

Topic : Measurement
Subject : Mathematics
Level : Primary 3
Time of lesson: 80 mins for two lessons

School's Mathematics curriculum

The school's Mathematics course is designed according to students' abilities, with different activities and materials provided. Activities like learning through enquiries, cooperative learning, group work and the catering of learning diversity are included in the curriculum to facilitate learning. Several assessment methods are adopted for collecting data and monitoring students, such as daily mental calculation exercises, unit assessments, task-based assessments and examinations.

The Maths curriculum includes five main areas, namely number, algebra, measurement, data processing, and shape and space. The content of the mathematics course is designed according to these five areas. The content of this lesson plan belongs to the category of measurement. Under this area, several types of measurement units are introduced, which include currency, length, time, weight, capacity, perimeter, area, volume and speed. This lesson plan focuses on the measurement of length, introducing the most common measurement units of length to the students and equipping them with the ability to apply the measuring techniques in real life situations.

Rationale

In the double lesson, we will teach students measurement. Measurement is involved in many aspects in our everyday life, like measuring the volume of food ingredients when cooking; measuring the length of our feet when buying shoes and so on. It is a kind of life skills that students should acquire. After two lessons, students should be able to make use of rulers and tell the length and width of certain subjects. Besides, they should be able to identify what unit should be used for some specific measurement, like distance, length, etc.

Before the lesson, students have to complete pre-task worksheet at home. Therefore, students are able to have better concept of measurement and explore potential problems by doing the pre-task. At the beginning of the lesson, there is a sharing session for students to share their work with the whole class.

Then, teacher explains the usage of rulers and the meanings of the marks on their rulers. Students will be introduced terms like millimeter, centimeter, meter, kilometer and the applications of these units in daily life. In order to let students have a better understanding of measurement, teacher not only do a small quiz with students, but will also distribute some materials to students for them to measure. Therefore, teacher can check if students understand how to read the marks on the ruler and whether they get correct reading of the marks on the ruler. Furthermore, teachers will distribute a piece of worksheet to every student to help them make sense of the usage of every unit. Then teacher will check answer with students to ensure students have acquired the knowledge.

Next, teacher will play a game with students to let students discover the pragmatic use of each unit have their own advantages, like mm is better for presenting short objects and precise measurement. The activity enable students to face measurement dilemma because sometimes what they are measuring doesn't match the units, like they may need to use m for measuring 5-dollar coin. Student can discover that there can't be a single unit to express everything, there is a need to have many units in the world to facilitate us in daily life. After that, teacher will also initiate students' reflection on the game, like the difficulties they have in the game. At the end of the game, teacher concludes students learning outcome to further strengthen students concept about the practical usages of different units.

At the end of the lesson, teacher concludes what students have learnt by asking them some questions based on the covered topic. As a following-up, students have to complete a piece of homework and post their work on e-classroom platform. The homework requires students to measure using the three standardised units, mm, cm and m. They will complete the worksheet by using the units they chose to measure three objects at home. They have to consider the effectiveness and choose the most suitable unit for measuring each one of the objects. For example, using cm as the unit is not efficient for measuring a door.

Besides posting their own work. Students will have one more day to read their peer's work and comment on **at least** one peers' work by giving them ticks underneath the comment box for accuracy and efficiency. To further enhance self-regulated learning, students are recommended to comment on more than one peers' work.

Teaching objectives

Upon completion of the lesson, students are able to

1. Identify the four basic units of length measurement: mm, cm, m, km
2. Make use of the standardized and appropriate unit(s) to measure different objects
3. Present the results of measurement by using numbers, units, and the word "about" in approximated results
4. Relate the concept of measurement to their daily lives

Teaching innovation

1. Teacher teaches not by the textbook, but by involving students different tasks and activities
2. The Mathematics problems are related to students' life, not fake and inauthentic context.
3. Students hand in homework with e-classroom platform

Teaching Plan

Purpose of teaching/Stage	Interaction pattern	Teaching sequence and activities	Resources	Time
Pre-task: - Introducing students into the topic of measurements - Allowing students to develop a basic idea on the topic	Teacher to students	Measuring activity: As a piece of homework from the previous lesson, teacher asks students to measure the height of a chair, the height of a television or the height of a table at their home by using their octopus card. Students need to finish their homework before coming to the lesson.	Pre-task worksheet	N/A
Introducing students the sense of units (mm, cm, m, km)	Teacher to students	Teacher will discuss with students about their homework. A few students will be invited to come out and share their measurement results to the class. (Homework from previous lesson) Teacher asks students to compare measuring results.	Homework in the previous lesson, PowerPoint, sample for	35 mins

		<p>For example: Who has a taller table? Who has a shorter chair? How do you know it?</p> <p>Then, teacher starts the lesson by introducing the usage of ruler and different units (mm, cm, m and km).</p> <ol style="list-style-type: none"> 1. Teacher shows students a cm ruler on Powerpoint and tells students that when we measure length in real life, we use a ruler and read the marks on a ruler. 2. Teacher tells the usages of mm, cm, m and km by Powerpoint. <ol style="list-style-type: none"> a. They are the worldwide standard of measurement. b. $mm < cm < m < km$ c. $10mm = 1cm$, $100cm = 1m$, $1000m = 1km$ 3. Teacher tells students that we use different tools to measure different units: <ol style="list-style-type: none"> a. cm ruler for mm and cm b. flexible meter ruler for m c. measuring wheel for km 4. Teacher tells students how to read the marks of all the kinds of ruler by showing authentic cm ruler, flexible meter ruler and measuring wheel in class. 5. Teacher makes use of an online platform: https://www.funbrain.com/cgi-bin/meas.cgi?A1=s&A2=1&A3=0 to assess students whether they know how to read the marks on the ruler, and teach them to use "about" for approximate value. 6. Teacher demonstrates how to measure by using the <ol style="list-style-type: none"> a. authentic cm ruler to measure the length of a lemon tea carton, b. flexible meter ruler to measure the length of the blackboard, and c. measuring wheel to measure the length of the classroom. 7. Teacher tells other authentic examples of mm, cm, m, km, <ol style="list-style-type: none"> a. rice for mm b. foot for cm c. door for m 	<p>measuring x8 (rice and packaging of paper packed drinks)</p>	
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		<p>d. marathon route for km by powerpoint.</p> <p>7. Meanwhile, teacher gives each groups some materials, like lemon tea boxes, rice and instructs students to measure the length of these samples. so that students can get some hand-on experience in measuring with rulers.</p>		
Consolidating students about the usage of units (mm, cm, m km) in daily life by showing authentic examples and doing a piece of worksheet	Teacher to students	<p>1. Teacher distributes worksheets and students are required to finish the worksheets in 10 minutes.</p> <p>(The worksheet tests students 'understanding about the usage of mm, cm, m and km in daily life. Students are required to choose the correct units in order to make a reasonable presentation of the subjects on the worksheet.)</p> <p>2. Students complete worksheets by themselves.</p> <p>3. Teacher assesses students' understanding of units by observing students' competence on finishing the worksheets.</p> <p>4. Teacher checks the answers with students. Teacher may give more explanation on the questions on which majority of students make mistake.</p>	Powerpoint and Worksheet	20 mins
Consolidating students about the daily usage of mm, cm,m by asking students to measure classroom objects by themselves.	Teacher to students Students to students	<p>Groups will take turns to participate in the game. A student will be selected from each group to come up demonstrating the activity, other groups can observe and discuss as well.</p> <p>1. Teacher gives game instruction. To tell students that they are going to play a measurement game. First, they are divided into 8 groups with 4 persons. Then, a student from each group should come out and spin an online wheel to decide which object in the classroom to be measured. No repetitive object is accepted. If it happens, the student should spin again. Then, the students choose from the rulers on the table, including cm ruler, mm ruler and m ruler. No repetitive ruler should be chosen. After that, teacher addresses that the measurement may not be successful. Students should think of the reason why it happens during the activity. Then, each groups should start measuring.</p> <p>2. Teacher invites one student from each group to come out and spin the wheel to decide what object to be measured. Then</p>	<p>(rulers are provided by teacher)</p> <p>mm ruler x1</p> <p>cm ruler x1</p> <p>m ruler x1</p> <p>Online Spinning Wheel http://wheeldecide.com/index.php?c1=cm&c2=m&c3=mm&c4=cm&c5=mm&c6=m&c7=mm&c8=cm&c9=m&c10=mm&c11=m&c12</p>	15 mins

	Teacher to students	<p>students choose from the rulers on the table, including a cm ruler, mm ruler and m ruler.</p> <p>Objects in the spinning wheel are as follows:</p> <p>The height of table The width of window The length of the chalk The height of the door handle (measuring from the floor) The diameter of a 5- dollar coin The length of the projector screen</p> <p>3. Students use the ruler to measure the objects they got. Teacher discusses with the student about their measurement. For example: -Do you find it hard to use (unit) to measure the (object)? - If you are given another chance, which unit will you choose?</p> <p>4. Teacher explains to students in what way they are doing good and in what way they can eliminate the difficulties students have come across. For example, it is better to use meter for projector screen because if mm meter is used, students need more time for the measurement and summing up the result.</p> <p>5. After playing the game, the teacher summarizes the concept of choosing units like it facilitate our measurement/ help us to get an accurate measurement. If we just randomly choose the rulers to measure any object, the measurement may become to clumsy and unclear.</p>	<p>=mm&c13=m&c14=mm&c15=cm&c16=m&c17=mm&c18=m&t=Measure+IT+with+cm%3Fmm%3Fm%3F&time=5</p>	
-Teacher concludes the lesson and explain to students the post-task they need to work at home with the aid of Powerpoint	Teacher to students	<p>Teacher concludes what students have learnt by prompting a few questions to students:</p> <ol style="list-style-type: none"> 1. What are the four units we learnt today? 2. Which unit is the smallest? 3. Which unit is for measuring very very long length? 4. What unit do you use for fingernails? <p>Key-Reminder: The appropriate units help us in measuring and presenting the length of an object!</p> <p>1. Then teacher explains to students what they need to do as homework.</p> <p>(Homework details:</p>	<p>Powerpoint slides</p> <p>Cardboard ruler of mm scale x32</p> <p>Cardboard ruler of cm scale x32</p> <p>String of 1m x32</p>	5 mins

<p>-Post-task: Allow students to have more practice on measuring with universal standardised units, and to use IT for displaying their work.</p>		<p>Students have to measure three objects at home and present the results using the three standardised units, mm, cm, m They have to consider the effectiveness and choose the most suitable unit for measuring. For example, using cm as the unit is not efficient to measure a door.)</p> <p>2. Teacher giving instructions: (i) Students have to complete the e-worksheet at home and post their results on the e-classroom platform.</p> <p>(ii) Students have to comment on at least one peers' work by giving them ticks underneath the comment box for creativity and efficiency.</p>		<p>5 mins</p>
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