



Here at NRICH, as we continue to develop primary problem solving, our attention has been drawn to considering the place and value of meaningful recording. In doing this, we are proposing three different contexts in which recording might take place and we would be interested to know whether they ring true for you and the learners with whom you work:

1. *Recording in the moment* - While working on a problem, I might jot down anything that helps me come to a solution. These jottings are purely for me and are done 'in the moment'. They are not intended for anyone else to read, therefore may not make sense to anyone else. They may not be particularly neat as they could include hastily scribbled ideas and crossings out. This would include what Carruthers and Worthington refer to as young [children's mathematical graphics](#).
2. *Recording as thinking* - I may consciously structure my recording so that it becomes part of the thinking process. Perhaps the way I record what I am finding out helps to reveal some underlying pattern or structure, or leads to a further question to explore. In other words, the way I organise my findings becomes a problem-solving tool in itself.
3. *Recording for another person/time* - I may wish to remember how I approached a task, perhaps because I know I want to be able to come back to it at a later date, or I may be asked to record my path to a solution for someone else to read without me being present. In these instances, my recording may well include elements of the jottings described above, but in addition there will be some further annotation describing decisions I made along the way to a solution. Part of this type of recording may well take place once the problem has been solved so that it becomes a presentation of my findings, with comments about my choice of method and any wrong turns I took.

### *So what are the implications for the classroom?*

Recording is therefore a form of communication, meaning that it has an audience (even if that is ourselves). Sometimes the audience is obvious from the beginning, sometimes we might need to re-record our work for a different audience. It's important that children know why they are being asked to record and that different expectations are attached to each type of communication. Do we always make it clear to learners what the purpose of their recording might be and who it is for? And do we value all types of recording and mathematical graphics? It can be tempting to place too much emphasis on recording that looks neat and is easily comprehensible. However, jottings which children make while they work on a problem support their mathematical thinking, so surely should be commonplace in their 'maths books'? It can also be tempting to expect children to record in the way we would if working on that particular task. Instead, try to discuss a range of recording strategies, for example by asking "How else might we record this?"

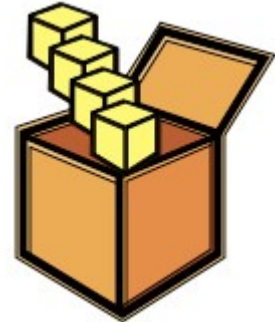
### *How can NRICH help?*

In this [Recording feature](#), we've put together a range of activities to help you grapple with recording. As usual, the problems fall into two categories – those that are live and those that already have pupils' solutions. By their very nature, NRICH tasks are non-routine so that there is not an obvious way to go about solving them. This immediately offers learners the freedom to record in whatever way they like. We feel that all the primary problems this month particularly lend themselves to creative recording. They give you the chance to try to keep an open mind and value all recording, no matter how baffling it might be to you personally. Make it clear to the children that it really is up to them how they go about tackling the task.



## Live problems

At the lower primary level, the live problems [The Amazing Splitting Plant](#), [What was in the Box?](#) and [School Fair Necklaces](#) offer contexts for young children to explore which give them the freedom to record in many different ways. We would love to receive solutions that capture this variety. It might be that some recordings fall into category 1 above, so, if appropriate, do encourage your learners to send us some commentary about their chosen recording method. Similarly, at upper primary, [What's in the Box?](#), [Money Bags](#) and the challenging activity [Dice in a Corner](#) have been selected for the same reasons.

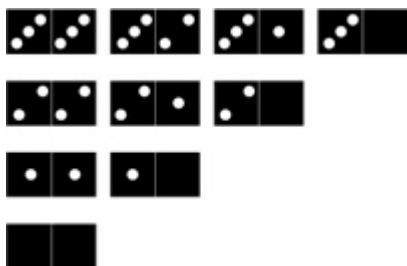


## Problems with published solutions

The three tasks in this feature for which we have already published children's solutions are [6 Beads](#), [Eggs in Baskets](#) and [Domino Square](#). We suggest you take a look at the solutions to these before introducing them to your learners so that you get a flavour for possible recording for different reasons and for different audiences. Of course, all solutions on NRICH fall into category 3 above as they will be read remotely, without it being possible to have a conversation with the problem solver. However, we can gain some insight into recording in the sense of jottings as well.

The first two solutions for [Eggs in Baskets](#) report back on the way the problem was approached so we don't actually see any of the 'in the moment' recording itself. However, we can imagine the coloured baskets which Phoebe, Alice and Luke drew and the way they moved the counters between the baskets. This concrete representation of the baskets and eggs contrasts with the more sophisticated and abstract algebraic representation that Jes uses.

The solutions to [6 Beads](#) also show a progression from concrete to more abstract. None of the children used an abacus to solve the problem but all represented the abacus in some way. Sam's recording consisted of drawings of an abacus, whereas Nicholas and Emily represented the abacus with objects. Nicholas notes that he also used jottings on paper. The solution from Ysgol Aberdyfi is interesting as, on its own, it illustrates a progression from use of concrete apparatus for recording workings (the counters), to representing this apparatus (the dots), to using just digits with additional annotation showing relationships between solutions.



In contrast, most of the solutions to [Domino Square](#) are recordings of a final answer, rather than of the journey to the solution. Here, though, we see different ways of recording the dominoes – drawing them literally (using dots), replacing the dots with digits or taking a photo of the dominoes themselves.

Look out for examples of this progression from concrete to abstract in your children's solutions. In addition, it might be that once your pupils have tackled one of these three tasks, you share the solutions on NRICH with them. You could



# Primary Children's Mathematical Recording

By The Primary Team

instigate a discussion about the different ways of recording and even ask children to reflect on the advantages and disadvantages of each. You may also like to look at these further examples of activities which offer rich opportunities to record in different ways: [lower primary](#) and [upper primary](#).

To explore these ideas further, the following articles may be of interest too:

[Children's Mathematical Writing](#)

[Pupils' Recording or Pupils Recording](#)

[Children's Mathematical Graphics: Understanding the Key Concept](#)