

Can I explain how I use approximation to help estimate the answer to a calculation?

Teaching guidance

Key vocabulary

approximation, approximate, round, nearest, estimate, estimation, inverse, calculator, display

Models, images and resources

Slidey box cards and missing number calculations

$$89.4 \times \blacksquare = 625.8$$

Use a strip of paper to create a slider to cover one of the numbers in a calculation on a card. Alternatively, write the calculation on an interactive whiteboard, hiding one of the numbers with a shape. Ask children to use rounding and approximation to estimate the hidden number.

Missing digits

$$\square 1.2 \times 1\square.9 = 778.68$$

Give children plenty of opportunity to use approximation and inverse operations to predict missing numbers or digits. Ensure that children explain how they came to their answer.

Make numbers spreadsheet

Select an 'A' number

7.55	6.17
6.28	2.45
1.34	1.84

Select an

+
-
x
÷

Select a 'B' number

0.71	7.38
4.38	1.65
6.95	4.08

New Numbers

A

6.17

x

B

4.38

=

Answer

27.0246

Click box to show or hide answer

Ask children to predict pairs of numbers from the grids whose product or quotient will lie within a given range. For example, predict pairs of numbers whose product will be between 20 and 30. The program allows you to test suggestions.

Teaching tips

- Make sure that children can round numbers to different degrees of accuracy, for example to the nearest thousand, hundred, ten, whole number, tenth and so on. The spreadsheet Rounding decimals can be used to practise some of these skills.
- Discuss with children how accurately you might choose to round the numbers in a calculation to get a reasonable estimate for the answer. This will vary depending on the calculation and context, for example:
 - *Apples weigh about 190 g each. How many apples would you expect to get in a 2 kg bag?* It is sensible to round 190 g to the nearest hundred grams.
 - To find an estimate for $44.81 \div 8.92$, it is sensible to round both numbers to the nearest whole number.
- Games provide a motivating way to rehearse approximation and help children to understand its value:
 - **Matching activities:** Provide children with a set of questions and a set of answers to match. Children will need to use the approximate size of numbers to establish the approximate size of the answer. They should work in pairs to discuss their reasoning. A matching activity is provided on the Consolidation and practice page.
 - **Call my calculation bluff:** Show children a calculation with three possible answers. Give them a short time to predict the appropriate answer using approximation. Children can make up their own examples to test each other.
 - **Hit the target:** Provide a set of numbers and some target answers. Children have to select pairs of numbers to use in a calculation. For each target answer they get one point. Setting a time restriction encourages children to use approximation to select appropriate numbers rather than to work randomly.
- Use paired discussion techniques so that children have to explain their reasoning to each other to agree sensible approximations.
- Expect children to use approximation to find an estimate before carrying out formal written calculations or using a calculator. This will help them to identify whether their answer is of a sensible size and to spot errors in keying in numbers.
- Plan in opportunities for children to use approximation and their understanding of inverse operations to find missing numbers and digits in calculations.