MINISTRY OF EDUCATION, YOUTH & INFORMATION
Every Child Can Learn, Every Child Must Learn

MATH COUNTS

Measurement Unit Plan

Standard

Use the correct units, tools and attributes to estimate, compare and carry out the processes of measurement to given degree of accuracy.

Objectives	Main Concepts	Teaching/Learning Activities	Assessment/Homework Activities
• Discuss the general meaning of the prefixes deci-, centi-, milli-, kilo • Estimate, measure and record distances in metres and centimetres, in centimetres or to the nearest centimetres. • Write lengths (metres and centimetres or centimetres) in terms of a metre using decimal form. • Convert one unit of measurement to another	• length • distance • measure • milli • centi • kilo • metres • metric • estimate	1. Help students transition from using non-standard units to using the standard units for measuring length. ***(Measurement Resource Document pages 1 & 2)*** a) Give students the experience to construct their rulers from non-standard units before they use standard rulers to measure length. (*Such experiences help students focus on the linear units represented by a ruler.)* b) Allow students to do a centimetre hunt c) Allow students to find objects that are about a metre long 2. Have students explore how numbers change when multiplied or divided by 10, 100 and 1000. This will set the foundation for converting from one unit to the other. ***(Measurement Resource Document page 3).*** 3. Have students examine the metre ruler and engage in a discussion on the graduations displayed on it. From this discussion, students should appreciate that 100cm make a meter. Further, let students express: **a) Metres and centimetres in centimetres** E.g. Mrs. Jones used a metre stick to measure the width of her desk. She got one metre and 37 centimetres. What is this amount written in centimetres only?	1. **Metric Me –** this is a take home assignment which requires students to measure different body parts with the assistance of a parent or guardian. ***(Measurement Resource Document page 4).*** 2. **Worksheet** – This gives the students the chance to determine the length of an object from a pictorial representation or actual measuring. ***(Measurement Resource Document page 5).***

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(length: kilometres and metres). • Identify the appropriate unit, centimetre, metre, kilometre, for a given measurement situation		**b) Centimetres in metres and centimetres** **c) Centimetre as a fraction of a metre** You can start by asking students to find the half mark of a metre ruler and then quarter. Further ask questions like what fraction of a metre is 20 centimetres, 90 centimetres 150 centimetres and so on. Let the students call the name of each fraction (e.g. 25 hundredths) then write the fraction as decimal. Ensure also that students see that 25 hundredths for example is the same as 25 ÷ 100. This would be a good platform to now introduce conversion from one unit to another. ➢ **See Sample Lesson Plan 1 attached that will give students the opportunity to estimate, measure & recording lengths (metres and centimetres, centimetres) in terms of a metre using decimal form.** 4. Using places that the students are familiar with, tell them for example that the distance from Half Way Tree (transport centre) to Devon House is about 1 kilometre long. Ask them to estimate how many metre rulers would be needed to measure this distance. Confirm/inform students that 1000 metres = 1 kilometre. Have them estimate the distance of other places	3. Give students situational lengths or distances for them to identify the most appropriate unit of measurement. Example: (a) the height of an adult (b) the length of a crocodile (c) the length of a long distance race. (d) the width of a child's hand (e) the depth of the Atlantic Ocean (f) the size of a large soda bottle (g) the length of a football field (h) the length of a highway (i) the length of a fingernail

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• Estimate and measure mass using gram or kilogram and gram. • Read a scale shown in a measurement situation using kilograms and/or grams. • Discover that 1000 kg = 1 tonne. • Identify the appropriate unit, kilogram, gram, tonne, for a given measurement situation • Estimate and measure capacity using litres and or millilitres. • Discover that 1000 ml = 1 L. • Convert one unit of	• metric • grams • weight • mass • litre • capacity	1. Show students a large bag with popcorn and a smaller bag with marbles. Ask: "Which of the two, do you think, has the greater mass?" Have students explain their thinking. Place the pop-corn and the marbles on a balance and discuss the results. 2. Let students examine the wrapper on their snacks (biscuit bag or bun etc.) to see the mass. You can further let them estimate the weight of a single item within the pack of biscuits for example. ➢ **See Sample Lesson Plan 2 attached that will give students the opportunity to use pictorial representations of scale faces to get them to read scales and convert measurements.** 3. Show students containers of different shapes and sizes and let them guess which holds the most/least or place them in order of how much liquid they think the containers can hold. Measure the actual amount in each using a measuring cup. Discuss the results. 4. Provide students with different pictures of measuring containers holding an amount of liquid. Each should have a measuring scale (up to three litres). Students interpret the scale and estimate how much liquid is in each container, using language such as about half full, about one litre. Discuss the gradations on each container. How is the scale recorded, e.g. in 500 ml intervals, 100 ml intervals, 50 ml intervals.	1. **Worksheet** – Students will get the chance to demonstrate their understanding of balancing weight. **(*Measurement Resource Document page 6).*** 2. **Worksheet 6** – students will get the chance to demonstrate their understanding of measuring liquid using a very practical approach. **(*Measurement Resource Document pages 7 and 8).***

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measurement to another (millilitres and litres). • Identify the appropriate unit (litre, millilitre) for a given measurement situation		5. Again you can allow students to see how much liquid is contained in each of the drinks that they carry to school. You can let them guess which holds most/least before they examine the labels.	
• Read and write time using the hour: minute format, e.g. 2:45 p.m. • Explain the relationships among units of time. • Convert one unit of measurement to another (time: hours, minutes and seconds). • Solve problems that involve finding time and elapsed time.	• time • time format • estimation • minute	1. Revise/introduce time to students by discussing concepts that tell how we measure time (*day, month, year, hour, second, minute, decade, century, etc.*) – **focus on the *minute*** a) Ensure that students understand that ▪ A day = 24 hours ▪ 1 hour = 60 minutes ▪ 1 minute = 60 seconds b) Get students to estimate and further enhance their understanding of a minute using *Learning Activity* I. (***Measurement Resource Document** page 9*) 2. Allow students to ***read*** times from pre-prepared analogue clocks. ➢ ***See Sample Lesson 3 attached –*** it illustrates how students can be introduced to reading the clock. 3. Allow students to ***write*** time in two/three given ways: ▪ 2:15 p.m. ▪ Fifteen minutes past two in the afternoon ▪ Quarter after 2 in the afternoon Create opportunities for students to convert among units of time – seconds, minutes.	a) Allow students to make and take to class an analogue clock face with the hour hand and minute hand. a) Tell students a variety of times and have them show the times on their individual clocks b) Have them hold up their clocks after they have made the correct times c) Call on students to express the time in different ways b) Allow students to complete a schedule of selected favourite television programmes over a period of one week. (***Measurement Resource Document** page 10*) c) Allow students to play a game of *TIME-O*. (***Measurement Resource Document** pages 11 and 12)*

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• Tell the difference between two temperatures both above zero. • Tell the temperature which is a given number of degrees warmer or cooler than a given temperature. ***Benchmark*** *1. Read and write time, and know the relationships between units of time. Understand the concept of temperature; estimate and measure using standard units.*	• Temperature • Degrees Celsius • Warmer than Cooler than	5. Divide students into small groups and give each group a cup of warm water and a thermometer. Have students measure the water's temperature. Challenge students to get the water to room temperature (*which is approximately 21^{0}C*). *[For this challenge, students may want to add cold water, drop in an ice cube or even blow air on the water.]* 6. Allow students to record the difference between the initial temperature and the *new* temperature. 7. Use the activity as a platform to discuss with students their observation of the measure of the temperature as the water cools, as well as to get their thoughts on what would happen if the water were to be heated again, etc. 8. Allow students to use their knowledge of the boiling point and freezing point of a liquid and the normal body temperature of humans as benchmarks to estimate temperatures in given story contexts in *Learning Activity*. (***Measurement Resource Document*** *pages 13 & 14 attached*)	4. Allow students to carry out research online to determine where the ***hottest place*** on earth is. They can use the following questions as guide: a) What is the hottest temperature ever recorded on each of the continents (*Asia, Africa, North America, South America, Antarctica, Europe and Australia*)? b) What is the hottest temperature ever recorded in Jamaica? c) Compare the two temperatures (*the highest recorded temperature of the continents with that of your country*) and comment on what you would have to do to adapt and thrive in the heat, if you were to visit the hottest place on earth.

Objectives	Main Concepts	Teaching/Learning Activities	Assessment/Homework Activities
• Compute the perimeter of regular and irregular plane shapes using units of measurement for length. • Estimate and read distances recorded in kilometres on a road map • Solve problems using information on a road map.	• polygon • length • perimeter • distance • scale • length • kilometres • centimetres • millimetres	**1. Perimeter** a. Use ***Sample Lesson 4 attached*** to help students develop the procedures for determining the perimeter of polygons. b. **Revise the definition of perimeter with students. Emphasise that perimeter is the 'total length of the boundary lines' of a polygon; avoid definitions that speak to 'distance around' (as this may cause misconceptions).** c. **Engage them in activities to help them to understand the idea of 'the total length of the boundary lines':** ○ Place students in groups and give each group straws of different lengths (three pieces with length of 8 cm, three pieces with length of 10 cm and three pieces with length of 12 cm); provide each group with a piece of string as well (approximately 70 cm in length). ○ Give description of polygons for students to build by threading the strings through the straws: ▪ Build a rectangle with a perimeter of 26 cm ▪ Build a five sided shape with a perimeter of 52 cm ▪ Build a polygon using 5 straws. Make it have a perimeter of 54 cm. ▪ Build 3 different polygons with a perimeter of 50 cm. ○ Allow students to draw their polygons in their notebooks and show their calculations for finding the perimeter of each polygon.	1. **Worksheet**– This worksheet gives students additional practice in drawing polygons of a given perimeter. (***Measurement Resource Document*** *pages 15 – 17 attached*). 2. **Worksheet –** This worksheet allows students to make inferences when solving problems involving perimeter (***Measurement Resource Document*** *pages 18 – 19 attached*). 3. **Worksheet 9** – This worksheet shows how you can assess students' understanding of reading distances given on maps. (***Measurement Resource Document page*** *20 attached*).

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		2. **Maps** a. Allow students to create simple maps of their immediate surroundings, such as their classroom. Let them use simple drawings to identify the location of key objects in the classroom (teacher's desk, chalkboard, their desk, rubbish bin, cupboards etc.). Compare distances on drawings to distances in real life (on the ground) and use these comparisons to establish the basis for using scales on maps. b. Provide students with samples of maps and discuss how they could be used to determine the distances on the ground. Allow students to measure distances on the map and match it against the scale given to determine actual distances on the ground **(do not use maps with scales given in ratio form)**. For sample, (***Measurement Resource Document*** *pages 21 – 22 attached)*	

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• Find the area of various objects and figures. • Demonstrate an understanding of the difference between units of length and units of area. • Compare and contrast units of length and units of area. • Use unit squares or a centimetre grid to cover regions so as to determine their area. • Use a square grid (1 cm^2 squares) to find the area of any shape.	• area • polygon • square units	1. Provide students with playing cards, post-it note paper or other small pieces of paper with a consistent size. Allow them to use the pieces of paper to measure the area of various surfaces in the classroom – the top of their desk, the cover of their text/note book, the teacher's desk, etc. Ensure that students associate the word 'area' with the size of the surface they are measuring and with the number of cards they used to measure the surface. 2. Allow students to use their cards, post-it notes, etc. to estimate the area of large surfaces in the classroom – such as the chalkboard, floor of the classroom or walls in the room. 3. The ***Sample Lesson 5*** shows how students can develop a conceptual understanding of area. 4. Allow students to determine (by counting and approximating) the number of pieces of paper needed to cover a region (*See Learning Activity – **Measurement Resource Document** pages 23 – 26 attached*) 5. Explore the relationship between perimeter and area of various shapes through the use of grids and tiles: 6. Allow students to use grid paper to create polygons of different area using a fixed perimeter (for example, draw 3 different rectangles – each with a perimeter of 32 units but with a different area) 7. Allow students to create polygons with different perimeter using a fixed area (for example, draw 3 polygons, each having an area of 24 square units but with different perimeter)	**Worksheet** – This worksheet shows how students can be engaged in problem solving activities involving counting squares to find area (***Measurement Resource Document*** *page 27 attached*) **Worksheet –** This allow students to estimate the area of irregular shapes drawn on grid paper (*See **Measurement Resource Document** page 28 attached*). **Worksheet 3 –** This allows students to draw polygons of a given area on grid (***Measurement Resource Document*** *page 29 attached*).