Problem Solving at Key Stage 4/5

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Aims of the session

- Reflect on our own problem solving process
- Explore ways of helping our students to become better problem solvers
- Learn how to find resources on NRICH and Underground Maths

Try some problems

Choose one or two problems from the Short Problems worksheets.

As you work on the problem, jot down any general problem-solving strategies you use.

What do you do when you get stuck?

How to Solve It

How to Solve It (1945) is a small volume by mathematician George Pólya, suggesting the following steps when solving a mathematical problem:

First, you have to *understand the problem*

After understanding, then *make a plan*

Carry out the plan

Look back on your work.

Understanding the problem

Restate the problem in your own words

What area of mathematics is this?

What exactly am I being asked to do?

What do I know? What do I need to find out? What am I uncertain about?

Devising a plan

Work out the first few steps before leaping in!

Have I seen something like it before?

Is there a diagram I could draw to help?

Is there another way of representing?

Carrying out the plan

I’m STUCK! How do I get UNSTUCK?

Reread the problem

Work backwards

Identify subgoals

Simpler problem, special cases

More general case

Guess and check

Looking back

Have I answered the question?

Does it make sense?

Have I fully solved the problem?

Is my solution consistent?

What have I learned?

Would I solve the problem the same way next time?

Developing Problem Solving Skills

Use scaffolding e.g. Proof Sorters

Use “Multiple solution problems” so students can analyse different approaches

Share ideas/strategies for “being stuck”

Praise the problem solving methods (rather than the final answer)

Proof Sorters

Iff

Kite in a Square

Underground Maths

Multiple Solutions

Marbles in a Box

Steel Cables

What's it Worth?

(and Kite in a Square again)

Secondary Curriculum Pages

Mapping Document

Working Mathematically

Developing Mathematical Habits of Mind

Live problems!

Stay in touch!

Register for our newsletter:

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