## Vision Empower & XRCVC Teacher Instruction KIT Weight and Volume

Syllabus: Karnataka State Board Subject: Math Grade: 5 Textbook Name: Karnataka State Board Chapter Number & Name: 16.Weight and Volume

## **1. OVERVIEW**

1.1 OBJECTIVE AND PREREQUISITES **Objective** 

- Know the units of weight and volume of heavy and light objects used in daily life,
- Compare the units of heavy and light weight and state their relationship,
- compare the units of greater volume with units of lesser volume and find their relationship,
- Analyze and solve problems involving weight and volume using mathematical operations.

## **Prerequisite Concept**

- Weight
- TIK\_MATH\_G4\_CH12\_Weight
- Measurement of volume

*TIK\_MATH\_G4\_CH13\_Measurement of volume* 

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*Kindly Note: Activities marked with \* are mandatory* 

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name :

run : 2019

org : VisionEmpower

number: VE\_TIK\_M\_G5-16

user: admin@example.com

#### 2. LEARN

#### 2.1 KEY POINTS

Weight: Weight is the measure of how heavy an object is. Weight is measured in standard customary units. such as miligram, gram and kilograms.

Volume: In math, volume can be defined as the 3-dimensional space enclosed by a boundary or occupied by an object. The standard units to measure volume is millilitre and litre.

#### 2.2 LEARN MORE

### **3. ENGAGE**

## 3.1 INTEREST GENERATION ACTIVITY EQUATING DIFFERENT THINGS BY WEIGHT

#### Activity 1: Equating different things by weight

Materials required: Common objects like feather, cotton, wood shavings and cuttings, pebbles, marbles, pencils, pen, spoon, knife, books and metal pieces of different sizes, and balances made of coat hanger or rod and two identical bowls, with suitable strings. Prerequisites: Concept of volume

#### Activity Flow

A set of common objects (pen and pencils, sand and nuts, beads and books, spoon and knife; etc.) is checked for equality by weight by placing one object at one end and trying out others (one or more as a combination) at the other, till they balance. The exercise can be repeated with different objects and with different combinations at the other end. If materials are so chosen as to have a number of 'equal pairs' the task can be to identify the one with the same weight by hand estimation followed by verification.

#### SERIATION OF WEIGHTS THROUGH ESTIMATION AND DISCRIMINATION

#### Activity 2: Seriation of weights through estimation and discrimination

Materials required: Common objects like feather, cotton, wood shavings and cuttings, pebbles, marbles, pencils, pen, spoon, knife, books and metal pieces of different sizes, and balances made of coat hanger or rod and two identical bowls, with suitable strings. Prerequisites: Concept of weight

#### Activity Flow

Children are asked to pick up (or are given) the objects in pairs, one after the other, and asked to compare their weights by hand estimation. This can be done/played partly as a game, with children identifying the objects and comparing weights with their eyes closed. The correctness of their judgments is verified with the aid of balances: 'Which is heavier or lighter' between the two objects can be confirmed.

In continuation, a set of similar objects (three or more) can be checked for weights and children are asked to place the objects in the order of their weights by estimation by hand followed by verification / confirmation by balance where necessary/desired, and on a random basis.

## **COMPARISON AND SERIATION OF DIFFERENT SHAPES AND SIZES** Activity 3: Comparison and seriation of different shapes and sizes

Materials required: A wide variety of containers - cans, boxes, mugs, empty plastic jars and so on - of different shapes and sizes. Prerequisites: Concept of volume

## Activity Flow

- *i.* Children are asked to compare the capacities of different containers through play with sand and water transfer from one to the other
  - a. A holds more than B because water or sand spills 308 over when transferred from A to B,
  - b. B holds less than A because material in B (full) will not fill A.
  - c. C holds about the same as D (C and D differing in shapes) because the material neither runs over nor fails to fill a container when transferred from one another.
- *ii.* (Repeat each with different pairs of containers starting with 'similar' ones, and moving on to dissimilar ones compared by different children - guessing, followed by verification by method suggested and accepted).
- *iii.* Ordering of containers by their capacities may be encouraged through guessing first, and then verifying the capacities by actually filling them and comparing the amounts.

# 3.2 CONCEPT INTRODUCTION ACTIVITIES **DISCUSSION**

## **Activity 4: Recap questions**

Materials required: None Prerequisites: Concept of weight and volume

Activity Flow

- 1. Give examples for the substances that can be weighed in grams and kilograms.
- 2. Anil weighs 37 kg. Arun weighs 4 kg more than him. What is the weight of Arun?
- 3. Weight of Anand is 32 kg 500 g. Suresh's weight is 28 kg 250 g. Whose weight is more and by how much?
- 4. Give examples for things measured in litres and millilitre.
- 5. A ration shopkeeper has three drums of capacities 120 litres 750 ml, 150 litres and 175 litres filled with kerosene. What is the total quantity of kerosene he has stored?
- 6. Sarita bought 5 litres 750 ml of cooking oil and she used 2 litres 500 ml. How much cooking oil remains?

## **CONVERSION OF UNITS OF WEIGHT**

#### Activity 5: Conversion of units of weight

Materials required: None Prerequisites: Concept and units of weight

#### Activity Flow

*To convert greater units of weight to smaller units Rule:* 

- To convert kg into gram multiply by 1000
- To convert hectogram into gram multiply by 100
- To convert decagram into gram multiply by 10

#### Examples:

- How many grams make 3 kg? Solution: 1 kg = 1000 grams Therefore 3 kg = 1000 × 3 = 3,000 grams
- 2. How many grams make 4 hectogram? Solution:
  1 Hectogram = 100 gram
  - i nectografii 100 grafii
  - *Therefore* 4 hectogram =  $100 \times 4 = 400$  grams
- 3. How many grams make 15 decagram ? Solution:

1 decagram = 10 grams

15 decagram =  $10 \times 15 = 150$  grams

*To convert smaller units of weight into greater units. Rule :* 

- To convert gram into kg divide by 1,000.
- To convert milligram into gram divide by 1,000.
- To convert kg into quintal divide by 100.

#### Examples:

 How many grams make 500 milligram ? Solution: 1,000 mg = 1 gram

500 mg = 500 ÷ 1,000 = 
$$\frac{1}{2}$$
 gram

500 mg = 500 gram

- 2. How many grams make 1,600 centigram ? Solution:
  - 100 centigram = 1 grams
  - $1,600 \text{ centigram} = 1,600 \div 100 = 16 \text{ grams}$

 3. How many quintals make 850 kg ? Solution: 100 kg = 1 quintal 850 kg = 850 ÷100 = 8 Quintal.

#### **MEASUREMENT OF VOLUME**

Activity 6: Measurement of volume Materials required: None Prerequisites: concept and units of volume

Activity Flow

The measurement of volume is expressed in cubic units. The standard unit of volume is 'litre'. Decalitre, hectolitre and kilolitre are the standard units to measure liquids with greater volume.

*Decilitre, centilitre and millilitre are the standard units to measure liquids with lesser volume.* 1 litre = 1000 ml.

 $\frac{1}{2} \text{ litre} = 500 \text{ ml.}$  $\frac{1}{4} \text{ litre} = 250 \text{ ml.}$ 1 kilolitre = 1,000 litre.

The word 'litre' is written as 'l ', millilitre as 'ml ' and kilolitre as 'kl '.

#### Activity 7: Conversion of units of volume

Materials required: None Prerequisites: Units of volume

Activity Flow

*To convert greater units of volume into smaller units. Rule :* 

- To convert kilolitre into litre multiply by 1,000
- To convert hectolitre into litre multiply by 100
- To convert decilitre into litre multiply by 10

Examples:

1. How many litres make 4 kilolitre ?

Solution: 1 Kilolitre = 1000 litre Therefore, 4 Kilolitre = 1000 × 4 = 4000 litre. 2. How many litres make 5 hectolitre ?

Solution: 1 hectolitre = 100 litre 5 hectolitre =  $100 \times 5 = 500$  litre.

To convert smaller units of volume into greater units. Rule :

To convert litre into kilolitre divide by 1000. To convert litre into hectolitre divide by 100. To convert litre into decilitre divide by 10. To convert millilitre into litre divide by 1000. Observe the following examples.

- How many kilolitres make 7,000 litres ? Solution: 1000 litre = 1 kilolitre Therefore 7000 litre = 7000 ÷ 1000 = 7 kilolitre.
- 2. How many hectolitres make 1200 litres ? Solution: 100 litre = 1 hectolitre Therefore 1200 litre = 1200 ÷ 100 = 12 hectolitre.

## Activity 8: Water Jug puzzle

Materials required: 3 different size containers (depending on the size, can correspondingly Prerequisites: Concept of volume and measurement

#### Activity Flow

You are doing some gardening, and need exactly 4 liters of water to mix up some manure. But you only have a 5-liter and a 3-liter bowl, but do have access to plenty of water. How would you measure exactly 4 liters?

Solution:

Fill the 5-liter bowl. Then fill the 3-liter bowl from the 5-liter bowl. You will now have 2 liters left in the 5 liter bowl.

Empty the 3-liter bowl, and then transfer the 2 liters from the 5-liter bowl into it.

Now fill the 5-liter bowl again, then pour water carefully from the 5-liter bowl into the 3liter bowl until it is full - exactly one more liter. The 5-liter bowl now has exactly 4 liters.

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE\*

- Calculating drinking amounts
- When you fill up your vehicle, the volume of gasoline your gas tank holds determines your purchase. Whether you fill up with gallons or liters of gasoline or other fuels, the amount is a volume calculation.
- Cooking and Baking: The number of measuring cups and spoons in the average person's kitchen is indicative of how often volume is used when cooking.
- Cleaning House: Volume is used in most house-cleaning chores. When washing clothes, you add a specific amount of laundry liquid to the washing machine based on the load or volume of the tub and the clothes being washed.
- Water Conservation: Water volume plays a huge part in water conservation.

## 4. EXERCISES & REINFORCEMENT

## 4.1 PRACTICE EXERCISES

## **HOMEWORK PROBLEMS**

#### **Activity 9: Homework problems**

Materials required: None Prerequisites: Concept of weight and volume

## Activity Flow

- 1. 62 kg of rice was supplied to a school under 'Akshara Dasoha Scheme'. If 15 kg of rice was used, find the quantity of rice remaining.
- 2. A bag can hold 20 kg of soji. If 140 kg of soji is to be filled equally, how many such bags are required ?
- 3. A merchant has 5 packets of sugar, each packet weighing 15 kg of sugar. What is the total weight of 5 packets of sugar ?
- 4. The yield of paddy per acre is 29 quintals and 50 kg. Rachappa has 30 acres of field. What is the total yield of paddy ?
- 5. 18 kg 400 g of sugar is to be packed in 4 bags equally. What is the weight of each bag?
- 6. A farmer gets 60 kg 400 g of onion from one field and 56 kg 800 g from another field. If he sells 98 kg 200 g of onion, find the weight of onions left with him.
- 7. Veena buys 3l 250 ml of groundnut oil while returning from her office. Her mother also bought 1l 500 ml of groundnut oil on the same day. What is the total quantity of groundnut oil bought by them?

- 8. A milkman has 25 litres of milk. He sells 16l 750 ml of it. Find the quantity of milk left with him.
- 9. A bottle contains 11 500 ml of sandal oil. It has to be filled into bottles of 250 ml each. How many bottles are required?
- 10. An oil can contains 15l of Sunpure oil. Out of this Rani uses 3l 600 ml in the first month and 5l 300 ml in the second month. Find the quantity of oil left in the oil can.
- 11. A vessel contains 1 litre 800 ml of tea. It is poured into 12 glasses of the same size equally. What is the quantity of tea contained in each glass?

#### **4.2 IMPORTANT GUIDELINES\***

#### **Exercise Reading**

It is very important that the children practice their learnings as well as their reading. Hence have the children read out the newly learned concepts from their textbooks or other available resources.

#### **Perform Textbook Activity**

It is good practice to have the children perform the textbook activities. Your textbook activities might not be accessible hence go through this resource to learn how to make textbook content accessible

#### **Provide Homework**

To evaluate their understanding and to help the student revise and implement the new learnt concept ensure to provide them with homework. Students should perform one or two of the questions mentioned above or from the textbook exercises with the teacher in Class and the remaining may be given for homework. Also, ensure that the student knows their special skills linked to independently using their accessible books as it will be critical to doing homework independently

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