

How to Use Science Probes

Research has established that it is important to identify students' misconceptions about natural phenomena and scientific concepts and use the information about students' thinking to design instruction that will facilitate their learning in science. Using the Science Probes in this book will help you achieve this result.

Science Probes are valuable assessment tools before and throughout instruction. Probes are designed to identify common misconceptions, as well as enhance metacognition for students by making them more aware of their existing ideas. Probes can be used before teaching a chapter to make you aware of concepts that may be stumbling blocks for students and to initiate student thinking and discussion about the concepts they will study. Probes also can be used to monitor student learning throughout the course of instruction to determine if students have corrected their understandings of natural phenomena and scientific concepts, and to assess their increasing grasp of the topics. But remember—in order for Science Probes to be considered formative assessments, it is not enough to merely find out what students are thinking. You must use the students' responses to inform instructional decisions.



Natural Resources



Four friends argued about natural resources and their impact on the environment. This is what they said:

Kate: It is better to use natural resources because they don't harm our environment like human-made resources.

Clint: It is better to use human-made resources because they don't harm our environment like natural resources.

Abby: It doesn't matter—both natural and human-made resources can harm the environment.

Troy: Neither human-made nor natural resources are harmful. They are both good for the environment.

Which friend do you agree with the most? _____ Explain why you agree

Teacher Notes

The best answer is Abby: It doesn't matter—both natural and human-made resources can harm the environment. Natural resources are Earth materials that exist naturally and that humans use, such as mineral, energy, and water resources. Human-made resources are manufactured resources used by humans, such as certain chemicals. Natural resources can be renewable, such as trees or solar energy. Natural resources also can be nonrenewable, such as fossil fuels. Both renewable and nonrenewable natural resources can have disadvantages. For example, coal is a non-renewable natural resource. Burning coal contributes to air pollution. However, some forms of biomass, which is a renewable resource, also can pollute the air. The big idea is that Earth's resources are both renewable and non-renewable and each has advantages and disadvantages in terms of the ways they can affect our environment.

A common misconception is that *natural* means good. If it is a natural resource, some students believe it does not harm the environment. Students' explanations will reveal various ways of thinking about natural resources and their advantages and disadvantages. Their answers and explanations will alert you to the need to make sure instruction builds a bridge between the students' initial ideas and the descriptions of renewable and nonrenewable natural resources in the chapter.