The Vision: Building Problem-Solvers

As a child perseveres through a challenge, experiments and thinks flexibly, they experience the thrill of being a mathematical problem-solver. This document outlines how we can give children these rich mathematical experiences.

Developing Reasoning Routines

With well established daily **reasoning routines** – explaining common errors, ranking questions by difficulty or finding different possible answers – children become accustomed to thinking divergently and working independently in maths lessons. These routines must be consistent, progressive between classes and allow for creativity.

We must also familiarise children with the **emotional experience** of being a mathematician: it can involve some confusion, frustration or maybe even embarrassment. However, it can also bring surprise, excitement and pride. That is the challenge and beauty of being a mathematician!

Building Problem-Solvers: Deconstructing Word Questions

By covering parts of a word question, and then **slowly revealing information,** we focus thinking on the key ideas in a question before an answer can be calculated. Children predict what the missing information could be, thinking about different possibilities.

Modelling with equipment/images shows the structure of questions. This must be an active process: for example, choosing which of two pictures correctly represents the question, or finishing a part-complete bar model.

By occasionally including **redundant information** in questions, children must be thoughtful in choosing the correct information to answer the question.

Make connections between questions. 'Minimally different' questions highlight the significance of small changes in wording between questions. Pairing questions with the same structure but different surface features helps children to make connections between seemingly unrelated questions.

Non-routine challenges allow scope for creativity within answering word questions.

Building Problem-Solvers: Sequences of Challenges

First, consider how we can **remove barriers** for children. We could practice the **domain-specific knowledge** that will be needed or introduce the **form of the task** before the main task is presented. We can **adjust the challenge of the calculation.**

This preparation enables children to persevere in the task. **Draw out the reasoning** by comparing different approaches, with visual representations or by focusing thinking on specific parts of the task.

Task development can involve introducing related challenges to deepen understanding. Changing one feature of the task can highlight key ideas. Exploring the same question type in a different context helps children to make connections between problem-solving tasks.

For detailed video exemplification: www.iseemaths.com/problemsolvers