

# **MEASUREMENT**

## **GRADE 4**

Ministry of Education  
Mathematics Curriculum 1999

**NOTE:** For every measurement activity students should estimate first.

OBJECTIVES	ACTIVITIES	ASSESSMENTS
<p>1. Estimate and measure length in kilometres, metres, decimetres, centimetres, and millimetres selecting the appropriate unit when necessary.</p>	<p>a. Put students in groups and give them several different lengths of string estimate how long one piece of string is. Record the estimate. What strategy did you use to help you make your estimate? Measure the length of the string. Record how close your estimate is. Try this task again with another piece of string and see if your estimate is closer the second time. Are your estimates more accurate with each new attempt? Why or why not? Record your findings for the other pieces of string.</p> <p>b. Estimate and measure common objects.</p> <p>c. Investigate how other countries (e.g: U.S.) measure. Let students try to use inches. Then let students write in their journals which system they believe is easier to use and <u>why</u>.</p> <p>d. Give students 3 items (or simply name 3 items). Ask the students which units they would choose to measure it.</p>	<p>a. To assess skill at measuring length, give students real objects to measure which you know the actual measure of.</p> <p>b. On a written test or quiz, ask students to measure the length of the test or quiz paper.</p>
<p>2. Explain the relationship among the metric units.</p>	<p>a. Let groups of students create metric posters which show the relationship among metric units. Hang them around the school.</p>	
<p>3. Solve problems which require the addition and subtraction of metric units.</p>	<p>e. When doing problems while studying decimals, such as <math>4.2 + 5.85</math>, include linear units. Examples are:</p> $\begin{array}{r} 4\text{m } 20 \text{ cm} \\ + 5\text{m } 85 \text{ cm} \\ \hline \end{array}$ $\begin{array}{r} 4.20\text{m} \\ +5.85\text{m} \\ \hline \end{array}$	

OBJECTIVES	ACTIVITIES	ASSESSMENT
5. Estimate and measure the perimeter of objects and shapes in metres and centimetres.	a. For homework have students measure and record the perimeter of items at home. If possible, bring the items to class.	
6 Name examples of perimeter in the real world.	a. Have individual students think of then act out examples of area perimeter. (e.g. Painting the wall.) Let the class guess if it is area or perimeter.	a. Create multiple choice questions such as:  Which of the following is an example of perimeter.  a) a man mowing the lawn b) mom filling the pool with water c) Dad jogging around Lake Killarney.
7. Determine the area of a rectangle using arrays.	a. Let students draw geometric shapes on graph paper using a ruler. Then determine the area in square units. (See appendix PFA-4)	
8. Name examples of area.	a. The activity for objective £5 can be re-written for area.	
9. Estimate and calculate area recordin with appropriate units.	a. Use construction paper and let pairs of students make square metres, square decimetres and square centimetres. . Label each square $m^2$ or $cm^2$ . Then, have them make a list of items whose area would be best measured in square metres vs square centimetres.	

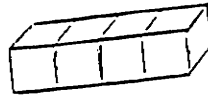
OBJECTIVES	ACTIVITIES	ASSESSMENT
9. Explain the concept of volume using words and/or pictures and/or concrete materials.	a. Teacher should build a structure out of centimetre cubes for the class. Let individuals estimate the number cubes then write in their journals <u>HOW</u> they arrived at their estimate. Give a prize to everyone with a reasonable estimate. As a class, graph everyone's estimates. What can you say about your class' estimation skills	
10. Select the appropriate unit for estimating and measuring volume.	a. Do the "cubes to Build Volume" activity on <i>Appendix page M-1</i> b. Construct cubic metres, cubic decimetres and cubic centimetres.	
11. Explain the volume concept of a litre by construction.	a. Make a one litre measure. <i>See Appendix M-2</i> b. Use various containers and let students order them according to capacity.	
12. Estimate and measure using millilitre and litre.	a. Find some punch recipes and let a different group of students be responsible for following the directions to make the punch each week.	
13. Use grams and kilograms to estimate and determine mass.	a. Estimate mass of various items in class. Let everyone record their estimates and then find the actual mass. Graph class estimates. Is the class composed of good estimators?	a. Make a list of things that can be measured. Let students select appropriate unit to measure each item.
14. Estimate and measure time needed to perform a task.	a. Perform experiments in class such as, "how many jumping jacks can you do in a minute?" To extend this activity, results can be graphed.	

OBJECTIVES	ACTIVITIES	ASSESSMENT
16. Read and write time to the nearest minute in 2 ways. (e.g.: 10:40 ten forty or 20 minutes to 11)	a. As an extension to the 12 hour clock, invite a speaker to class who uses the 24 hour clock in their daily routine.	a. List examples of situations where one needs to know the 24 hour clock.
17. Use a.m. and p.m. appropriately.		a. List 3 things commonly done in the am.
18. Convert hours to minutes and vice versa.		
19. Read the thermometer in Celsius and Fahrenheit.		
20. Create and solve problems involving measurement.		
21. Solve real world problems involving the +, -, x, ÷ of money.	a. For independent workers, put students in groups to create class businesses. Discuss profit, loss and overhead. If possible, let students actually create their items and sell them for a fundraiser.	

# BUILDING VOLUME

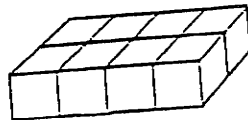
Build up structure of rectangular prism as shown:

(a) A row of cubic units



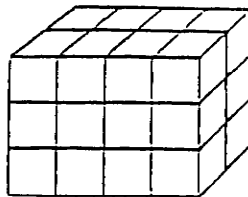
Each cube has volume of  $1 \text{ cm}^3$   
Volume of one row =  $4 \text{ cm}^3$

(b) One layer of cubic units



Volume =  $2 \times$  one row  
 $= 2 \times 4 \text{ cm}^3$   
 $= 8 \text{ cm}^3$

(c) Several layers of cubic units



Volume =  $3 \times$  one layer  
 $= 3 \times (2 \times 4) \text{ cm}^3$   
 $= 3 \times 8 \text{ cm}^3$   
 $= 24 \text{ cm}^3$

# MAKE A LITRE MEASURE

Use a  $\frac{1}{2}$  gallon milk (or juice) carton

1. Measure the carton at each vertical edge and put a mark 12 centimetres from the bottom.
2. Join the marks on the outside of the carton and cut off the top along the resulting line.
3. Putting a ruler (or tape) on the inside of the truncated carton (at the corners) measure and mark 10 centimetres up from the bottom. Join the marks to form a line around the inside of the carton. One litre of liquid should come to this mark.

**Note:** These milk and juice cartoons usually have uniform cross sections of 10 cm x 10 cm.

Measures of half a litre (500 millilitres) or of 250 millilitres may be made by measuring off 5 centimetres and 2.5 centimetres from the bottom of the carton

