Year 6 PROBLEM SOLVING

GENERAL INFORMATION

Background
According to the Australian Curriculum by the end of Year 6 students should be able to select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers. This is a skill that requires a great deal of practice and should be taught throughout the year, rather than as a designated unit. The following suggestions include a list of popular strategies for problem solving and some age-appropriate problems for students to work on.

Australian Curriculum Link(s):
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

Year Level(s): 6

Details:
- applying strategies already developed for solving problems involving small numbers to those involving large numbers
- applying a range of strategies to solve realistic problems and commenting on the efficiency of different strategies

Context and reason
Read about the importance of a growth mindset when doing maths and find some great information on https://www.youcubed.org/
The AMSI outreach team have some information about problem solving and how to implement it on the Calculate site: https://calculate.org.au/2016/04/13/problem-with-problem-solving/

It is important to give students the opportunity to investigate problems to provide the struggle and the context for the learning.
Introduce open-ended questions into all planning.
- What do you know about this problem?
- What do you feel less confident with?
- Have you done anything like this before?
- What strategies could you use?
- What would you do if you knew what to do?

Read the information on the NZMaths website. It gives a great summary of what problem solving actually is (hint: it's not just finding the answer!) and gives a list of strategies and age-appropriate problems.
https://nzmaths.co.nz/problem-solving-information

Strategies
Check the accompanying PDF, 'Problem solving strategies with examples.' It gives a comprehensive list of problem-solving strategies and includes relevant problems that can be best solved using the described strategy. This can be a great way to introduce an unfamiliar strategy. Later, random problems can be used and the question above, "Have you done anything like this before?" will lead to retrieval of the strategy.

POSSIBLE ACTIVITIES
There is no need to reinvent the wheel. The activities and problems are available on the websites below. Just make sure you allow students the opportunity to struggle, make mistakes and talk about their problem solving.

CHOOSEMATHS

Warming up

Number talks are always a great warmup for any maths class, but especially for one involving problem solving. It shows students that there are always multiple ways to solve a problem and allows them to make and celebrate mistakes.
https://calculate.org.au/2018/09/14/building-number-sense-through-number-talks/
https://calculate.org.au/2015/08/10/number-talks-developing-understanding-fluency-number/

Sources of Problems

A measurement and estimation problem: https://calculate.org.au/2016/07/13/long-piece-string-open-ended-problem-solving-mathematics-classroom/

An inquiry lesson around ribbons and bows: https://calculate.org.au/2018/12/12/inquiry-prompt-ribbon-year-3-6/

Jo Boaler's weeks of inspirational maths are great sources of problems for all ages.
https://www.youcubed.org/week-inspirational-math/

NRich is a great go-to for problem solving. https://nrich.maths.org/10334

Illuminations has interactives as well as problems. Go to the home page and type 'problem solving' into the search bar. https://illuminations.nctm.org/Default.aspx

ReSolve is an Australian site that seeks to teach Maths by inquiry https://www.resolve.edu.au/

FURTHER INFORMATION

Australian Curriculum and Assessment Reporting Authority. (2014). *Foundation to Year 10 curriculum: Mathematics*. Retrieved https://www.australiancurriculum.edu.au/f-10-curriculum/mathematics/

NSW Government Education Standards Authority. (2018). *Mathematics K-10: Rationale.* Retrieved from https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/mathematics-k-10/rationale

CHOOSEMATHS