PLACE VALUE: METRIC SYSTEM

PURPOSE

This Mathsheet practises place value in relation to the metric system and emphasizes multiples of 10, 100, and 1000.

PREPARATION

You need a metre stick, a variety of grocery items sold by weight (like cereal and canned goods), a measuring cup, and measuring spoons. You will also need a pencil.

PROCEDURE

The next page is a reference page that lays out the relationships among the various units used to measure length, mass (weight), liquid capacity, area, and volume. The most common units are the thousands (kilometre), kilogram, and kilolitre); ones (metre, gram, and litre); hundredths (centimetre, centigram, and centilitre); and thousandths (millimetre, milligram, and millilitre).

Begin by explaining the relationships among the metric units used to measure **distance.** Allow your child to verify the relationships by measuring distances with the metre stick. Perhaps you could go for a kilometre-long walk. Once your child understands the relationships among kilometres, metres, centimetres and millimetres, draw his or her attention to the Distance units in the chart on the next page. Note that the number gets bigger as the unit of measure gets smaller. You may have to teach the principle of multiplying and dividing by 10 (when multiplying, add a zero; when dividing, subtract a zero). You may need to start slowly, working only with the top line of the Distance units at first. Once your child has mastered the concept of distance measurement, provide some practice using the third page of this Mathsheet. Enter a number in each bolded box in the Distance units, and ask your child to fill in the equivalent units in the rest of the boxes.

Once your child has grasped the principles involved in distance measurement, introduce the other concepts one by one, in the same manner. Provide practice with concrete examples of the various units of measurement.

If you find the Area and Volume units too difficult for your child at this time, they can be revisited later.

The ****** indicates that the numbers have too many digits and may be omitted for lack of space.

METRIC PLACE VALUE RELATIONSHIPS

NOTE: King Henry Doesn't Mind Drinking Cold Milk is a mneumonic device you may find helpful.

	KING	HENRY	DOESN'T	MIND	DRINKING	COLD	MILK
Prefix	**kilo-**	**hecto-**	**deca-**	**metre**	**deci-**	**centi-**	**milli-**
Meaning	**1000**	**100**	**10**	**1**	**1/10**	**1/100**	**1/1000**
Distance	**km**	**hm**	**dam**	**m**	**dm**	**cm**	**mm**
Mass	**kg**	**hg**	**dag**	**g**	**dg**	**cg**	**mg**
Liquid	**kL**	**hL**	**daL**	**L**	**dL**	**cL**	**mL**

DISTANCE IN RELATION TO THREE STARTING UNITS (1m, 1mm, 1km)							
Starting unit	**km**	**hm**	**dam**	**m (metre)**	**dm**	**cm**	**mm**
1 m	0.001	0.01	0.1	**1**	10	100	1000
1 mm	0.000001	0.00001	0.0001	0.001	0.01	0.1	**1**
1 km	**1**	10	100	1000	10000	100000	1000000
MASS (WEIGHT) IN RELATION TO THREE STARTING UNITS (1g, 1mg, 1kg)							
Starting unit	**kg**	**hg**	**dag**	**g (gram)**	**dg**	**cg**	**mg**
1 g	0.001	0.01	0.1	**1**	10	100	1000
1 mg	0.000001	0.00001	0.0001	0.001	0.01	0.1	**1**
1 kg	**1**	10	100	1000	10000	100000	1000000
LIQUID CAPACITY IN RELATION TO THREE STARTING UNITS (1L, 1mL, 1kL)							
Starting unit	**kmL**	**hL**	**daL**	**L (litre)**	**dL**	**cL**	**mL**
1 L	0.001	0.01	0.1	**1**	10	100	1000
1 mL	0.000001	0.00001	0.0001	0.001	0.01	0.1	**1**
1 kL	**1**	10	100	1000	10000	100000	1000000

RULE 1 for Distance, Mass, Liquid Capacity: When moving to the next smaller unit multiply by 10.
RULE 2 for Distance, Mass, Liquid Capacity: When moving to the next larger unit divide by 10.

AREA IN RELATION TO THREE STARTING UNITS ($1m^2$, $1mm^2$, $1km^2$)							
Starting unit	**km^2**	**hm^2**	**dam^2**	**m^2**	**dm^2**	**c^2**	**mm^2**
1 m^2	0.000001	0.0001	0.01	**1**	100	10000	10000000
1 mm^2	* * * * * *	* * * * * *	* * * * * *	0.000001	0.0001	0.01	**1**
1 km^2	**1**	100	10000	1000000	* * * * * *	* * * * * *	* * * * * *

RULE 1 for Area (2 dimensions): When moving to the next smaller unit multiply by 100.
RULE 2 for Area (2 dimentions): When moving to the next larger unit divide by 100.

VOLUME IN RELATION TO THREE STARTING UNITS ($1m^3$, $1mm^3$, $1km^3$)							
Starting unit	**km^3**	**hm^3**	**dam^3**	**m^3**	**dm^3**	**cm^3**	**mm^3**
1 m^3	0.000000001	0.000001	0.001	**1**	1000	1000000	1000000000
1 mm^3	* * * * * *	* * * * * *	* * * * * *	0.000000001	0.000001	0.001	**1**
1 km^3	**1**	1000	1000000	1000000000	* * * * * *	* * * * * *	* * * * * *

RULE 1 for Volume (3 dimensions): When moving to the next smaller unit multiply by 1000.
RULE 2 for Volume (3 dimensions): When moving to the next larger unit divide by 1000.

Write a different number in each bolded box and have your child fill in the other units.							
Question	**km**	**hm**	**dam**	**m (metre)**	**dm**	**cm**	**mm**
1							
2							
3							
4							
5							
6							
7							
Write a different number in each bolded box and have your child fill in the other units.							
Question	**kg**	**hg**	**dag**	**g (gram)**	**dg**	**cg**	**mg**
8							
9							
10							
11							
12							
13							
14							
Write a different number in each bolded box and have your child fill in the other units.							
Question	**kmL**	**hL**	**daL**	**L (litre)**	**dL**	**cL**	**mL**
15							
16							
17							
18							
19							
20							
21							
Write a different number in each bolded box and have your child fill in the other units.							
Question	**km^2**	**hm^2**	**dam^2**	**m^2**	**dm^2**	**c^2**	**mm^2**
22							
23							
24							
25							
26							
27							
28							
Write a different number in each bolded box and have your child fill in the other units.							
Question	**km^3**	**hm^3**	**dam^3**	**m^3**	**dm^3**	**cm^3**	**mm^3**
29							
30							
31							
32							
33							
34							
35							

Water at 4 degrees Celsius: 1 g occupies 1 mL or 1 cm3, 1 kg occupies 1 L or 1 dm3, 1 tonne occupies 1 kL or 1 m3.

Designed by David Harris (1992)