

Introductory Activities (Engage)

(5 minutes each)

As a class group explore and mind map:

- The students understanding of energy.

Create a mind map on whiteboard that is used throughout lesson.

Energy Words	
Kinetic Energy (energy of motion)	Potential Energy (stored energy)

Have a class vote:

- Does a marble have energy?

Lesson 1 (Explore)

(15 minutes)

Energy is described as the ability of matter or radiation (light) to do work. Energy can neither be created nor destroyed. It can only be changed from one form to another.

The forms of energy are:

- Heat energy. Example; the sun.
- Magnetic energy. Example; an MRI machine, a compass.
- Chemical energy. Example; petroleum, wood, batteries.
- Mechanical energy (*energy of motion*). Example; turbine in a hydropower station.
- Kinetic energy (*energy of motion*). Example; an aeroplane, water.
- Potential energy (*energy of position or stored energy*). Example; a coiled spring, water behind a dam.
- Electrical energy. Example; Lightning, electrical charges moving through a wire or electricity.

Electricity is not 'made' in a power station. A power station only converts or changes a form of stored energy or potential energy into electrical energy or electricity.

Exploratory Activity (15 mins)

Focusing on potential and kinetic energy, ask the students to stand up and stay still for ten seconds. Then ask the students to jump on the spot for a few seconds. Explain that while they were still, they were demonstrating potential energy but once they moved, they changed to kinetic energy. Ask the students to jump on the spot again but for much longer and then ask the students if they feel hot or warm. If so, they have transformed kinetic energy into thermal energy.

Use the tennis ball to reinforce that learning. Have the students describe to you what energy is being used when you hold the ball and then release it.

Explain that students are going to conduct an experiment in pairs to find out more about forms of energy (AS1 Does a marble have energy?). Remind them to add to the mind map as they learn.

Materials	Quantity
Tennis ball.	1
White board or Butchers Paper	1
Packet of whiteboard markers	1
AS1 Does a marble have energy?	1

Demonstrate the experiment without letting the marble roll. Ask the students to predict what they think will happen and share this with their partners.

Before students investigate, encourage them to plan, the following questions may assist:

1. What is it they want to find out?
2. What questions they would like to answer?
3. How will they work together?
4. How will they record their results?

Students will need to share the roles of conducting the experiment, taking notes and observing.

Options for assessment and extension

	Activity
SCIENCE Science & Understanding Individual Activity	To extend the student's knowledge of kinetic energy: Investigate the five types of kinetic energy - radiant, thermal, sound, electrical (light) and mechanical (motion) and provide descriptions and examples of each in a poster. Present findings to the class.
SCIENCE Science & Understanding Individual Activity	To extend the student's knowledge of potential energy: Investigate the four types of potential energy, chemical, nuclear, gravitational, or mechanical and provided descriptions and examples of each in the form of a poster. Present findings to the class.

Elaborate and Review

As a class group review:

What have you learnt?

Encourage students to revisit their original statements and mind maps and make additions and changes where necessary.

1. In what ways can energy be used to do work for us? (Stored and used).
 2. In what ways can energy transfers be controlled to do work for us?
 3. How do we know when energy is transformed?
 4. How have your ideas changed?
 5. What other questions come from your investigations?
-