

Helping your child to solve problems in mathematics at home

A major goal of education is to help children learn in ways that enable them to use what they have learned to solve problems in new situations. By solving problems children get a much better feel for what mathematics is all about and what it can do.

What is problem solving?

Problem solving is cognitive processing directed at achieving a goal when no solution is obvious to the problem solver. Problem solving is related to other skills such as thinking, reasoning, decision making, critical thinking, and creative thinking.

According to Mayer and Wittrock (2006), pupils need to have four kinds of knowledge in order to be successful problem solvers:

Knowledge of facts, such as “there are 100 pennies in a pound”;

Knowledge of concepts, such as knowing what place value means in arithmetic;

Knowledge of procedures, such as how to carry out short division;

Knowledge of strategies, such as, how to break a problem into parts or how to find a related problem.

Problem solving strategies

- Guess (this includes ‘guess and check’ and ‘guess and improve’)
- Act it Out (this includes using equipment)
- Draw (this includes drawing pictures and diagrams)
- Make a List (this includes making a table)
- Think (this includes using skills you already know)

Children also need to develop skills such as: being systematic; keeping track by not repeating the examples; looking for patterns and working backwards at the same time.

How do I get my child to think, reason and explain?

The quality of questioning is crucial in helping pupils develop mathematical ideas and improve their thinking skills. Open questions provide a greater challenge to your child but will also allow them to answer it

at their own level. The following type of questions will help your child to think and explain about the process rather than just achieving the answer.



How can we get started on this problem?

What have you found out? How did you do that?

What patterns can you see? What reason might there be for these patterns?

Can you explain what is happening when?

What other examples can you find to explain how to find the area of a triangle?

What could we look at next?

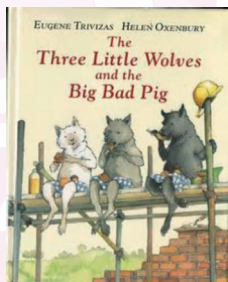
If you were doing this investigation again **what would you do?**

Activities and ideas to help your child with problem solving at home

Sporting events, daily life, stories or favourite films allow opportunities for problem solving using knowledge of measure including money, area, perimeter, distance, speed and time. Where possible it is always best to deliver problem solving through your child's interest, rather than through dry uninspiring problems out of a text book.

Problem solving in Stories

When reading with your child look for opportunities to practise problem solving



The following activities link to the book: The Three Little Wolves and the Big Bad Pig by Eugene Trivizas and Helen Oxenbury.

Page 2: Red bricks are worth 5p and weigh 5g. Yellow bricks are worth 8p and weigh 8g. Kangaroo has a wheel barrow of bricks worth 80p or weighs 80g. How many red and yellow bricks could he have in his wheelbarrow?

Page 4: Croquet: Finding all the possibilities: There are four different coloured balls. In which order will they come through the final hoop? How many different combinations can you find? Explain your strategy to ensure that you have found all the different ways.

Page 8: Sledgehammer: The Big Bad Pig smashes the little wolves' house and damages the roof. To retille the roof how many tiles will the wolves need? Which part of the picture could help you to start? How could you use this to estimate/calculate one side of the roof? What about the other side of the roof?

Page 10: To make four buckets of concrete the wolves follow the following recipe:

- 1 bucket of cement
- 1 bucket of sand
- 2 buckets of water



Write the recipe for 12 buckets of concrete. If the wolves had 40 Buckets of concrete how many buckets of water would be needed?

Daily life opportunities In the kitchen

A bag of potatoes weigh 600g. What would the weight of half a bag be?

Cut three sandwiches into quarters. How many quarters do you know have? If I had 24 quarters, how many whole sandwiches could I make?

In a packet of Maltesers there are 20 Maltesers. If Dad eats a quarter of them and your brother eats six of them, how many are left for you?

In the bedroom

How many different quadrilaterals can you spot around your bedroom?

Clubs and hobbies

11 people play in a football team. How many players will there be on the pitch at one time?

A football game lasts for 90 minutes. The next programme lasts for twice as long. How many minutes does this one last for?

In a game of rugby a try is five points and a conversion is two points. If a team has 26 points at the end of the game, how many tries and conversions could they have scored?

Archery

Games: Card and board games, such as Pontoon and Cribbage



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