



Very young children are natural problem solvers. They learn to walk and talk by having a desire to attain their goal, by mimicking others, by trying things out, by making lots of mistakes and adjusting strategies accordingly, and by gradually gaining in confidence. The NRICH Early Years resources aim to further develop children's natural problem-solving abilities in the context of mathematics.

In her article, [Developing Excellence in Problem Solving with Young Learners](#), Jennie Pennant suggests that there are three main ways in which we can support primary-aged children in becoming confident and competent problem solvers:

- Through our choice of task
- Through structuring the stages of the problem-solving process
- Through explicitly and repeatedly providing children with opportunities to develop key problem-solving skills.

In an Early Years (EY) setting, I would suggest that the first and third of these are particularly important.

### **Choice of 'task': think resources and skilful questioning**

I have deliberately used inverted commas as it is not so much a task but a rich context that is crucial in the EY setting. All the [EY activities on the NRICH site](#) start from something that children might enjoy doing as they play and explore. Furthermore, we assume that whatever this initial starting point, it has been at the child's (or children's) own instigation, prompted only by the resources that they are able to interact with in the setting. Therefore, a rich context could be thought of as a carefully-chosen, inviting set of resources that offer lots of freedom to play, explore, question and try out ideas. The resources themselves may not be regarded as inherently mathematical.



For example, many EY settings have pots or trays or boxes containing a variety of resources such as beads, buttons, counters, fir cones, leaves, marbles, stones, interlocking cubes, coins, clothes pegs, small world toys ... the list is endless and of course children themselves will make their own collections. Children will be drawn to these items for all sorts of different reasons. They might use the items as part of a game or as a prop in a role play situation (where the items might represent something else). Alternatively, children may be attracted to the items as something to play with in their own right. Other children may enjoy tidying up items like these, whether after their own play or someone else's.

### **Choice of approach: think follow, support, question, stimulate thinking**

We have seen above that it is the availability of a range of practical resources and their positioning in the setting that is the first step to creating a rich context for the children to develop their problem-solving skills. The next step is the ability of the adults in the setting



to recognise the mathematical potential in play activities and draw this out through skilful questioning. It is central to this approach that the adult follows and stimulates the child's thinking. The adult needs to resist any temptation to 'lead', 'tell' or 'impose ideas' on what the child is doing. Their challenge is to seek to understand what the child is doing and thinking, and support them to develop their ideas further. Throughout this process the adult is seeking to develop the children's key problem-solving skills in a context of the child's choosing.

## The NRICH EY activities

These activities have been carefully structured to support adults in understanding how to help children to develop key problem-solving skills. They outline what children might be doing in a rich context and suggest what an adult may say and/or do initially to provoke mathematical activity. Each of the EY activities follows the same structure so that they are easy to use.

Let's take the collections context mentioned above. (Several NRICH EY activities are relevant here, for example [Packing](#), [Collecting](#), [Tidying](#) and [Baskets](#).)

Here children might well be seen sorting, comparing, arranging, matching, using trial and improvement or working in a systematic or ordered way. These processes are the skills which help them to solve the problem that they themselves have posed, or been encouraged to explore by an adult. The EY activity sheet then offers further questions and prompts for practitioners to help them develop children's mathematical thinking. These prompts are always grouped into four categories:

- Describing - these prompts encourage children to talk about their mathematics, which helps organise their thoughts and helps familiarise them with mathematical language
- Recording - these prompts encourage children to think about how they could keep a record of what they have done, whether to help them explore the mathematics in that moment or to refer back to at another time themselves or to communicate to someone else what they have done
- Reasoning - these prompts encourage children to connect ideas together, perhaps making logical arguments and to go beyond describing what they have done to explaining why
- Opening out - these prompts encourage children to explore the context further and possibly more deeply.

The prompts are also designed to help us probe children's understanding of mathematical concepts and ideas such as counting, sharing and knowledge of spatial properties. In [this pdf](#), Jenni Back outlines the reasons for our activity format in more detail.



## **In conclusion**

The NRICH Early Years resources aim to support practitioners to further develop children's natural problem solving abilities in the context of mathematics. They all follow the same format and offer ideas based around engaging starting points or contexts. In providing this support the intention is that practitioners will get better at noticing children's natural mathematical problem-solving abilities in the EY setting, recognise the mathematical problem solving potential in situations and become more confident at asking mathematically probing questions.