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Teacher Training Module:

Mathematics

Learning Cycle Eighteen

Unit Conversions

Sindh Technical Assistance – Development through Enhanced Education Programme (STA-DEEP)

School Education & Literacy Department (SE&LD)

Government of Sindh.

Introduction and Rationale of the Training

Dear Teachers!

Welcome to the new phase of the Continuous Professional Development (CPD) Program. In the previous phase, we had focused on pedagogical skills that helped you to develop your skills to make classroom more interactive, participative, and joyful for our students. In the new phase, we will continue practicing those pedagogical skills and also learn about the introduced content knowledge and skills in Mathematics, Science, English, Urdu, and Sindhi. As a result, you will be better prepared to deal classroom situation using modern teaching strategies integrated with subject knowledge.

Our vision

Our common goal is to improve the quality of teaching in schools all over Sindh. We want students to become active and collaborative learners, problem solvers, and critical thinkers who approach tasks with creativity and confidence. They are conceptually clear about the subject content and have the skills to link this content with the world around them. To make this possible, we, as teachers, must be better prepared for the classroom demands in pedagogy and the subject content. Moreover, we aim to professionalize these trainings so that the CPD teacher training courses make an impact and substantially change student performance.

Our Teaching Philosophy

The CPD training sessions, including this training, follow a participatory teaching philosophy that engages teachers to apply and practice active and collaborative learning, as well as engage in self and peer reflection to become community of practice. The objective is not only to improve the teaching practices but to help you understand the theory of the subject content and the strategies that help students apply the content in daily life with confidence and mastery.

Supporting You

The training module is designed to support you in your classroom teaching. It will introduce you to the subject content and some approaches for use in the classroom. This will make your teaching more manageable and help you grow as a skillful teacher.

Acknowledgement

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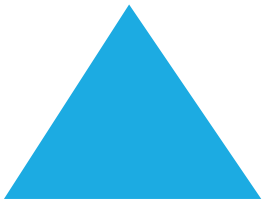
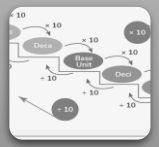


Unit Conversions

Learning Objectives: By the end of the session, the teachers will be able to:

identify the appropriate metric unit of measurement in length, weight, volume and time



Convert between units of measurements using the metric system

Apply their learning about units of measurement in daily life situations.

Session Plan

Instructional strategies/activities

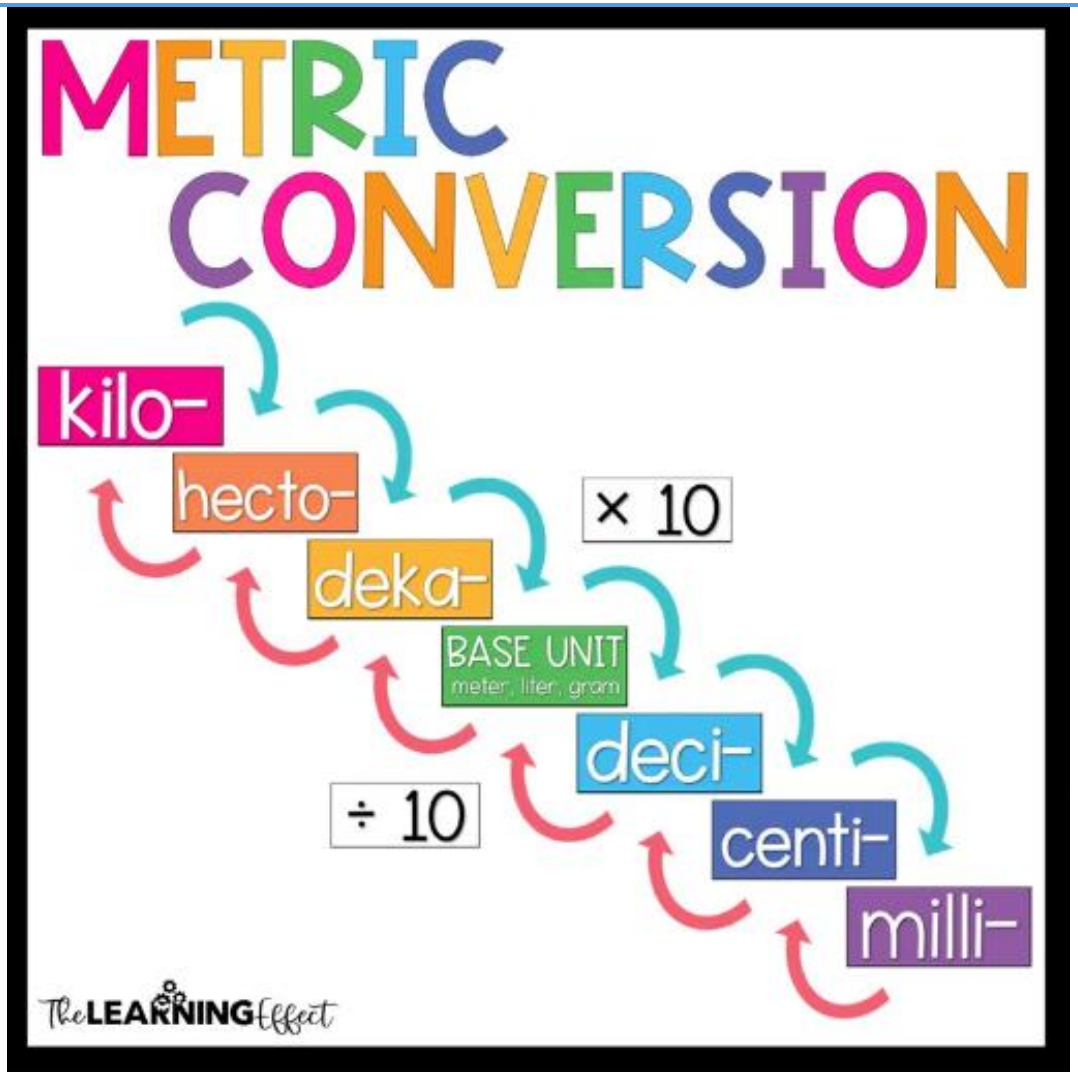
Time	Objective/purpose of the activity	Activities/learning experiences	Materials/resources
 15 min	**Activity 1:**  **Warm up by estimating and checking different objects**	This activity will help teachers understand the importance of estimation. They will also assess their own estimation skills. In this activity, teachers will first estimate the lengths of different objects in centimeters and then check their estimates by measuring with standard tool. Ask teachers to look at the list of objects given in Handout 18.1. Ask teachers to estimate each object in cm and then check their estimation by accurately measuring each object. Compare the estimation and the actual measurements. Discuss any discrepancies and encourage teachers to reflect on their responses. Talk about techniques that could improve their estimation skills, such as using reference objects or segments.	Handout 18.1 Measuring tape/ Scale

		Conclude the activity by summarizing the importance of both estimation and precise measurement. Highlight how practicing these skills can improve everyday tasks and decision-making.	
15 min	**Activity 2:**  **Identify Units of Measurement**	Ask teachers to watch the video related to introduction of units of measurement and their use in real life situation. Following are the guiding questions that teachers need to answer after watching the video. 1. Name four units of measure 2. How do you define measurement 3. What kind of problems world would face without proper measurement 4. What is Metric SI system of measurement After the teachers have watched the video, they will be asked to share their responses of the above guided questions within their respective groups. Then the facilitator will collect the responses from each group and summarize the activity by providing feedback and explanation. For facilitator information:	Video Link: https://youtu.be/AVC-426M6V0

		Units of measurement are a way to quantify the size, length, weight, and volume of objects. Understanding these units is essential for many everyday activities. In real life, we use units of measurement to: • **Measure Length:** We use centimeters, meters, and kilometers to measure how long or tall something is. For example, we measure the height of a door in centimeters or the distance to the park in kilometers. • **Measure Weight:** We use grams and kilograms to find out how heavy something is. For example, we weigh fruits and vegetables in grams and kilograms. • **Measure Volume:** We use milliliters and liters to measure liquids. For instance, we measure the amount of water in a bottle in liters. The facilitator will then ask teachers the following questions to reinforce their understanding of units of measurement. 1. In which unit we measure: 2. The medicine injection 3. Milk 4. Mangoes 5. Distance between two cities 6. Height of the mountain 7. cloth	

30 min	**Activity 3:**  **Introduction of the conversion of units of measurement**	**Activity 3A:** The facilitator will engage the teachers in a brainstorming session by asking, "Why do we need to convert units of measurement?" The facilitator will collect the responses, write them on the board, and then provide a summary. Summary for facilitator: We need to convert units of measurement in daily life for several reasons: 1. **Consistency and Standardization:** Ensuring that measurements are consistent and standardized, especially when communicating with others or comparing objects. 2. **Compatibility:** Making different systems of measurement compatible, such as converting metric units to imperial units or vice versa. 3. **Practicality:** Using the most practical unit for the task at hand, such as using liters for liquids and grams for small weights. 4. **Accuracy:** Achieving more accurate measurements in specific contexts, such as scientific experiments or cooking. 5. **Convenience:** Simplifying calculations and making measurements more understandable and easier to work with.	

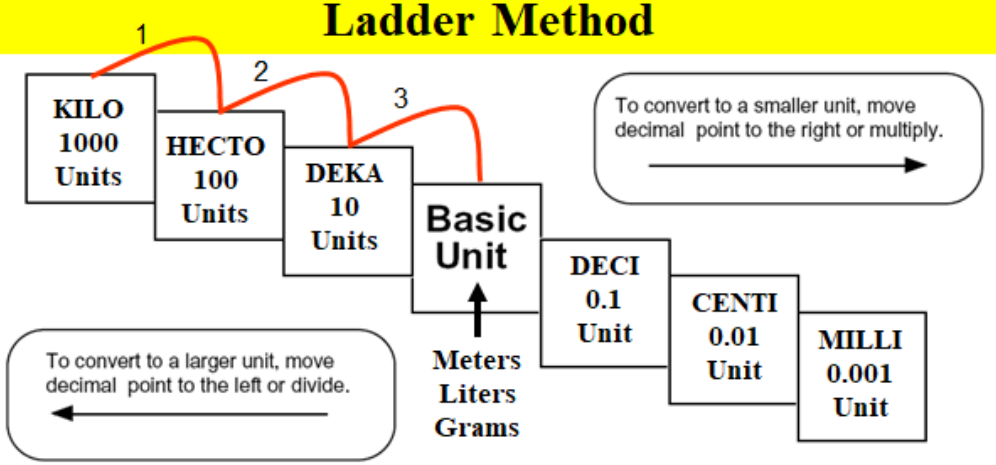
		6. **Global Communication:** Facilitating global trade, travel, and communication where different regions use different measurement systems. **Activity 3B:** Ask teachers to first watch the video and then respond to the following questions: 1. What is the video all about? 2. What are the things or ideas you have noticed in the video? 3. How would you define unit conversion or conversion? 4. How important is unit conversion in your everyday life? 5. How many cm in 1 meter? 6. How many meters are in 1 kilometer? 7. How many milligrams are there in 1 gram? After having a small discussion on the above questions, the facilitator will ask participants to work in groups and determine the process of conversions of units by looking at the following diagram:	https://youtu.be/djTNUp4XlRo


METRIC
CONVERSION
kilo-
hecto-
deka-
BASE UNIT
meter, liter, gram
deci-
centi-
milli-
× 10
÷ 10
TheLEARNINGEffect

Teachers will be asked to explain the unit conversion process and explain how unit conversion is performed.

Then the facilitator will show the following unit conversion process to convert length, weight and volume in different units.

Ladder Method



How do you use the "ladder" method?

1st – Determine your starting point.

2nd – Count the "jumps" to your ending point.

3rd – Move the decimal the same number of jumps in the same direction.

4 km = _____ m

Starting Point Ending Point

How many jumps does it take?

4. __. __. __. = 4000 m

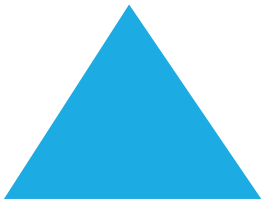
1 2 3

 25 min	**Activity 4:**  **Conversion of units of measurement**	The teachers will play a game of Snakes and Ladders to practice converting units of measurement. This game will engage teachers and demonstrate how teaching unit conversions can be made easy and interesting for students. • The teachers will play the game in groups of 4 following the given instruction on Handout 18.2. After they finish the game they will be asked to discuss: • Any challenges faced during the conversions and share tips and strategies for improving accuracy. • Highlight successful strategies and common pitfalls in unit conversion. • Discuss how this activity can be adapted for classroom use to make learning unit conversions enjoyable and engaging for students. • Encourage teachers to think of additional ways to incorporate interactive activities into their lesson plans. Emphasize the importance of hands-on learning and interactive teaching methods.	Handout 18.2 Dice to play the game

 20 min	**Activity 5:**  **Real life application conversion of units of measurement**	This activity aims to help teachers to identify real-life scenarios where metric system unit conversions are commonly used. Divide the teachers into three groups. Ask each group to think of as many real-life scenarios as possible where unit conversions are necessary. Ask each group to share their responses with the whole class. The facilitator will write the responses on the board and make a list of scenarios where unit conversions are important. For facilitator: the list may include • Cooking and baking recipes • Travel distances • Shopping for materials • Home improvement projects • Health and fitness Assign one problem to each group to solve. Each problem will present a different real-life scenario that requires unit conversions in the metric SI system. **GROUP 1** **<u>Cooking and Baking (Volume)</u>** Maria is baking a cake and needs 2.5 liters of milk. However, her measuring cup only measures 250 milliliters. How many cups of milk does Maria need?	

		GROUP 2 **<u>Distance measurement</u>** A runner completes a 10-kilometer race. How many centimeters did the runner cover? **Group 3** **<u>Weight Conversions</u>** A recipe calls for 2 kilograms and 500 grams of flour. How many grams of flour is needed? Each group will present their solutions to the problems to the whole class. The facilitator will offer feedback where necessary to ensure understanding and accuracy.	
 15 min	**Activity:**  **Assessment**	Teachers will be asked to complete the assessment related to the learning cycle: 1. A garden measures 25 meters in length. What is the length of the garden in centimeters? A) 250 cm B) 2500 cm C) 25,000 cm 2. A construction site requires 600 kilograms of cement. How many grams of cement are needed? A) 60,000 g B) 600,000 g	

		C) 6,000,000 g 3. A recipe calls for 2.5 liters of milk. How many milliliters of milk is needed? A) 25 mL B) 250 mL C) 2500 mL 4. Emma bought 3 meters of ribbon to decorate gift boxes. How many centimeters of ribbon did she buy? 5. A construction site requires 800 kilograms of wheat. How many grams of cement are needed?	



Indoor Measures Scavenger Hunt

Activity Instructions:

1. Look at the provided list of objects.
2. First, estimate the measurement of the objects in centimeters (any four)
3. Then, use a measuring tape to find and record the actual measurement.

In my Classroom		
The Object	Guess/Estimate (cm)	Measurement (cm)
Length of white board		
Height of Window		
Length of Pencil		
The top of your desk		
Length of eraser		

The height of door		
The length of a book		
Height of your desk		
Length of classroom		
Any object higher than you		

Handout 18.2

33 8 kg = _____g	**34** 14 cL = _____ml	**35** 200 g = _____mg	**36** 10 m = _____ cm	**37** _____m = 4 hm	**38** 10 km = _____m	**39** 10,000 m = ____ km	**40** 15 g = _____ mg **FINISH**
32 1 min. = _____sec.	**31** 1 hr. = _____ min.	**30** 1 year = _____days	**29** 1 week = _____days	**28** 45 min. = _____sec	**27** 3 years = ___weeks	**26** 18 days = ____hours	**25** 1 day = _____min.
17 300 cl = _____ L	**18** 11 g = _____mg	**19** 15g = _____mg	**20** 600 cl = _____L	**21** 31,000 mL = _____ L	**22** 35 L = _____ mL	**23** 5,000 kg = _____ g	**24** 40 kg = _____g
16 3 L = _____dL	**15** 50 dL = _____ L	**14** 7 L = _____dL	**13** 120 dL = _____L	**12** 3 L = _____mL	**11** 1 g = _____mg	**10** 15,000 mg = _____ g	**9** 1 L = _____cL
1 5 m = _____cm **START**	**2** 3 hm = _____ cm	**3** 7 km = _____ m	**4** 1 m = _____ dm	**5** 7,000 m = _____km	**6** 400 cm = _____m	**7** 15 cm = _____mm	**8** 12 m = _____mm

Directions:

1. Play with 2-4 players. Need dice and counters to play.
2. Roll dice to see who goes first. The player with the highest number goes first.
3. Roll dice and move counter that many spaces. When landing on a space, answer the question. If you get the question correct, you stay there. If you answer the question incorrectly, move to where you were before you rolled.
4. Play until someone reaches the finish line.

For reference:

List of 1-20 LCs topics

Learning Cycles (LCs)	Topics
LC-1	Developing Number Sense
LC-2	Fractions
LC-3	Decimal and Percentage
LC-4	Ratio and Proportion
LC-5	Introduction to Algebra
LC-6	Algebraic Identities
LC-7	Angle and its Constructions
LC-8	Area and Perimeter
LC-9	Three Dimensional Shapes
LC-10	Information Handling
LC-11	Place Value
LC-12	Highest Common Factor (HCF) and Least Common Multiple (LCM)
LC-13	Fraction Addition and Subtraction
LC-14	Fraction Multiplication
LC-15	Laws of Exponents
LC-16	Square Roots
LC-17	Simultaneous Linear Equations
LC-18	**Unit Conversion**
LC-19	Pythagoras Theorem
LC-20	Construction of Different Types of Triangles

For reference:

List of Resource Items for LCs (11-20)

Items	No. of items	LC-11	LC-12	LC-13	LC-14	LC-15	LC-16	LC-17	LC-18	LC-19	LC-20
Dice	8	✓							✓		
Pair of scissors	8	✓	✓								
Paper Plate	18		✓								
Red beans	½ kg	✓	✓								
Counters (Red/Black)	10								✓		
Counters (Blue/White)	10								✓		
Color pencil box	4			✓	✓						
Measuring tape	8								✓		
Geometry Box	8									✓	✓

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