



TI-AIE

## Teacher's questioning: forces

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## What this unit is about

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Many teachers ask a lot of questions during their lessons in school. But how many of these contribute significantly to students' thinking? In fact, teachers often spend more than half their time in class asking questions. Many questions only require one-word answers and students are given very little time to answer, so many are not enthusiastic about being involved in the lesson.

However, there is a variety of ways that questions could be used and formed more effectively in the classroom to stimulate students' thinking and participation. This unit focuses on identifying the most productive types of questions that teachers can use to promote students' thinking and extend their learning. It also gives you the opportunity to try some of these techniques and skills in your own lessons. Through activities investigating forces and their properties, you will discover how questions can help students to build a deeper understanding. The skills of questioning can also be transferred across all science topics and across other subjects to enhance learning.

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## What you can learn in this unit

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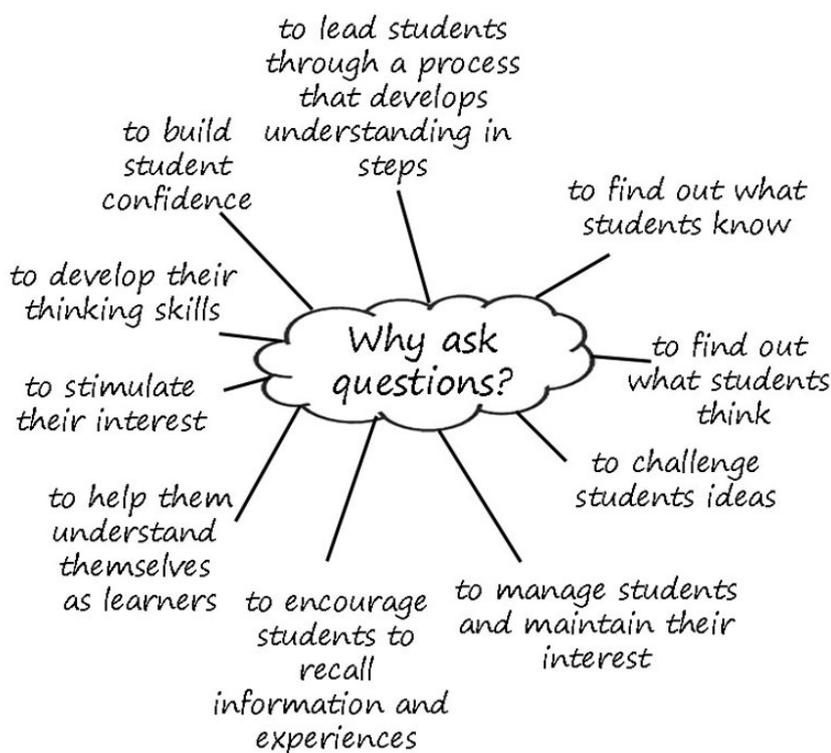
- The different types of questions you can use to stimulate students' thinking and learning.
- New ways and skills in using more open questioning techniques in practical science lessons to extend students' understanding.

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## Why this approach is important

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As a teacher, being able to ask pertinent and challenging questions is an important skill to learn, because it stimulates students' thinking and their responses provide you with a range of useful information and insights into their knowledge and current ideas. Figure 1 highlights the key advantages of asking purposeful questions.



**Figure 1** Key advantages of asking purposeful questions.

Asking good questions in a planned and purposeful way will make a significant difference to the students' achievement. Questions can be used to give students feedback about their ideas, their understanding and their progress. Most students welcome such information, especially if it is given in a positive and constructive way. It helps them to measure their progress and gives them confidence.

The important thing to do when planning a lesson is to be clear about the kind of questions that you could use to help you achieve the intended learning outcomes. Developing students' scientific understanding about forces and how they affect the movement of objects in different ways is not an easy task.

## 1 Questioning and thinking

One of the important factors in helping the students link theory and their own experience together and so develop a deeper understanding about forces is to ask questions that they can investigate and hopefully solve. To do this, you need to be able use your questioning skills in creative and dynamic ways so that students are encouraged to think.

### Case Study 1: Two teachers and forces

*Mrs Nair is questioning her class about what she is doing. Here, she describes what she did.*

At the start of my lesson I asked the students to watch me push a book across my desk and asked the class, 'What am I doing?' One of the class replied, 'Pushing the book.'

'Good,' I say, 'and that is what a force is. Say after me, "A force is a push."' The class said what I asked, and I asked them to say it again. I asked again what a force was, and they repeated it over and over until I thought they knew it.

Next, I pulled the book across my desk towards myself and ask the pupils, 'What am I doing?' They replied that I was pulling the book and I said that that was correct. I next asked them to repeat, 'A pull is a force.' I tell them to repeat the statement several times before we return to the textbook and the next section.

*Mrs Sharma is working with her class on forces. She explains how she started her lesson and then continued it.*

First I asked my class, in their groups, to list as many things as they could think of that move. As they wrote, I went round and gave each group a set of objects – a mixture of all kinds of things, from a stone to a picture of a rickshaw bike [Figure 2] taken from the newspaper. The collection included small and large, heavy and light objects.



**Figure 2** A rickshaw: an example of an object that moves.

I then asked them the question, 'How can you make these objects move?' I gave them several minutes to discuss and try out some of their ideas before asking each group to list their responses on a sheet of paper for all to see. They displayed these on the wall and together the students and I picked out the common ideas and words or terms they had used, such as 'push', 'pull', 'lift', 'drop', 'strong', 'weak', 'gentle', 'friction', 'heavy', 'light' and 'movement'. Next I asked them, 'Can you write a sentence or two to describe what you think causes things to move?'

