

A2: CHANGING ENERGY

Overview

The aim of the following activities is to help the students to understand visually how the different forms of energy are interrelated. They are useful both as teacher-led as well as student-led activities.

As the activity proceeds, the teacher poses probing questions for the students – What if...?, What do you think might happen if...? – leading them to an understanding of the different energies involved and how they are interlinked.

A2 ACTIVITY 1: THROWING PEBBLES introduces **gravitational potential energy** and kinetic energy. **A2 ACTIVITY 2: THE OBEDIENT BOTTLE** looks at **elastic potential** and **kinetic energies**. In **A2 ACTIVITY 3: THE POWER OF THE WIND — MAKING YOUR OWN GENERATOR** students construct a wind generator and use it to light an LED. **A2 ACTIVITY 4: EXPLORING THE WIND TURBINE** examines an alternative for generating electricity using a renewable source. **A2 ACTIVITY 5: THE ENERGY OF BOUNCE** examines the energies involved when balls bounce. How **gravitational potential energy** and **kinetic energy** change as a pendulum oscillates is examined in **A2 ACTIVITY 6: THE ENERGY OF SWING**.

A2 ACTIVITY 7: HEATING AND COOLING examines the simulation [Energy Forms and Changes](#), which allows students to explore the energies involved in **heating and cooling** solids as well as examining some energy systems. **A2 ACTIVITY 8: THE ENERGY OF SKATING** examines another simulation [Energy Skate Park: Basics](#), in which the students explore the **conservation of energy** by observing the results of changing both the shape and surface of a skater's track.

Suggested approaches:

- Before using any of these activities, a brainstorming session should take place to gather ideas that students have about different forms of energy – What is **kinetic energy**? Why is it so called? What is the origin of the word **kinetic**? Sometimes knowing the etymology of unfamiliar scientific words can make the understanding of them easier for students.
- A discussion should be facilitated to gather ideas and questions that students have about different forms of energy. Some useful questions to pose before the activity session might be, for example: What is **kinetic energy**? What is **friction**? The aim of both the brainstorming session and the discussion should be to enable the students to draw up a bank of questions to which they could find the answers as they carry out the various activities.
- There are a number of ways to use these simulations. They can be conducted in small groups or with the whole class together. Students could direct you as to what to do, and so present you with opportunities to ask questions of the class as a whole. As well as the simulations, the [PhET website](#) provides resource material for teachers to adapt to suit their own class situations.