<u>**Monday**</u>

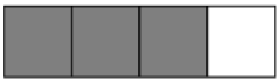
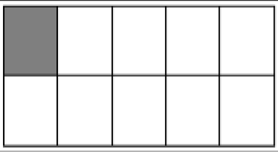
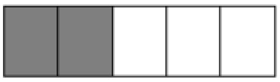
Matching Fractions, Decimals and Percentages

Age 7 to 14 ★

The aim of this game is to match pairs of cards.

Click on a card in the interactivity below to turn it over. Then click on another one. If the two cards match, they will stay face-up. If the two cards do not match, they will return to being face-down.

The game ends when all the cards have been matched in pairs.

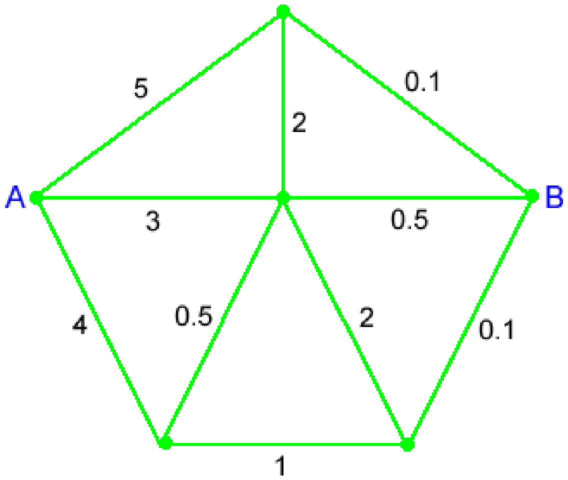
$\frac{1}{2}$	0.75	30%
10%	$\frac{2}{5}$	$\frac{1}{4}$
25%	0.3	
	0.5	
$\frac{9}{10}$	70%	0.9
$\frac{1}{5}$	$\frac{1}{100}$	0.8
80%	0.7	0.6
20%	$\frac{3}{5}$	0.01

<u>**Tuesday**</u>

Route Product

Age 7 to 11 ★★

There are lots of different routes from A to B in this diagram:



The idea is to work out the product of the numbers on these different routes from A to B. Let's say that in a route you are not allowed to visit a point more than once.

For example, we could have 3×0.5 but we couldn't have $3 \times 2 \times 5 \times 4 \times 1 \times 0.1$ because that route passes through A twice.

Which route or routes give the largest product?

Which route or routes give the smallest product?

Do you have any quick ways of working out the products each time?

[This problem is adapted from a SMILE Centre card.]

Wednesday

Mixing Lemonade

Age 11 to 14 ★

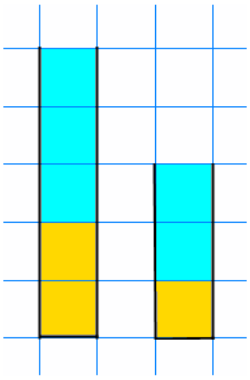
Warm-up | Try this next | Think higher | Read: mathematics | Read: science | Explore further

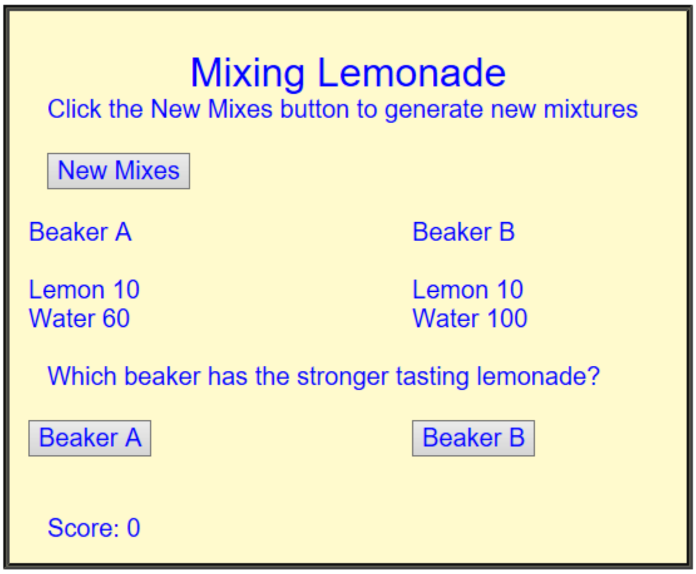
I mixed up some lemonade in two glasses.

The first glass had 200ml of lemon juice and 300ml of water. The second glass had 100ml of lemon juice and 200ml of water.

Which mixture has the stronger tasting lemonade? How do you know?

Use the interactivity below to compare different mixtures of lemonade and develop a strategy for deciding which is stronger each time.





Once you are confident that you can always work out which mixture is stronger, **here are some questions to consider:**

How might you use fractions to help you to work out which mixture is stronger?
How might you use ratios?
How about a graphical approach?

Do you always use the same strategy?
Describe some occasions when one strategy might be more efficient than another.

In the original example, the first glass had 200ml of lemon juice and 300ml of water, and the second glass had 100ml of lemon juice and 200ml of water. If I mix the two glasses of lemonade together, the mixture is weaker than the first glass was, but stronger than the second glass.
Try the same with some other mixtures. Is the strength of the combined mixture always between the strengths of the originals? Can you justify your findings?

<u>**Thursday**</u>

Spiralling Decimals

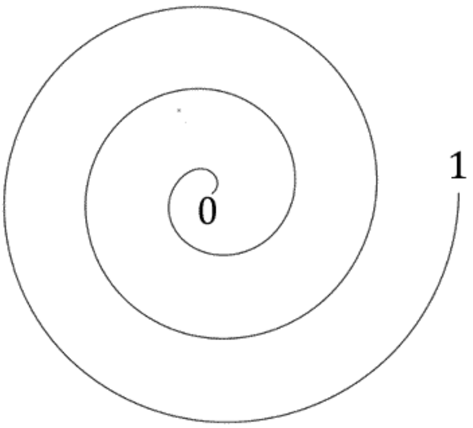
Age 7 to 14 ★★

Have you noticed that some very long numbers are very big whilst other very long numbers are small? Can you think of an example of each?
Here's a game where you can test your skill at putting small numbers into the right order - it's not as easy as it sounds!

How to play

You need a partner, a copy of the game board, and two different coloured pencils.
Decide who goes first.
Take turns to choose a number from the grid and mark it on the spiral. Make sure you know where 0 and where 1 is!
Keep taking turns until one of you has marked three numbers next to each other.

0.5	0.25	0.75	0.3
0.35	0.9	0.99	0.999
0.1	0.01	0.05	0.79
0.64	0.32	0.54	0.865



What next?

Can you work out a winning strategy?
Does it matter who goes first?
Does it matter which number you choose first?

Can you make up a different set of numbers which would make the game more challenging?
Perhaps you could have different start and end numbers for your spiral?
Send us your ideas so that we can share them with other children.

Friday

Peaches Today, Peaches Tomorrow...

Age 11 to 14 ★★

This problem is in three parts. If you are feeling confident about working with fractions, you might want to skip straight to part (ii) or part (iii).

(i) A little monkey had 60 peaches.

On the **first** day he decided to keep $\frac{3}{4}$ of his peaches.
He gave the rest away. Then he ate one.

On the **second** day he decided to keep $\frac{7}{11}$ of his peaches.
He gave the rest away. Then he ate one.

On the **third** day he decided to keep $\frac{5}{9}$ of his peaches.
He gave the rest away. Then he ate one.

On the **fourth** day he decided to keep $\frac{2}{7}$ of his peaches.
He gave the rest away. Then he ate one.

On the **fifth** day he decided to keep $\frac{2}{3}$ of his peaches.
He gave the rest away. Then he ate one.

How many did he have left at the end?

(ii) A little monkey had 75 peaches.

Each day, he kept a fraction of his peaches, gave the rest away, and then ate one.
These are the fractions he decided to **keep:**

$$\frac{1}{2} \quad \frac{1}{4} \quad \frac{3}{4} \quad \frac{3}{5} \quad \frac{5}{6} \quad \frac{11}{15}$$

In which order did he use the fractions so that he was left with just one peach at the end?

(iii) Whenever the monkey has some peaches, he always keeps a fraction of them each day, gives the rest away, and then eats one.
I wonder how long he could make his peaches last for...
Here are his rules:

- Each fraction must be in its simplest form and must be less than 1.
- The denominator can never be the same as the number of peaches left.
  For example, if there were 45 peaches left, he could not choose to keep $\frac{44}{45}$ of them.

Can you start with fewer than 100 peaches and choose fractions so that there is at least one peach left after a week?

Starting with fewer than 100, what is the longest you can make the peaches last?