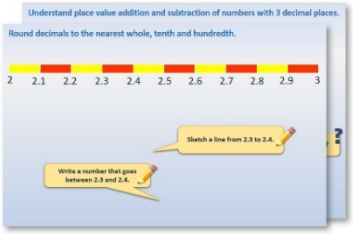
Week 13, Day 2

Solve scaling problems; Convert from centimetres to metres

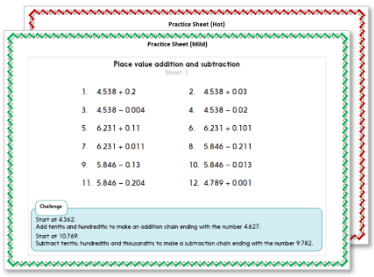
Each day covers one maths topic. It should take you about 1 hour or just a little more.

1. Start by reading through the **Learning Reminders**.
   They come from our *PowerPoint* slides.



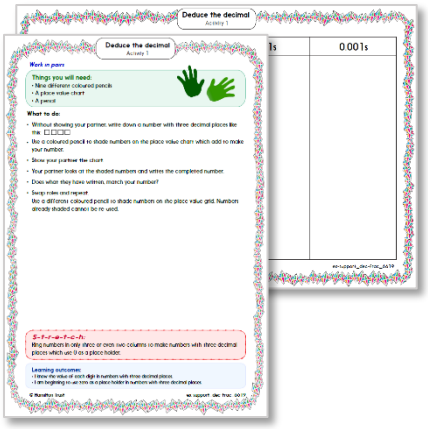
---

2. Tackle the questions on the **Practice Sheet**.
   There might be a choice of either Mild (easier) or Hot (harder)!
   Check the answers.



---

3. Finding it tricky? That's OK… have a go with a grown-up at **A Bit Stuck?**



---

4. Think you've cracked it? Whizzed through the Practice Sheets?
   Have a go at the Investigation…

Learning Reminders

Solve scaling problems; Convert from centimetres to metres.

Architects, for example, will produce a **scale drawing** or even a **scale model** when working out what a design will look like, both as part of their work (to design a building), and then to show their clients.

Every dimension will be the ***same*** fraction of the life-size one, e.g. each length might be $^{1}/_{10}$ of what it will be when built.

Learning Reminders

Solve scaling problems; Convert from centimetres to metres.

A model car was made that was $^1/_{10}$ of the length of a real car. If the model was 48 cm we can multiply by 10 to find the actual length of the car.

48 x 10 = 480 so the length of the actual car is 480cm or 4m 80cm.

If the height of the actual car is 1m 60cm to find the height of the model we need to divide by 10.

1m 60cm = 160cm. 160 ÷ 10 = 16. The length of the model will be 16cm.

Learning Reminders

Solve scaling problems; Convert from centimetres to metres.

A toy sheep is made that is $^1/_4$ of life-size.
If the toy is 15cm long, we can multiply by 4 to find the life-size length.

15cm x 4

What's my strategy for multiplying by 4...?

Double, and double again...!

Double 15cm is 30cm, then double 30cm is 60cm, so the life-size length of the sheep is 60cm.

15cm x 4 = 60cm

If the height of the real sheep is 48cm, we need to divide by 4 to find $^1/_4$ of life-size for the toy.

48cm ÷ 4

What's my strategy for dividing by 4...?

Find half, and half again, or recall a tables fact!

48cm ÷ 4 = 12cm

Practice Sheet Mild

Scaling problems

Farm animal models

Each model needs to be a $\frac{1}{4}$ of the size of the real-life animal.

Divide each dimension by 4 to calculate the model measurements.

height 180cm, length 220cm

height 60cm, length 80cm

height 90cm, length 120cm

Challenge

What if you wanted to make model farm animals $\frac{1}{10}$ of the real size, what size would the models be for each animal?

Practice Sheet Hot

Scaling problems

Toy cars

Each toy car is a scale model. Each toy car measurement is $\frac{1}{10}$ of the real car measurements.
Calculate the real-life size measurements in metres.

height 14cm, length 37cm, width 17cm

height 15cm, length 43cm, width 18cm

height 20cm, length 40cm, width 19cm

Farm animal models

Each model needs to be a $\frac{1}{4}$ of the size of the real-life animal.
Calculate the model measurement in centimetres.

height 1.8m, length 2.2m

height 0.6m, length 0.8m

height 0.9m, length 1.2m

Challenge

What if you wanted to make model farm animals $\frac{1}{10}$ of the real size, what size would the models be for each animal?

Practice Sheets Answers

Scaling problems (mild)

Animal	Height	Length
Cow model	45cm	55cm
Sheep model	15cm	20cm
Pig model	22.5cm	30cm

Challenge

$\frac{1}{10}$ animal models are:
Cow 18cm height 22cm long; sheep 6cm height 8cm long; pig 9cm height 12cm long.

Scaling problems (hot)

Vehicle	Height	Length	Width
	140cm or 1.4m	370cm or 3.7m	170cm or 1.7m
	150cm or 1.5m	430cm or 4.3m	180cm or 1.8m
	200cm or 2m	400cm or 4m	190cm or 1.9m

Animal	Height	Length
Cow model	45cm	55cm
Sheep model	15cm	20cm
Pig model	22.5cm	30cm

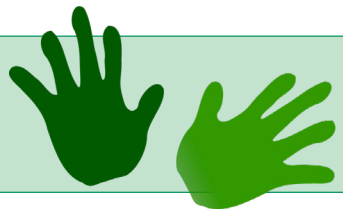
Challenge

$\frac{1}{10}$ animal models are:
Cow 18cm height 22cm long; sheep 6cm height 8cm long; pig 9cm height 12cm long.

A Bit Stuck?
Sleeping spiders

Work in pairs

Things you will need:
- A set of 0 to 12 cards
- Ten spider cards



What to do:

- Shuffle the 0 to 12 cards and place face down.
- Turn over the top card. This is the number of spiders asleep in a room in your house.
- Take that number of spider cards. Use clever counting to work out the number of legs.
- Return the card to the bottom of the pack. BUT if you knew the answer without using clever counting, keep the card.
- Turn over the next card and repeat.
- Keep playing the game until you don't have many cards left in the pack because you have learned so many facts!

For example:

You choose the 4 card, so take 4 of the sleeping spider cards. You'll see that each of them has 8 legs...

Write a multiplication with a missing number: 4 x 8 = ☐

Do you already know the answer? If not, use 'clever counting' in 8s to find how many legs there are altogether: 8, 16, 24, 32

S-t-r-e-t-c-h:
Use the 0 to 12 cards. See if you can learn eight facts by heart!

Learning outcomes:
- I can multiply numbers by 8.
- I am beginning to know some facts for the 8 times tables by heart.

A Bit Stuck?
Sleeping spiders





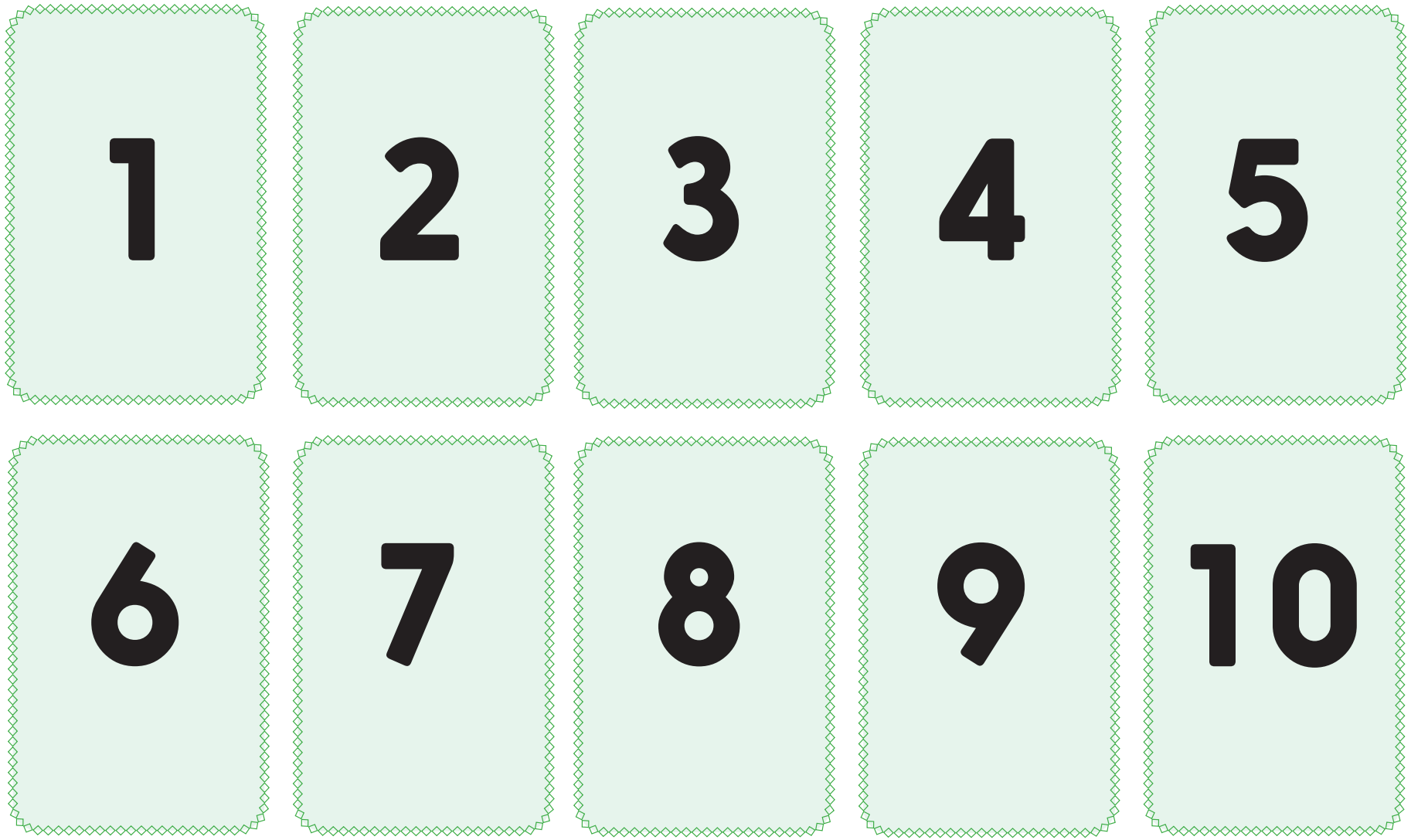







A Bit Stuck?

Sleeping spiders



A Bit Stuck?

Sleeping spiders

Investigation
The giant!

The giants are, on average, four times human height!
All of their measurements – their handspan, foot size and so on – and ***everything they have*** – their furniture, cutlery, books, TVs – are 4x greater than ours!

You will need:

- 10 household items
- Ruler or tape measure

- In this activity we are going to find out the **giant sizes** of some common items.
  Everything is the same scale, so everything must be multiplied by 4!

- Measure your own teaspoon to the nearest cm. Calculate the giant size.

Example

A teaspoon is 11cm long.

Multiply by 4 to find the giant length...

= 11cm x 4cm long

= 44cm long

- Now collect and measure at least 9 more items and find the size of the giant's version.

Remember!

To multiply by 4 we can double and double again,
e.g. to find 23 x 4: double 23 is 46, and double 46 = **92**
Or, we could partition 23 and solve using grid multiplication:

x	20	3
4	80	12

80 + 12 = **92**

Challenge

What if the giants were 7 times our height?
How tall would everyone at home be?!
What would be the size of the household items you chose?