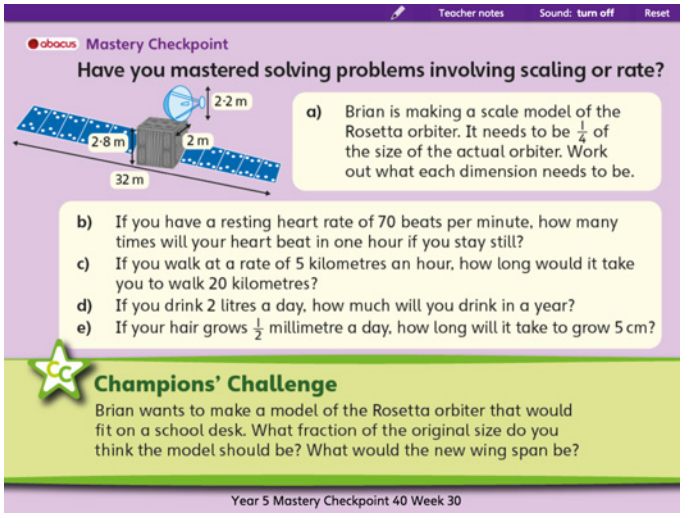
Solving problems involving scaling or rate



Objective(s) from the National Curriculum

- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Objective(s) from the National Numeracy Framework for Wales

- Multiply and divide 3-digit numbers by a single-digit number

Abacus progression map outcome(s)

- Solve problems (including word problems and problems about measure) involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Answers

Have you mastered solving problems involving scaling or rate?

a. Box height: 70 cm or 0·7 m
Box depth: 50 cm or 0·5 m
Dish height: 55 cm or 0·55 m
Wingspan: 8 m

b. 4200 beats

c. 4 hours

d. 730 litres

e. 100 days

Champions' Challenge

For example $\frac{1}{100}$. The wingspan would be 32 cm.

Possible errors and misconceptions

Children may have made mistakes if they tried to convert from metres to centimetres, or centimetres to millimetres in question (a). Some may not understand the concept or vocabulary of rate and so have multiplied 5 by 20, for example, when answering question (c).

Same day intervention

Ask children to work in pairs to measure each other to the nearest 0·1 m – height, arm span and other measurements that aren't sensitive e.g. leg length (hip to heel) and head circumference. Explain that they are going to make a scale model of themselves. Help each child to work out $\frac{1}{10}$ of their height in centimetres. *It will be easier if we write your height as centimetres first*. Ask children to work out $\frac{1}{10}$ of their other measurements. Give each child some modelling clay and ask them to make a scale model of themselves. *Does it look in proportion?* If so, their scaled measurements are probably right.

Help children to measure their resting heart rate. Take one example and discuss how many times the heart would beat in two minutes, in three minutes, and in four or five minutes to consolidate the concept of rate. *So if we want to know how many times the heart would beat in one hour, we just multiply the number of beats per minute by 60*. Children work out how many times their own heart would beat in one hour.

Further activities

Use these Abacus objectives to search for more activities:

- WMD.68 Solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates

If children need to go back further, use the following pre-requisite objectives to search for activities:

- FRP.50 Find any fraction of an amount and relate to division and multiplication
- PRA.48 Solve problems involving multiplication and division, including missing number problems