

Every lesson a problem-solving lesson

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Problem-solving Process

1. Getting started

try a simpler case

draw a diagram

represent with model

act it out

2. Working on the problem

visualise

work backwards

reason logically

conjecture

work systematically

look for a pattern

trial and improvement

3. Digging Deeper

generalise

verify

prove

4. Concluding

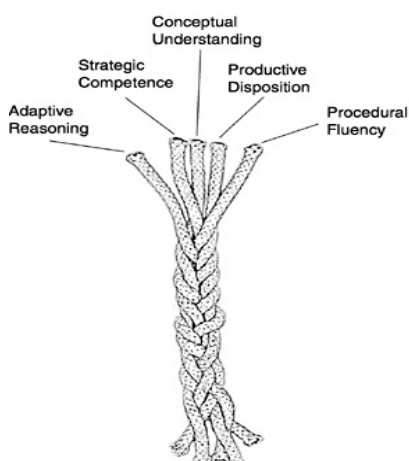
communicate findings

evaluate



Five strands of mathematical proficiency National Research Council (2001)

Adding it up: Helping children learn mathematics



Adaptive reasoning:

capacity for logical thought, reflection, explanation, and justification

Strategic competence:

ability to formulate, represent, and solve mathematical problems

Conceptual understanding:

comprehension of mathematical concepts, operations, and relations

Productive disposition:

habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy.

Procedural fluency:

skill in carrying out procedures flexibly, accurately, efficiently, and appropriately

Key messages

WHAT is the key to all children becoming competent and confident as problem solvers?

WHEN does problem solving happen in the classroom?

HOW do we support all children to become fluent problem solvers?

Resources

1. Flip flaps: dotty dinosaurs
<https://global.oup.com/education/content/primary/series/beam>
 2. NNS Shape and space visualisation
http://www.suffolklearning.co.uk/cms/u_search3.asp
 3. Problem solving skills: tasks listed under the skills
www.nrich.maths.org/12634
 4. Visual proof (towards the end of the article: six-tenttotal)
<http://nrich.maths.org/11489>
 5. Mastering Mathematics: the challenge of generalising and proof
www.nrich.maths.org/11488
 6. BEAM Maths of the Month (scroll to the bottom of resources page)
<https://global.oup.com/education/content/primary/series/beam/?region=uk>
 7. Strategy games from around the world
<http://nrich.maths.org/8261>
 8. Mathematical Problem Solving in the Early Years: Developing Opportunities, Strategies and Confidence <http://nrich.maths.org/12166>
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