

Solving problems involving capacity

National Curriculum attainment target

- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

Lesson objective

- Calculate and convert between standard units of capacity to solve problems; use decimal notation up to three decimal places

Previous related lesson

Unit 10, Week 3, Lesson 1

Prerequisites for learning

Pupils need to:

- be able to write measurements of capacity to two decimal places, e.g. 3.47 l

Vocabulary

capacity, millilitre (ml), litre (l), decimal place

Future related lessons

None

Success criteria

Pupils can:

- calculate and convert between litres and millilitres to solve problems involving capacity
- use decimal notation up to three decimal places



Getting Started

- Choose an activity from Measurement (volume and capacity).

**Collins
Connect**

Year 6, Unit 10,
Week 3

Teach

Resources

Mini whiteboard, eraser and pen (per child)



- Distribute the whiteboards, erasers and pens.
- Display: Slide 1 showing the digit cards 1, 3, 7 and 0.
- Say: **Using these four digits I can make a capacity in millilitres, for example, 1307 ml. Work with your partner and record on your whiteboards five more capacities that use each digit only once and that are less than 2000 ml.**

- After sufficient time ask the pairs to read out their list of capacities.



- Display: Slide 2 showing all six capacities.
- Take each capacity in turn and ask the children to convert it to litres.

- Ask: **Who can recall the four-step model for problem solving?**



- Display: Slide 3 showing the four-step model for problem solving.
- Review the information shown on the slide.



- Display: Slide 4 showing the word problem: Jordan and his grandfather built a 250 litre tank for tropical fish. The number of fish that they can keep in the fish tank depends on the capacity of the tank. If each fish needs 9 litres of water, how many tropical fish can they buy?

- Ask a child to read the problem to the class.

- Elicit the key phrases, '250 litre fish tank' and 'each fish needs 9 litres of water'.

- Ask: **What is the operation to find the answer to this question?** (division) Ask a child to write the calculation on the board. ($250 \div 9$)

- Ask: **What is a good estimate of the answer?** ($250 \div 10 = 25$)

- Ask the children to find the answer in an efficient way and write it on their whiteboards.

- Say: **We have two answers to the calculation, 27 remainder 7 and 27.77778.** Ask: **How many fish can they buy?** (27 fish for a 250 litre tank)

- Ask: **Who can explain to the class why the answer does not round up to 28?** Elicit that the answer depends on the context of the problem and that a tank for 28 fish needs to have a capacity greater than 250 litres because $28 \times 9 \text{ l} = 252 \text{ l}$.

i 1307 ml
1370 ml
1730 ml
1703 ml
1037 ml
1073 ml



- Display: Slide 5 showing the second word problem: Aaron is having five friends to his house to watch a football match on television. He estimates that everyone will drink three 250 ml glasses of juice.

a What is the total capacity of juice required?

b How many 1 litre bottles of juice will he need to buy?



- Ask pairs to work together to solve the problem and to share their answers with the class.
- Take feedback and discuss the calculations that were used to solve the problem (a: 4.5 l, b: 5 bottles)



- Ask: **Why must we round the answer up to five bottles?** Elicit that the juice is sold in 1 litre bottles so four 1 litre bottles will not be sufficient.



- Display: Slide 6 showing the third word problem: A tap is dripping at the rate of 1 millilitre per second.

a How many seconds will it take to fill a 0.1 litre jug placed under the tap?

b If the tap continues to drip at the same water-flow rate, how many litres of water will be lost in 1 hour?



- Ask pairs to discuss the calculations that are needed to solve the problem and to share them with the class. (a: 100 s, b: 3.6 l)



- Ask: **Using the same water-flow rate, how would you find the number of litres lost in one week?** ($3.6 \text{ l} \times 24 \times 7 = 604.8 \text{ l}$)

Individualised Learning

Refer to Activity 2 from the Learning activities on page 412.

Pupil Book 6C – Page 46: Maritime problems

Resources: 1 cm squared paper (Challenge 3 per child); ruler (Challenge 3 per child)

Progress Guide 6 – Extension, Year 6, Unit 10, Week 3, Lesson 2: Water-flow rates

Resources: wide-necked jar (per pair); measuring cylinder with 10 ml divisions (per pair); funnel (per pair); stopwatch (per pair); access to water tap (per pair)

Plenary

- Read through some of the problems that the children have worked on independently.
- Ask the children to share with the class the operation and the calculation they used to work out the answer.
- Write the calculation on the board as required.
- Elicit that calculations can be checked by using the inverse operation.
- If some children have not completed a particular problem, use the problem to review strategies for solving problems.

Overcoming Barriers

- Some children may find that drawing a diagram or a sketch can help to clarify the problem.