📘 Chapter 14: How Big? How Heavy?

This chapter explores **volume, weight, and estimation** using fun, hands-on activities. Here's a detailed Q&A breakdown:

🔶 A. Measuring Volume with Marbles

Q1: If 5 marbles are dropped in water and it rises, what is the volume of 5 marbles?

👉 Whatever amount of water is displaced = volume of 5 marbles (say 10 mL).

Q2: Estimate volume of:

- Ball = ~20 marbles
- Eraser = ~5 marbles
- Lemon = ~10 marbles
- Pencil = ~8 marbles
- Potato = ~15 marbles

Now use a measuring glass to confirm.

🔶 B. Using Coins and Measuring Bottles

- 9 five-rupee coins raise water by 10 mL.
- So, **volume of 6 marbles** = ~6.7 mL (if 9 = 10 mL)
- **Volume of 16 one-rupee coins** = Estimate based on size ratio.

🔶 C. Volume Estimations in cm^3 (cm cubes)

Q: How many cm^3 in your Math-Magic book?

If:

- Length = 24 cm
- Width = 18 cm
- Height = 1 cm
  👉 Volume = 24 × 18 × 1 = **432 cm^3**

🔶 D. Matchbox Models

- A matchbox ≈ 10 cm^3
- If Tanu uses 14 matchboxes in one layer × 4 layers = **56 matchboxes**
- Volume = 56 × 10 = **560 cm^3**

🔶 E. Paper Cube Activity

- Each side = 7 cm
  👉 Volume = 7 × 7 × 7 = **343 cm^3**

Q: A cube with double side (14 cm)?

👉 Volume = 14^3 = **2744 cm^3**

So, it can hold **8 small cubes** (since $2^3 = 8$).

🔶 F. Packing Cubes in Boxes

Box A:

- 20 × 10 × 6 = 1200 cubes

Box B:

- 20 × 10 × 10 = **2000 cubes**

Box C:

- 15 × 9 × 10 = **1350 cubes**

→ Total = 1200 + 2000 + 1350 = **4550 cubes**
✅ Enough for 4000 cubes.

🔶 G. Pipe Volume Activity (Postcard Pipes)

Make pipes with same area but different shapes:

- Circle pipe has **maximum volume**
- Square, triangle, rectangle—compare volume by filling with sand

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🔶 H. Trek to Gangotri – Weight & Food Calculation

One day's food:

- Rice: 100g
- Flour: 100g
- Pulses: 100g
- Onion: 10g
- Tomato: 10g
- Oil: 50g
- Sugar: 50g
- Milk powder: 40g
- Tea: 10g
- Dalia: 40g
- Salt: 5g
  → **Total/day = 515g approx.**

For 6 days = 515 × 6 = 3090g = ~3.1 kg per person

🔶 I. Weight Comparison

- Elephant = 5000 kg
- Blue whale ≈ 35 × 5000 = **1,75,000 kg**
- Baby elephant = 90 kg
  If a baby weighed 3 kg → elephant is **30× heavier**

🔶 J. Coin Weights

- 5-rupee coin = 9g
  → 1 kg = 1000g → 1000 ÷ 9 ≈ 111 coins
  → 9 kg = 9000 ÷ 9 = **1000 coins**
- For 54 kg → 54000 ÷ 9 = **6000 coins**