

Activity 1: What is energy

Learning intentions

This activity is to get students to think critically about the nature of energy by asking questions and by working in small groups, start to challenge their own and others' perceptions of what energy is. This is a pre- and post-exercise. Students should repeat the activity at the end of the units teachers select and use the post-activity as a form of reflection on how their perceptions and understanding of energy have changed.

Materials

- Whiteboard, butcher's paper – anything to write or draw on. Alternatively, an online shared document or share platform such as Miro or Mural.
- Crayons, marker pens, pencils, sticky notes

Teacher Notes

This activity will provide a baseline understanding of how students perceive energy. The other activities in this resource will help students begin to understand energy.

What is energy: Energy is the capacity of a physical system to do work or cause a change. There are lots of different forms of energy that we will examine in other sections of this unit. Energy is not something you can see, taste or smell, but we can measure its effect, that is, it is quantifiable. It is essentially a mathematical concept that, most importantly, helps us predict how stuff in the universe will behave, whether we are considering something the size of atoms or as large as the universe itself. This quantifiable form of energy is distinct from the energy claimed to exist in things such as healing crystals or 'The Force' used by the Jedi.

Remember energy is the capacity for something to do work or cause change in a system. A key part of this definition is the concept of work. See Activity 2 to explore this a bit further.

For example, work is apparent when you tell children to clean up their room and move their box of toys or sport gear from the floor. When they (eventually) push that box across the floor to under their bed, work has been done. Their muscles have done work by exerting a force (pushing) on a box to move it across the floor. The box has done work as

Teaching Notes: Running the activity

Method

There is a pre- and post-component of this activity.

Pre-

Students work in small groups and think about and discuss what they think energy is.

Use the whiteboard, butchers' paper or a share document for students to write down their ideas using words, descriptions or drawings/images.

Get students to write any questions they have on post-it notes or as comments and make them visible to the class. Compare each group's perceptions with the class.

Can the students explain the rationale for their theories? Get the students to communicate and present their thoughts with other groups. Compare and contrast each group's thoughts in a class discussion.

Post-

Compare these responses and themes to a similar exercise following completion of selected activities in this resource. This is part of student reflection and can help determine any learning that has occurred.



it moved across the floor. There is mechanical movement over a distance – muscles moved your arms a distance to push the box, and the box moved from the floor to under the bed. Energy was required to enable this movement (work) to happen.

But where does the energy come from? Your muscles get their energy from the food you eat; the box gets its energy from your muscles pushing on it. How much work something can do depends on how much energy it has. But the food itself is not the energy; it is just the source of energy. For the box, its source of energy is the force applied by your muscles.

See Activity 2.

Revisit student questions from the pre-activity and see if the students can answer their own questions as they progress through the selected parts of the unit. Get students to reflect on and discuss their answers and what they have learned as part of a class discussion.