Group-worthy Tasks and Their Potential to Support Children to Develop Independent Problem-solving Skills

By Jennie Pennant

Are you looking for tasks for the classroom that will support all children to develop their problem-solving abilities? Are you keen that children become confident to explore their ideas for solving a problem independent of you, the teacher? Are you aiming to develop a classroom where there is less teacher talk and more student talk? If so, then this feature on group-worthy tasks may well be of interest to you.

What are group-worthy tasks? Almost all NRICH tasks could be tackled by a group of learners, as opposed to an individual or a pair. However, some tasks work particularly well in a group, hence the name ‘worthy of a group’ or group-worthy.

Such tasks may be designed to foster children’s group–working skills, that in turn support the development of their problem-solving abilities. For example, if I know how to listen to others and ask questions that help me understand their thinking, then that may help me to develop my own thinking. This could be helpful as I might be stuck and not sure how to start a problem or I may have tried a number of strategies to solve the problem, none of which have worked. Sorting the Numbers is a good example of a group-worthy task, where children are encouraged to share their ideas for solving the two jigsaw puzzles to help them find the solution.

At our NRICH Primary Mathematics Leaders day in March 2013 we explored the potential of group-worthy tasks by trying one out together: Dice in a Corner. Teachers worked in groups of five, with four of them focussing on the task and the fifth observing the group. After thirty minutes, the group stopped work on the problem. All the observers went off to another room to pool their findings and create the combined feedback. This was to support the anonymity of each group in the final feedback and enable observers to be open when sharing what they had noticed.

The feedback from the observers revealed that working as a group on this task had supported colleagues to develop their ideas: they were able to bounce ideas around, see what others thought of their ideas, build on the ideas of others and see new ideas emerge. Colleagues found that the group working helped them to extend themselves. The need to verbalise thinking to convince others of an idea was found to be important, as it helped to clarify that thinking. They noticed that they were using mathematical language, including words like ‘conjecture’. They felt that they were able to capitalise on different brains working in different ways, to help develop their individual thinking and group ideas. Colleagues commented that in the classroom such group work would give an opportunity for children to hear language modelled, both sentence structure and mathematical vocabulary. It would also help children to become confident at explaining their thinking and communicating their findings: two important aspects of mathematics.

Each observer noticed that colleagues were predominantly using two problem-solving skills in the Dice in a Corner task: looking for patterns and trial and improvement. Colleagues were keen to see if there was a pattern to the solutions for two and three dice so that they could predict the solutions for more dice. When using trial and improvement, colleagues were having a go at making a tower of dice, finding the total and looking to see how they could change part of the tower to adjust the total to 18. They didn’t just have another random go at building a new tower! Colleagues commented on how the group work could help children develop an understanding of what it meant to look for patterns

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and work systematically when using a trial and improvement approach.

Trying Dice in a Corner as a group with an observer enabled us all to see the richness such a task could offer to children. We could see that it could help them:
• learn how to tackle a problem
• develop their problem-solving skills, such as trial and improvement
• learn how to persevere, including using a 'dead end' to foster a new way of working or a new possible solution to trial
• learn how to communicate their reasoning
• extend themselves, possibly achieving more as a group than they could individually.

As adults, we were able to work as a group, take turns, listen, question and build on other colleagues' ideas. However, with children these group-working skills need to be taught and fostered over time. In this feature we have chosen problems from our collection that will help you develop these skills with children. Naturally, each problem is built around mathematical knowledge.

As you see in the Teachers' resources for Sorting the Numbers your reflection with the children at the end of the task, will depend on whether your focus has been on the development of group-working skills or the mathematical content of the task. If it has been the former then you may find this list of skills that support group work helpful. We are encouraging this reflection on group-working skills in the way that we are inviting solutions for the problems featured in this collection. Liz explores these group-working skills and the idea of submitted solutions further in her article Group-working Skills.

CPD Opportunity

Focus: embedding group work in mathematics to support the development of children's problem-solving abilities.

Try out the Dice in a Corner activity, as described above, at a staff meeting to discover for yourselves the value of group-worthy tasks.

Have a go at one or two of the tasks selected for this feature and look at how they support the development of particular group-working skills featured in this list.

Think together about how you could use the list to help you choose the focus of a lesson when using one of the tasks. What would be an appropriate mathematical focus and an appropriate group work focus? Which will you focus on most when you reflect with the children on their learning at the end of the task? Discuss how you could use the list of group-work skills to assess the development of children's group-working skills over a period of time.

Agree what you are each going to try out from the meeting in the classroom. Decide on a time scale, such as a fortnight, when you can all meet again to discuss what happened, share progress and look at the next steps in embedding group work in your school.