

4 Meeting the needs of all pupils – some comments to consider

Differentiate by quantity?

When pupils appear successful, you provide them with a new problem to do.

This approach is common, but it leads to pupils viewing the curriculum as a list of problems to do, rather than processes to acquire. This approach will not promote reflection on alternative methods for doing a problem - different ways of representing, analysing, interpreting and communicating.

Differentiate by task?

You try to give each pupil a problem that is matched to their capabilities.

But how does one know if a problem is suitable? We can only match a problem to a pupil if we have a profound understanding of both. Our view of the problem is usually based on our own way of doing it – and there may be many other approaches. We also have an imperfect and often prejudiced view of pupils' capabilities. We so easily judge pupils' 'mathematical ability' by their ability to carry out routine procedures they have recently been taught. Problem solving requires a different set of skills and may result in different pupils performing well. This approach also creates management difficulties as different problems are used with different pupils. This reduces possibilities for whole class discussions and sharing knowledge.

Differentiate by outcome?

You use more open problems that encourage a variety of possible approaches and outcomes.

This approach requires problems and situations that allow for such a variety to emerge. The Bowland problems are like this, but they do make considerable demands on pupils who are unfamiliar to problem solving. Many teachers comment that as soon as pupils begin to struggle, they want to 'leap in', 'take over' and structure the problem, so that pupils have clear steps to follow. This tendency undermines the very purpose of the lesson – to develop pupils' ability to use Key Processes in an autonomous way. On the other hand, too little guidance may result in prolonged failure and frustration. Some teachers therefore make it a rule that pupils should always help and share ideas with each other, before asking for help from the teacher.

Differentiate by level of support?

You give all pupils the same problem, but then offer different levels of support, depending on the needs that become apparent.

This approach avoids many of the difficulties described above. The support may be by other pupils, or by the teacher - orally, or in written form. In the lessons we have suggested, the teacher asks the pupils to attempt what they can unaided, then they are offered the support of their peers as ideas and approaches are shared and discussed. If further support is needed, then the teacher may supply this through questions that cause pupils to attend to particular features of the problem, or through more specific hints. Timing such help is critical. One of the important goals of problem solving is to allow pupils the experience of *struggling* with a problem for some time and experiencing the sense of achievement that arrives when the problem has been overcome. If we help pupils too quickly, we rob them of this experience.