

# LETTER TO PARENTS

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*Cut here and paste onto school letterhead before making copies.*

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## SCIENCE NEWS

Dear Parents,

Our class will be learning metric measurement over the next several weeks using the **FOSS Measurement Module**. We'll explore the need for standard units, and work with the metric units and tools used by scientists worldwide. Our approach will be to introduce the metric system as the language used by scientists to communicate the results of their observations and experiments.

It has been found that students learn metric units (liter, gram, meter, degree Celsius) quicker and more thoroughly when they are introduced as an independent, integrated system— not converted from the English customary units (foot, pound, quart, degree Fahrenheit). Our goal is that the metric concepts will have their own frame of reference in your child's mind, and that in time he or she will think metric.

Knowing how to measure is important in everyday life as well as in scientific endeavors. Watch for the Home/School Connections sheets that I will be sending home from time to time. These homework assignments suggest ways for your whole family to review the metric measurement already in common usage in the U.S., and to extend your use of metrics into areas that are less familiar. At this time the U.S. is the only major country in the world that does not use metric measurement as its national standard. It is only a matter of time before the U.S. adopts the metric system, and the students in our class will be ready.

We are looking forward to several weeks of activities designed to provide an interesting introduction to metric measurement. If you have any questions or comments, or have some metric measuring tools you would like to share with the class, please drop me a note.

Metric Measurement Units	
<b>The Meter...</b> is about the height of a typical doorknob above the floor.	<b>The Liter...</b> is about the volume of water in a nice big water balloon.
<b>The Gram...</b> is about the mass of a standard paper clip.	<b>Degree Celsius</b> Room temperature is about 24°; body temperature is about 37°.

Comments: \_\_\_\_\_

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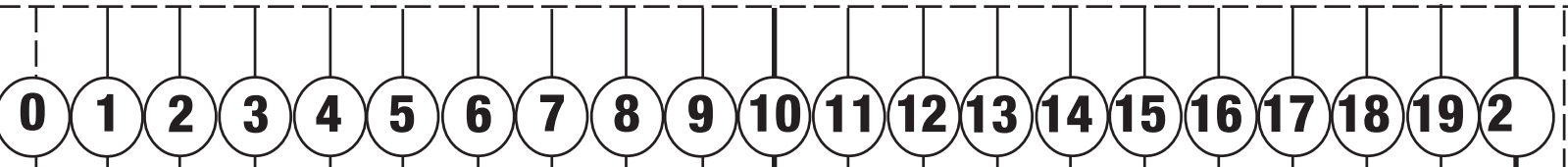
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Name \_\_\_\_\_

Date \_\_\_\_\_

# PAPER METER TAPE

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**THIS METER TAPE BELONGS TO:**





Name \_\_\_\_\_

Date \_\_\_\_\_

# MAKING COMPARISONS

USE YOUR METER TAPE TO FIND OUT WHICH IS LONGER.

	ESTIMATE	MEASUREMENT
<b>1. Your height...</b>		
<b>or your arm span?</b>		
<b>2. From the inside of your wrist to the inside of your elbow...</b>		
<b>or the length of your foot?</b>		
<b>3. The circumference of your neck...</b>		
<b>or the circumference of your upper arm?</b>		
<b>4. The length of your nose...</b>		
<b>or the length of your ear?</b>		
<b>5. The distance from your knee to the floor...</b>		
<b>or the distance from your hip to your knee?</b>		
<b>6. The distance from the top of your forehead to the bottom of your chin...</b>		
<b>or the distance around your ankle?</b>		
<b>7.</b>		
<b>8.</b>		

Name \_\_\_\_\_

Date \_\_\_\_\_

# RESPONSE SHEET—LINEAR MEASUREMENT

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A student was out shopping, looking for a desk the family could use at home for homework, paying bills, and so forth. She was at a garage sale and thought she had found the perfect desk, but she wasn't sure it would fit in the space they had planned to put it in. She didn't have anything to measure with, but she remembered that sometimes people measured horses in hands. So she used her hands placed side by side to measure the desk. She called home and told her mother that the desk she had found was 12 hands wide. Her mother used her own hands to measure the space, then told her daughter that the space was only 10 hands wide. They decided not to buy the desk because they thought it would be too big for the space.

Do you think they made a good decision? Why or why not? What advice would you give them?

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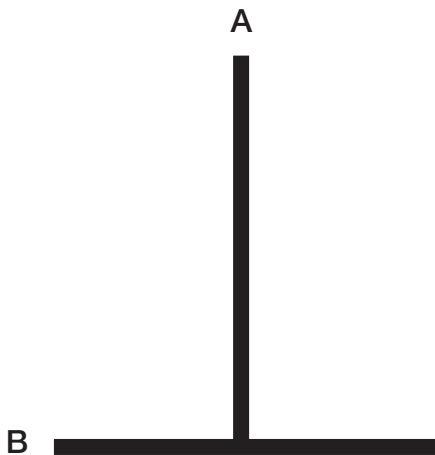
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### Just for fun!

Do you think line A and line B are the same length? How can you know for sure?

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Name \_\_\_\_\_

Date \_\_\_\_\_

# **STEPS FOR WEIGHING AN OBJECT**

## **A SEQUENCING EXERCISE**

**PLACE THE OBJECT TO BE  
WEIGHED IN ONE CUP.**

**SET CUPS IN HOLES AT  
THE ENDS OF THE BALANCE  
BEAM.**

**WRITE THE RESULT ON A  
STUDENT SHEET OR A  
PIECE OF PAPER.**

**ADD UP THE TOTAL NUMBER  
OF GRAMS THAT THE  
OBJECT WEIGHS.**

**PLACE THE BALANCE BEAM  
ON THE BALANCE BASE.**

**RETURN THE MASS PIECES TO  
THE CONTAINER.**

**MOVE THE SLIDER ON THE  
BALANCE BEAM TO ZERO THE  
BALANCE.**

**PLACE MASS PIECES IN THE  
OTHER CUP UNTIL THE  
BALANCE BEAM BALANCES.**



Name \_\_\_\_\_

Date \_\_\_\_\_

## RESPONSE SHEET—WEIGHT WATCHING

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A teacher asked his students to measure the mass of an orange, and then to write a short paragraph to explain how it was done. One student wrote:

The best way to measure the mass of an orange is to use a balance. You put the orange and the mass pieces in the same cup on the balance, and find out how many centimeters it is. The mass of my orange was 145.

Do you think this student has done a good job of weighing the orange? Why or why not?

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Rewrite the paragraph the student wrote correcting any errors the student made.

The best way

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Name \_\_\_\_\_

Date \_\_\_\_\_

# SOAKING SPONGES

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**1. Weigh the dry sponge.**

The mass of the dry sponge is \_\_\_\_\_ .

**2. Make a guess.**

I think the mass of the water a sponge can pick up will be \_\_\_\_\_ .

That's \_\_\_\_\_ times the mass of the sponge.

**3. Soak the sponge with water.**

**4. Weigh the water-soaked sponge.**

The mass of the sponge and the water together is \_\_\_\_\_ .

**5. Find the mass of the water.**

Mass of water and sponge \_\_\_\_\_

Subtract the mass of the sponge      — \_\_\_\_\_

Answer: the mass of the water      \_\_\_\_\_

**6. How many times the mass of the sponge is the mass of the water?**

For example, if the sponge weighed 5 g and the water weighed 30 g, you would ask yourself,  $5 \times ? = 30$ . Since  $5 \times 6 = 30$ , you know that the mass of the water is 6 times the mass of the sponge.

Your calculations go here.

**7. Were you surprised by the mass of water your sponge could pick up?**

**Why or why not?**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

# MEASURING VOLUME

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OBJECT	ESTIMATED VOLUME OR CAPACITY	MEASURED VOLUME OR CAPACITY	DIFFERENCE
Cup, mark A			
Cup, mark B			
Cup, mark C			
Cup, mark D			



Name \_\_\_\_\_

Date \_\_\_\_\_

# SODA-CAN VOLUME

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**PROBLEM.** *When you open a can of soda, it does not appear to be full. The label on the can reads that there is 355 ml of soda in the can. How could you find out if you are getting the amount of soda that is on the label?*

## PLAN

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## DATA

## CONCLUSIONS

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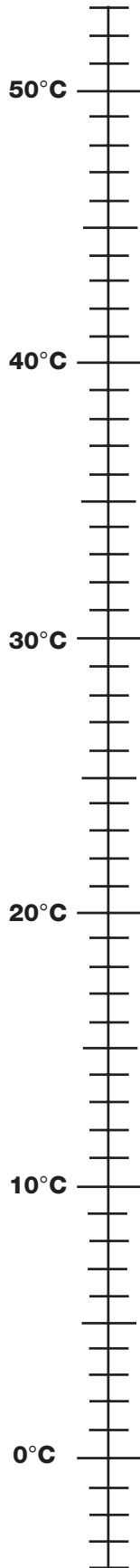
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Name \_\_\_\_\_

Date \_\_\_\_\_

# MEASURING TEMPERATURE

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***After you measure the temperature of a liquid, write its name next to the correct number on the number line.***

Name \_\_\_\_\_

Date \_\_\_\_\_

# COLD-WATER DATA .....

MINUTES	TEMPERATURE °C
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

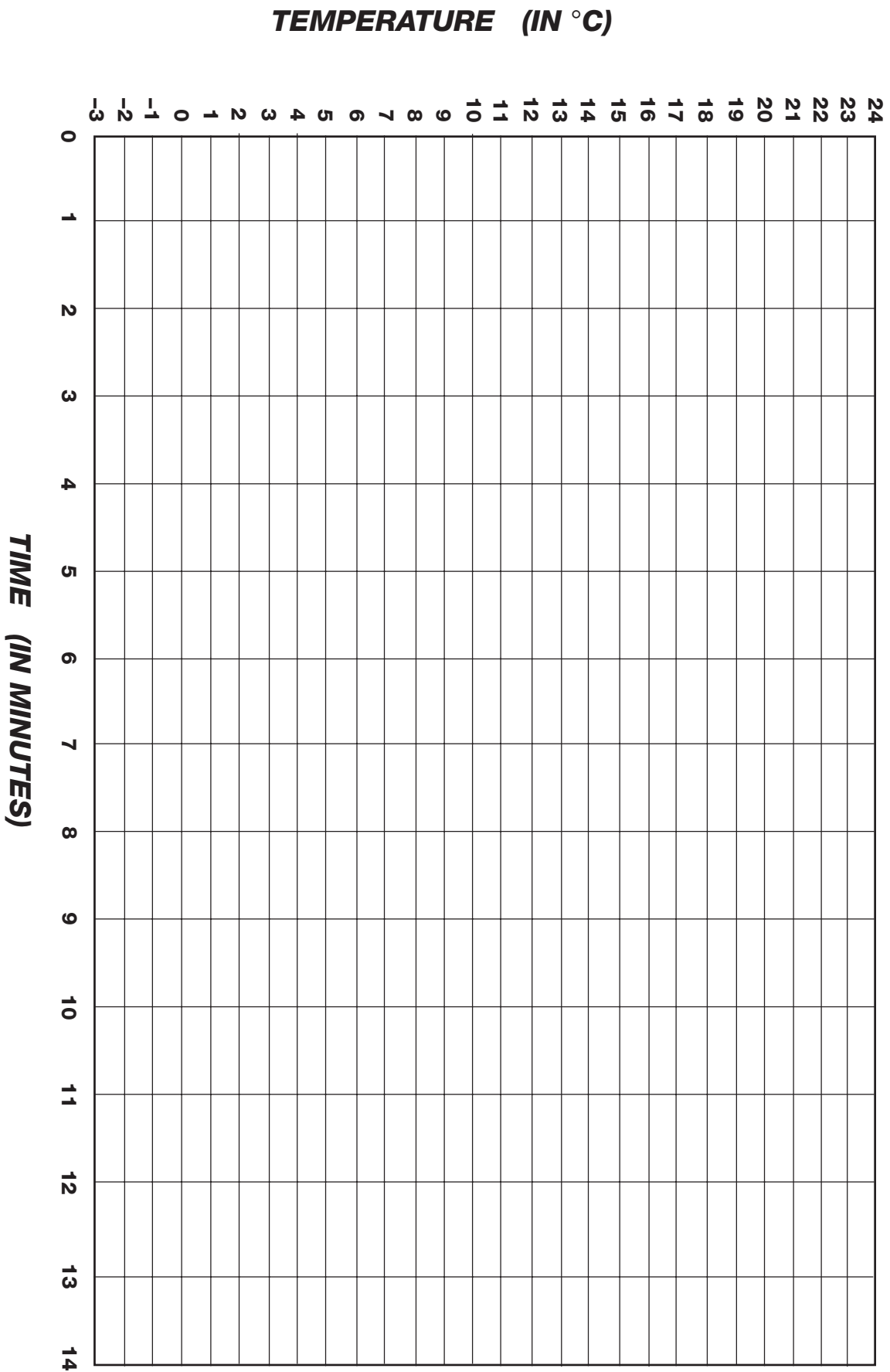
Name \_\_\_\_\_

Date \_\_\_\_\_

# COLD-WATER DATA .....

MINUTES	TEMPERATURE °C
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

# GRAPHING COLD WATER



Name \_\_\_\_\_

Date \_\_\_\_\_

# RESPONSE SHEET—TEMPERATURE

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Two students set up a project to find out what happens to the temperature when powdered drink mix is combined with water, then put in paper cups and frozen for a treat for a hot summer day. The chart below shows what they observed.

9:00 a.m.	22°C	Powder mixed in drink, temp before placed in freezer
10:00 a.m.	9°C	Still liquid
11:00 a.m.	2°C	Still liquid
12:00 p.m.	-3°C	Had to break through crust of ice
1:00 p.m.	-5°C	Almost frozen
2:00 p.m.	-6°C	Frozen solid

When they showed their data to the teacher, she asked them to tell what the temperature change was from 9:00 a.m. to 2:00 p.m. One of the students said, "Oh, that's easy! You just write a problem like this:  $22^{\circ}\text{C} - 6^{\circ}\text{C} = 16^{\circ}\text{C}$ . The change in temperature was  $16^{\circ}\text{C}$ ."

Do you agree with this student? Why or why not? (Use the number line shown on this page to help you decide.)





Name \_\_\_\_\_

Date \_\_\_\_\_

## **MATH EXTENSION—PROBLEM OF THE WEEK**

### **INVESTIGATION 1: THE FIRST STRAW**

Marny and Max wanted to estimate the length of the playground. It was not important that they have an exact measurement, but they wanted some idea of how big it was for a field day event they were planning.

Marny decided to measure it by walking across the playground. She marked off one walking step and found it was 50 cm long.

Max decided to measure using the wheel on his wheelchair. Marny measured the circumference of the wheel and found out that it was 2 m around. Then they walked and wheeled across the playground to see how big it was.

If Max counted 40 full turns of his wheel from one end of the playground to the other, how many walking steps did Marny take to cover the same distance?

Name \_\_\_\_\_

Date \_\_\_\_\_

## **MATH EXTENSION—PROBLEM OF THE WEEK**

### **INVESTIGATION 2: WEIGHT WATCHING**

Seventy-five years ago, pharmacists weighed medicine on balances like the ones you have been using. The mass pieces were very expensive, so a pharmacist would buy as few mass pieces as possible. If a pharmacist had 1-g, 3-g, and 9-g mass pieces, he or she could weigh out any number of grams from 1 g to 13 g. Show how you could measure all of the masses from 1 g to 13 g using only the three mass pieces given.

Name \_\_\_\_\_

Date \_\_\_\_\_

## **MATH EXTENSION—PROBLEM OF THE WEEK**

### **INVESTIGATION 3: TAKE ME TO YOUR LITER**

Some students were raising crayfish in their classroom. The students set up the habitat in a large bus tray. They used 12 liters of water to fill the tray. To keep the water fresh, they needed to replace one-third of the water every 3 days.

How much water did they use for the crayfish habitat in a month (30 days)?

Name \_\_\_\_\_

Date \_\_\_\_\_

## **MATH EXTENSION—PROBLEM OF THE WEEK**

### **INVESTIGATION 4: THE THIRD DEGREE**

A girl was planning to visit one of two cousins for her vacation. She was having a hard time deciding which one to visit, so she decided she would check the newspaper for the next 5 days, then visit the cousin who lived in the city with the highest average temperature.

She recorded these temperatures the third week of September.

	Dallas	Miami
Monday	31°C	29°C
Tuesday	30°C	30°C
Wednesday	36°C	32°C
Thursday	28°C	32°C
Friday	30°C	32°C

Which cousin do you think she decided to visit?

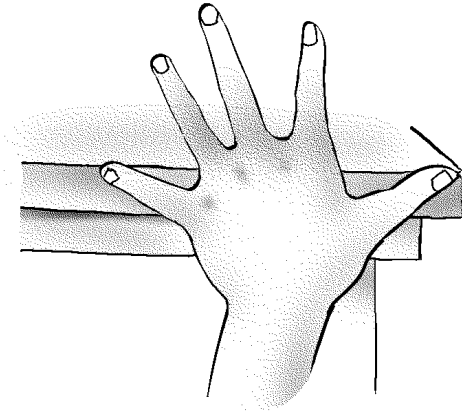
Name \_\_\_\_\_

Date \_\_\_\_\_

# HOME/SCHOOL CONNECTION

## INVESTIGATION 1: THE FIRST STRAW

Find a home partner to work with you. (Try to choose someone who is not close to your age.) Make a list of five objects that you would like to measure. Then choose a body part to use as a measurement unit. For example, you might measure the kitchen table using a thumb-to-pinkie unit. First you measure the table using your hand, then your family partner uses his or her thumb-to-pinkie unit to measure the same length that you did. Fill in the chart below, then answer the question at the bottom of the page. Be sure to fill in your name and the name of the person who worked with you.



OBJECT	UNIT	(ME)	(HOME PARTNER)

Look at the chart above. Do you think it's a good idea to use different parts of your body as a measuring unit? Why or why not?

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Name \_\_\_\_\_

Date \_\_\_\_\_

# HOME/SCHOOL CONNECTION

## INVESTIGATION 3: TAKE ME TO YOUR LITER

Gather eight different products you use at home. Fill in the chart below with the name of the product, the type of container it comes in, and the measurement that is marked on the label. An example is given on the first line of the chart.

PRODUCT	TYPE OF CONTAINER	LABEL MEASURE
soft drink	aluminum can	355 ml

How are these products packaged? Are they filled to capacity, or is air space left in the package?

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When do manufacturers label packages with liters or milliliters, and when do they label them with grams?

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Do you think it is better to label packages with the volume, the capacity, or both?

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