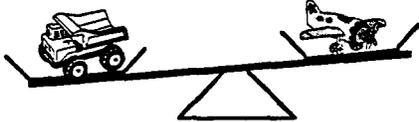
Scale	Items you could measure with this scale
Scientific	rock, beans 
Balance	
Kitchen	
Postal	
Infant	
Bathroom	

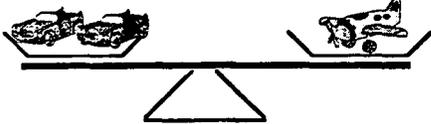
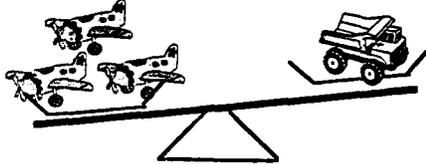
Name \_\_\_\_\_

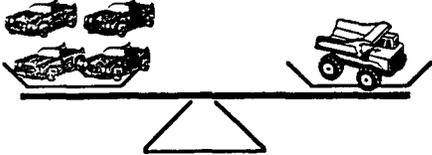
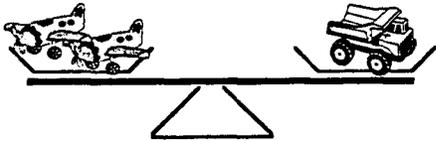
# Writing about Weight



Complete the sentences about the pictures.

1)  The toy _____ is heavier than the toy _____.	2)  The toy _____ is lighter than the toy _____.
---	---

3)  2 toy cars weigh _____ as 1 toy airplane.	4)  3 toy airplanes weigh _____ than 1 toy truck.
---	--

5)  4 toy cars _____ the weight of 1 toy truck.	6)  2 toy airplanes _____ the weight of 1 toy truck.
--	---

Look at the problems above to help get your answer.

7) 1 toy car weighs about 35 grams. How much do the other toys weigh?		
 _____ 35 g	 _____	 _____

## Answer Key Measurement - Obj. 5

### Weight

#### Part 1

- 1) dog
- 2) table
- 3) cake
- 4) paper clip 2
- 5) sneaker
- 6) baseball bat

#### Part 2

No. Explanations will vary.

### Estimate and Weigh

Answers will vary.

### Let's Weigh with Beans

Answers will vary.

### Weighing with Pounds

Answers will vary.

### Weighing with Ounces

Answers will vary.

### Estimating Weight in Ounces, Pounds, and Tons

#### Page 1

- |    |               |    |          |          |          |
|----|---------------|----|----------|----------|----------|
| A. | 1) strawberry | B. | 1) ounce | 2) ounce | 3) pound |
|    | 2) book       |    | 4) ounce | 5) ton   | 6) ounce |

#### Page 2

- |    |         |            |          |
|----|---------|------------|----------|
| C. | 1) 1 oz | 3) 150 lbs | 5) 3 lbs |
|    | 2) 3 oz | 4) 300 lbs | 6) 1 T   |

### More Practice with Customary Units of Weight

#### Page 1

Estimate the weight. Write the words ounce, pound, or ton.

- |          |          |          |
|----------|----------|----------|
| 1) pound | 2) ounce | 3) ounce |
| 4) pound | 5) ton   | 6) pound |

Estimate the weight. Write oz, lb, or T.

- |       |       |       |
|-------|-------|-------|
| 1) lb | 2) oz | 3) lb |
| 4) oz | 5) T  | 6) T  |

Page 2

Estimate which objects weigh more than 1 ounce.

- |        |              |          |
|--------|--------------|----------|
| 1) cat | 5) 3 cookies | 6) spoon |
|--------|--------------|----------|

How did you make your estimates for the weights of the objects? Compare to the weight of the envelope. Answers will vary.

Estimate which objects weigh less than 1 ounce.

- |             |             |           |             |
|-------------|-------------|-----------|-------------|
| 2) a needle | 4) a peanut | 5) a leaf | 6) a button |
|-------------|-------------|-----------|-------------|

How did you make your estimates for the weights of the objects? Compare to the weight of the envelope. Answers will vary.

### Estimating Weight in Grams and Kilograms

Page 1

- |    |               |    |             |             |              |
|----|---------------|----|-------------|-------------|--------------|
| A. | 1) squirrel   | B. | 1) gram     | 2) kilogram | 3) milligram |
|    | 2) paper clip |    | 4) kilogram | 5) kilogram | 6) kilogram  |

Page 2

- |    |           |          |
|----|-----------|----------|
| C. | 1) 3 g    | 5) 20 kg |
|    | 2) 2 g    | 6) 12 g  |
|    | 3) 2 kg   | 7) 3 kg  |
|    | 4) 130 mg | 8) 6 g   |

### More Practice with Metric Measurement

crayon - gram      chair - kilogram      spider - milligram      cow - kilogram

Write two items that you can weigh with each unit of metric measurement. Answers will vary.

Draw a box around each object that you estimate weighs less than 1 kilogram.

a chili pepper, five balloons, a pretzel

Complete each sentence with the words milligrams, grams, or kilograms.

- 1) kilograms
- 2) grams
- 3) milligrams
- 4) kilograms

## Problem Solving with Weight

### Part 1

35, 38, 3 kilograms

### Part 2

- 1) Jose
- 2) Ming
- 3) Khalid and Mike

- 4) 40 kg
- 5) 44 kg

### Part 3

(One possible solution)

- 750 g = 500 g, 200 g, 50 g  
1,050 g = 1 kg, 50 g  
2450 g = 1 kg, 1 kg, 200 g, 200 g, 50 g  
12 kg = 5 kg, 5 kg, 2 kg  
7950 g = 5 kg, 2 kg, 500 g, 200g, 200g, 50 g  
8 kg = 5 kg, 2 kg, 1 kg

Now, find the weight in Grams!

- 1)  $E + G = 250$  g
- 2)  $E + F + G = 350$  g
- 3)  $B + D + E + G = 2750$  g

### Part 4

- 1) 2 oz  $14 - (4 \times 2) = 6$ ,  $6 \text{ oz} \div 3 \text{ erasers} = 2$  oz
- 2) 5 oz  $4 \times 3 \text{ oz} = 12$  oz,  $27 - 12 = 15$ ,  $15 \div 3 = 5$  oz
- 3) 11 lbs  $93 - (20 \times 3) = 33$ ,  $33 \div 3 = 11$  lbs

## Language Practice

### Part 1

- 1) g
- 2) heavier
- 3) kilograms
- 4) grams or kilograms
- 5) a ton

### Part 2

Answers will vary.

## Writing about Weight

- 1) airplane, car
- 2) airplane, truck
- 3) the same
- 4) more
- 5) equal
- 6) equal
- 7) 70 g, 140 g



**Objective 6: Identify the most appropriate unit for measuring weight/mass of given objects. Compare and convert units of measure for weight within the customary system and within the metric system.**

### **Vocabulary**

convert  
metric units  
customary units

### **Materials**

scales  
magazines or newspapers to cut out  
Tables of Measurements for Weight (Obj. 5)  
calculators

### **Transparencies**

What Do We Use to Measure . . . ? (g or kg)  
What Do We Use to Measure . . . ? (oz, lb, or T)

### **Student Copies**

Converting Weight in the Metric System  
More Practice with Weight in the Metric System  
Converting Weight in the Customary System  
Converting with Remainders  
Practice Converting in the Customary System  
Review of Weight  
Which Is It? Ounces, Pounds, Tons, Grams,  
or Kilograms?

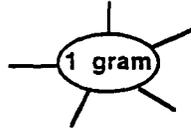
### **Language Foundation**

1. Review metric and customary units of measurement for weight.
2. Explain to students that they will be comparing units of measurement as they did in Objective 4. They will learn how to **convert** or change one unit of measurement to another. For example, they will learn how to change from one metric unit to another such as grams to kilograms and from one customary unit to another such as ounces to pounds.

## Mathematics Component

### 1. Review the units of weight for *metric system*.

- Ask students to recall the units of weight in the metric system. (mg, g, and kg)
- Ask them which one they would use to measure very small/ light things. (mg or g)
- Ask if they can name something that weighs *about* 1 gram. (\$1 bill, paper clip, etc.) Make a web together. Write **1 gram** in the middle and have students name as many things as they can that weigh about 1 gram.



- Have students double check their estimates with the scales. (If items are available in class.)
- Follow the same process for 1 kilogram.
- Point to objects around the room and ask what they would use to measure a desk - grams or kilograms? A pencil - g or kg? A person - g or kg? A thumbtack - g or kg?, etc.
- Put the transparency What Do We Use to Measure...? (g or kg) on the overhead. This will give students additional practice. Complete as a class.

### 2. Converting units of weight in the metric system - larger to smaller (kilograms to grams)

- Write this problem on the board - How many **grams** are in 2 kilograms? Write below it.

$$2 \text{ kg} = \underline{\hspace{2cm}} \text{ g}$$

- Ask the students to take out their tables of measurement for weight (Obj. 5) and a calculator.
- Ask them how many grams are in 1 kilogram? (1,000) Point to this on the chart. Ask "If there are 1,000 g in 1 kilogram, then how many grams are in 4 kg?" (4,000)

- To help students visualize this problem, make a chart.  $\longrightarrow$
- Ask students if they know a shorter way to do this instead of adding.

$$\begin{array}{r} 1 \text{ kg} = 1,000 \text{ g} \\ 1 \text{ kg} = 1,000 \text{ g} \\ 1 \text{ kg} = 1,000 \text{ g} \\ + 1 \text{ kg} = 1,000 \text{ g} \\ \hline 4 \text{ kg} = 4,000 \text{ g} \end{array}$$

Lead them to see multiplication would be a quicker way.

$$\text{Multiply : } 4 \text{ kg} \times 1,000 \text{ g} = 4,000 \text{ g}$$

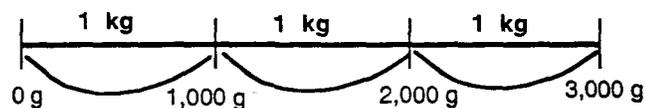
- Repeat asking how many grams there are in 6 kg, 10 kg, etc.
- Ask students to recall what operation they are using. (multiplication)
- Tell them we **multiply** when we change **larger units** (kg) to **smaller units** (g).

### 3. Converting units of weight in the metric system - smaller to larger (grams to kilograms)

- Write this problem on the board. How many **kilograms** are in 3,000 grams? Write below it.

$$3,000 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$$

- Point to the chart and tell students 1,000 grams = 1 kilogram. Ask how many kilograms are in 3,000 grams? Then tell students we divide 1,000 g into 3,000 g. The answer is 3 kg.
- To help students visualize this problem, make a number line divided into groups.



- Repeat asking how many kilograms there are in 5,000 g; 8,000 g; etc.
- Ask students what operation they are using. (division)
- Tell them to **divide** when changing **smaller units (g)** to **larger units (kg)**.
- Pass out Converting Weight in the Metric System. Go over an example. Have students complete in pairs. The activity sheet More Practice with Weight in the Metric System is included for practice.

4. Review the units of weight for the *customary system*.

- Ask students to recall the units of weight in the Customary system. (oz, lb, T)
- Ask which one they would use to measure very small/ light things. (oz)
- Ask if they can name something that weighs *about 1 oz*. Make a web together. Enter **1 ounce** in the middle and have students name as many things as they can that weigh about 1 ounce. ( an envelope, a slice of cheese, etc.)
- Have them double check their estimates with the scales.
- Do the same for 1 pound and 1 ton.
- Point to objects around the room and ask students what they would use to measure a desk - ounces or pounds? A pencil - oz or lb? A person - oz or lb? A thumbtack - oz or lb? Then ask what they would use to measure a school bus? (ton)
- Put the transparency What Do We Use to Measure...? (oz, lb, or T) on the overhead. Complete as a class.

5. Converting units of weight in the customary system - larger to smaller (pounds to ounces)

- Write this problem on the board - How many **ounces** are there in 3 pounds? Write below it.  
**3 lbs = \_\_\_\_\_ oz**
- Ask the students to take out their tables of measurement for weight and a calculator. Ask how many ounces are in 1 pound? (16) Point to this on the chart. Ask "If there are 16 ounces in one pound, then how many ounces are in 3 pounds?" (48)
- To help students visualize this problem, make a chart.  $\longrightarrow$ 

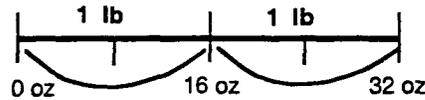
1 lb = 16 oz
1 lb = 16 oz
+ 1 lb = 16 oz
3 lbs = 48 oz
- Ask students if this problem can be done a shorter way. Lead students to see multiplication would be a shorter way. (Remind them that they multiplied to change kilograms to grams in section #2) Then tell students to multiply - 3 lbs by 16 oz = 48 oz
- Repeat, asking how many ounces there are in 6 lbs, 10 lbs, etc.
- Ask students to recall what operation they are using. (multiplication)
- Tell them to **multiply** when changing **larger units (lbs)** to **smaller units (oz)**.

6. Converting units of weight in the customary system - smaller to larger ( ounces to pounds)

- Write this problem on the board. How many **pounds** are in 32 ounces? Write below it.  
**32 oz = \_\_\_\_\_ lbs**
- Point to the chart and tell students 1 pound = 16 ounces. Ask how many pounds are in

32 ounces? Tell them we divide 16 oz into 32 oz. The answer is **2 lbs**.

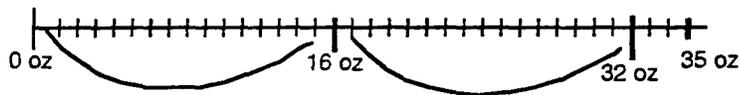
- To help students visualize this problem, make a number line divided into groups.



- Repeat the process asking how many pounds there are in 48 oz (3lbs), 96 oz (6 lbs), etc.
- Ask students to recall what operation they are using. (division)
- Tell them to **divide** when changing **smaller units (oz) to larger units (lbs)**.
- Pass out Converting Weight in the Customary System. Go over an example. Complete in pairs.

#### 7. Converting with remainders

- Explain to students that when they convert units of measurement, the units will not always divide evenly. Sometimes they might have a remainder.
- Tell students we want to know how many pounds are in 35 oz. First, ask them to think if they are changing larger units to smaller units or smaller to larger. (smaller to larger) Second, what operation would be used? (division) Third, ask students how many ounces are in a pound? (16)
- Ask students what happens when 16 oz is divided into 35 oz. (You get 2 lbs and 3 oz remaining.) You can draw a number line to illustrate this for students.



- Practice several more examples with students:  
How many pounds in 50 oz? (3lbs 2 oz)  
How many ounces in 2 lbs 7 oz? (multiply  $16 \times 2$ ,  $+ 7 = 39$  oz)
- Have students complete the activity sheet Converting with Remainders.
- Practice Converting in the Customary System, Review of Weight, and Which Is It? are included for further review.

#### 8. Weight Project

- Have students get into pairs.
- Tell students to think of at least 5 things that equal 1 pound.
- Have them make a poster on an a piece of construction paper, tag board or chart paper. They should include the following:
  - a) A picture of each object. (Can be drawn, cut out, etc.)
  - b) The name of each object.
  - c) The weight of each object.
  - d) An equation like  $3 \text{ oz} + 6 \text{ oz} + 7 \text{ oz} = 1 \text{ lb}$ .
- Do the same for 1 kilogram.
- For additional practice, students can also do 5 pounds and 5 kilograms.

# What Do We Use To Measure...?

(Grams or Kilograms)



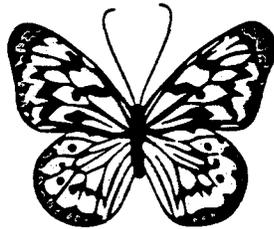
about 1 gram (g)



about 1 kilogram (kg)

**Remember:** 1 kilogram = 1,000 grams

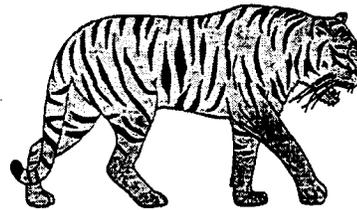
1.



grams

kilograms

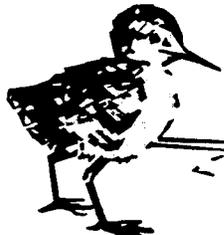
2.



grams

kilograms

3.



grams

kilograms

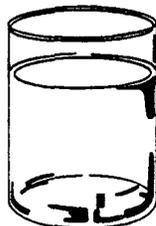
4.



grams

kilograms

5.



grams

kilograms

6.



grams

kilograms

Name: \_\_\_\_\_

## Converting Weight in the Metric System

### METRIC UNITS

1 kg = \_\_\_\_\_ g 

### REMEMBER...

To change from a larger to smaller unit  
- **MULTIPLY.**

To change from a smaller to larger unit  
- **DIVIDE.**



Example: 4 kg = \_\_\_\_\_ g

*Think:* kilograms to grams, larger to smaller - **multiply**

*Think:* 1 kg = 1,000 g

4 kg x 1,000 g = 4,000 g

So, 4 kg = 4,000 g.

Or move the decimal point 3 places to the right. 4.000

Example: 4,000 g = \_\_\_\_\_ kg

*Think:* grams to kilograms, smaller to larger - **divide**

*Think:* 1,000 g = 1 kg

4,000 g ÷ 1,000 kg = 4 kg

So, 4,000 g = 4 kg.

Or move the decimal point 3 places to the left. 4.000

1. 8 kg = \_\_\_\_\_ g      multiply or divide
2. 2,000 g = \_\_\_\_\_ kg      multiply or divide
3. 8,000 g = \_\_\_\_\_ kg      multiply or divide
4. 30 kg = \_\_\_\_\_ g      multiply or divide
5. 12 kg = \_\_\_\_\_ g      multiply or divide
6. 15,000 g = \_\_\_\_\_ kg      multiply or divide

### Difficult - Try it!

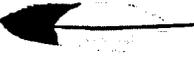
(Remember: 1 kg = 1,000 g)

- \* 7. 0.5 kg = \_\_\_\_\_ g      multiply or divide
- \* 8. 5 g = \_\_\_\_\_ kg      multiply or divide

Name: \_\_\_\_\_

## More Practice with Weight in the Metric System

Circle the measurement that is more reasonable:

- 1) a feather  1 g or 100 g
- 2) a pair of socks  10 g or 100 g
- 3) a piano  45 kg or 450 kg
- 4) a truck  120 kg or 1,200 kg
- 5) a child  15 kg or 150 kg

Problem Solving with Metric Weights Show your work and solve.

- 1) Pedro bought 5 cakes for a party. Each cake weighs 900 grams.  
How many kilograms do all the cakes weigh?



- 2) Karina needs 1 kilogram of flour to make cookies. She has 325 grams.  
How much more flour does she need?

Challenge Problem: This one is tricky!!

- 3) You want to fill a box with 14 kg of apples. How can you measure 14 kg of apples using a balance scale and only 3 weights: 1 kg, 5 kg, and 10 kg?

# More Practice with Weight in the Metric System

p.2

Put these weights in order from *greatest* to *least*.

Hint: Use your chart to help convert to all one unit (all grams or all kilograms), then compare.

a) 0.5 kg

b) 600 g

c) 6,000 mg

[ \_\_\_\_\_ g                  \_\_\_\_\_ g                  \_\_\_\_\_ g ]

Greatest to least order: \_\_\_\_\_

a) 1 kg

b) 1580 g

c) 15,000 mg

[ \_\_\_\_\_ kg                  \_\_\_\_\_ kg                  \_\_\_\_\_ kg ]

Greatest to least order: \_\_\_\_\_

## Measurement Comparisons

Compare these measures. Write  $>$ ,  $<$ , or  $=$  in each

1) 2 kg  1200 g

2) 1 g  1,000 mg

3) 5,500 g  55 kg

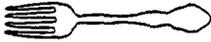
4) 500 mg  0.5 g

5) 10 kg  100 g

6) 3,000 mg  30 g

# What Do We Use To Measure...?

(ounces, pounds, or tons)



about 1 ounce (oz)



about 1 pound (lb)



about 1 ton (T)

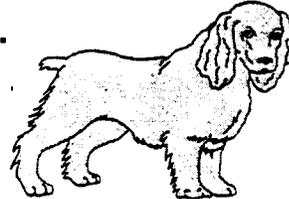
<b>Remember:</b>	1 lb = 16 oz
	1 T = 2,000 lbs

1.



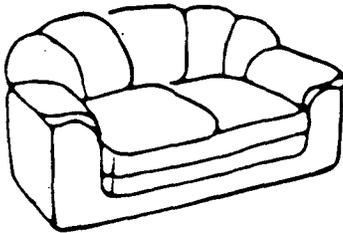
oz  
lb  
T

2.



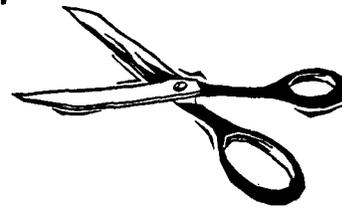
oz  
lb  
T

3.



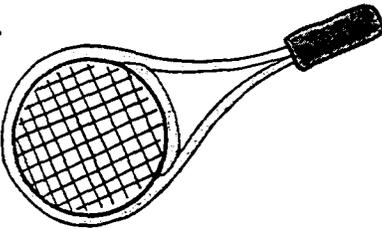
oz  
lb  
T

4.



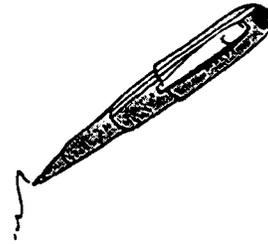
oz  
lb  
T

5.



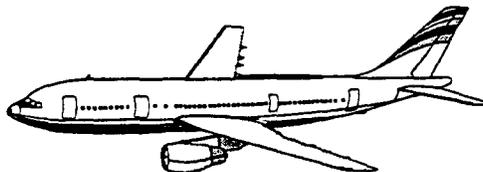
oz  
lb  
T

6.



oz  
lb  
T

7.

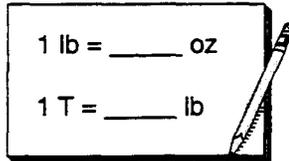


oz  
lb  
T

Name: \_\_\_\_\_

## Converting Weight in the Customary System

### CUSTOMARY UNITS



**Example:** 4 lb = \_\_\_\_\_ oz

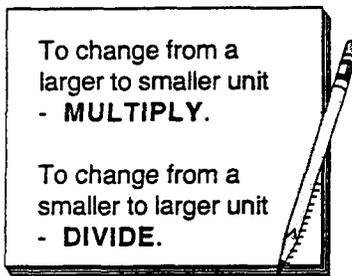
*Think:* pounds to ounces, larger to smaller - **multiply**

*Think:* 1 lb = 16 oz

$$4 \text{ lb} \times 16 \text{ oz} = 64 \text{ oz}$$

So, 4 lb = **64 oz.**

### REMEMBER...



**Example:** 64 oz = \_\_\_\_\_ lb

*Think:* ounces to pounds, smaller to larger - **divide**

*Think:* 16 ounces = 1 lb

$$64 \text{ oz} \div 16 \text{ oz} = 4 \text{ lbs.}$$

So, 64 oz = **4 lbs.**

1. 26 lb = \_\_\_\_\_ oz                      **multiply or divide**
2. 32 oz = \_\_\_\_\_ lb                      **multiply or divide**
3. 3 lb = \_\_\_\_\_ oz                      **multiply or divide**
4. 4,000 lb = \_\_\_\_\_ T                      **multiply or divide**
5. 3 T = \_\_\_\_\_ lb                      **multiply or divide**
6. 80 oz = \_\_\_\_\_ lb                      **multiply or divide**
- 7) 10,000 lbs = \_\_\_\_\_ T                      **multiply or divide**

Name: \_\_\_\_\_

## Converting with Remainders



Remember: There are 16 ounces in a pound.  
Each mark on the scale is one ounce.

Complete the conversion table. Use a calculator to help.

POUNDS	1	2	3	4	5	6	7	8	9	10
OUNCES	16	32								

For each box, change the units of weight.

Remember: To change lbs to oz → multiply the number of pounds by 16.  
To change oz to lbs → divide the number of ounces by 16.

 Think 32 oz = 2 lbs because  $32 \div 16 = 2$ 
 Think 3 lbs = 48 oz because  $3 \times 16 = 48$ 
 Think 41 oz = 2 lbs and 9 oz left over

32 oz = \_\_\_\_\_ lbs      3 lbs = \_\_\_\_\_ oz      41 oz = \_\_\_\_\_ lbs

 5 lbs = \_\_\_\_\_ oz     
  10 lbs = \_\_\_\_\_ oz     
  144 oz = \_\_\_\_\_ lbs

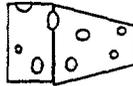
 66 oz = \_\_\_\_\_ lbs \_\_\_\_\_ oz     
  170 oz = \_\_\_\_\_ lbs \_\_\_\_\_ oz     
  5 lbs 11 oz = \_\_\_\_\_ oz

Name: \_\_\_\_\_

## Practice Converting in the Customary System



About 1 oz



About 1 lb

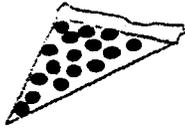


About 1 T

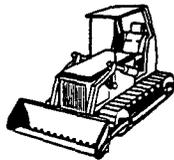
Multiply to change larger units to smaller units.

Divide to change smaller units to larger units.

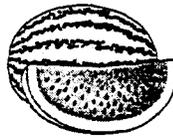
Which would you use to measure the weight of these objects?



- a) ounces
- b) pounds



- a) pounds
- b) tons



- a) ounces
- b) pounds



- a) pounds
- b) tons



- a) ounces
- b) pounds

Complete:

1) 8 lbs = \_\_\_\_\_ oz

2) 4 T = \_\_\_\_\_ lbs

3) 84 oz = \_\_\_\_\_ lbs \_\_\_\_\_ oz

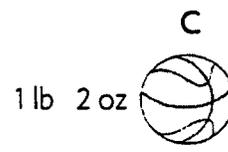
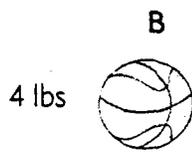
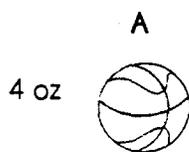
4) 6,000 lbs = \_\_\_\_\_ T

5) 2.5 T = \_\_\_\_\_ lbs

6) 5 lbs 1 oz = \_\_\_\_\_ oz

Put the balls in order from lightest to heaviest.

Use your calculator to change pounds to ounces. (Remember to multiply by 16.)



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Compare these measures. Write  $>$ ,  $<$ , or  $=$  in the

1) 2 lbs  22 oz

2) 3,000 lbs  1.5 T

3) 4 lbs  60 oz

4) 16 oz  1 lb

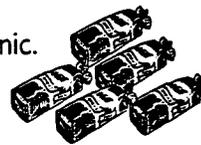
5) 2 T  5,000 lbs

### Problem Solving

- 1) Ling says her big dog weighs 55. Does she mean pounds, ounces, or tons?  
Explain your answer.



- 2) Mr. Singh bought five 14 oz loaves of bread for the picnic.  
What is the total weight in ounces and pounds?



- 3) For each pair, find out how much both weigh together.  
(Remember to rename if there are more than 16 ounces.)



Baby 1

12 lbs 10 oz



Baby 2

11 lbs 8 oz



Dog

20 lbs 14 oz



Cat

5 lbs 10 oz