



Evidence-based resources for home-supported learning

Problem-solving in mathematics

Encouraging problem-solving in mathematics can enable students to make sense of unfamiliar situations and tackle them intelligently.

Approach summary

A problem-solving strategy is a general approach to solving a problem. During the period of home-supported learning, providing prompts and scaffolds could help students tackle challenges independently to improve engagement and outcomes.

Evidence around problem-solving skills suggests effective teaching strategies may include:

- Selecting genuine problem-solving tasks that extend students beyond practicing a procedure;
- Organising problems that have similar structures and different contexts, or vice versa;
- Explicitly teaching students to compare different approaches, such as by looking for similarities and differences;
- Leading students to draw on their prior knowledge;
- Using visual representations;
- Using worked examples;
- Designing learning that will support students to monitor, reflect on and communicate their reasoning.

The use of visual representations as a tool for solving problems is one of the most effective approaches from the list above.

Tips

- Draw on the [plan, monitor and evaluate cycle](#) to design learning to build metacognition, such as by modelling questions: *'What is this problem asking?'* *'Where have I seen a problem like this before?'*
- Create tasks that challenge students to try a number of strategies.
- Mix up how you organise problems ensuring that students aren't just repeating the same strategy again and again.
- Help students understand the difference between a problem-solving strategy and an algorithm.
- Provide worked examples that contain problems to prompt discussion about misconceptions in mathematics.

What should I consider?

- How am I ensuring students have the strategies and prior knowledge to have success in problem-solving tasks?
- Does the task that I've created allow students to draw on a range of problem-solving strategies, or is there one strategy that I am wanting students to select?
- How can I support the use of worked examples and visual representations virtually or offline?
- Are there opportunities for my students to communicate their thinking verbally and in writing – both to me and their peers?
- Are there any tips on supporting student problem-solving that I can give to parents?

This resource has been developed from our Guidance Report [Improving mathematics in upper primary and lower secondary](#).