Energy storage

Unit 2 · Energy, materials, systems and devices · matches the "Energy storage" lesson slides (about 60 minutes)

Teacher notes for someone teaching this lesson without a Design and Technology background, including a cover or supply teacher standing in for the usual class teacher.

IF YOU ONLY DO ONE THING (RUSHED COVER LESSON)

If you only do one thing: make sure every pupil can say what "Kinetic energy" means in their own words before the lesson ends. The energy of something moving. Ask two or three pupils to explain it back to you - do not just ask "does that make sense?".

Key facts in plain language

These are the facts this lesson depends on. They are written in plain English, not subject jargon, so you can say them in your own words while you teach.

Kinetic energy:
The energy of something moving.

Potential energy:
Stored energy due to position, such as water held high or a stretched spring.

Alkaline battery:
A single-use battery, cheap and widely available.

Rechargeable battery:
A battery that can be recharged many times, such as lithium-ion or NiMH.

Pumped storage:
Water pumped uphill when demand is low and released through turbines when demand is high.

Mechanical energy:
Energy stored or transferred by moving parts, such as a spring or flywheel.

Common misconceptions

Drawn from the wrong answers pupils pick in this lesson's own question bank, paired with the explanation that is already written for the right answer.

Pupils may think: "Compressing air in underground caverns" is correct.
Why it is wrong: the correct answer is "Pumping water up to a high reservoir". Water held high has potential energy that is released through turbines when it flows down.

Pupils may think: "It gives a higher voltage than an alkaline cell" is correct.
Why it is wrong: the correct answer is "It can be reused many times, reducing waste". One rechargeable battery replaces many single-use ones, reducing waste over its life.

Pupils may think: "Chemical (stored in a cell)" is correct.
Why it is wrong: the correct answer is "Mechanical (elastic potential)". Winding the spring stores elastic potential energy while it is still; it becomes kinetic energy as it unwinds and turns a generator.

Pupils may think: "Storing electricity increases the energy produced" is correct.
Why it is wrong: the correct answer is "Supply and demand do not always match". Storage lets energy generated at quiet times be used at peak times.

Pupils may think: "A smoke alarm" is correct.
Why it is wrong: the correct answer is "A mobile phone". Phones need light, high-capacity rechargeable cells; low-drain devices often use alkaline cells.

Talking points to follow the slide deck

The slide deck for this lesson follows the usual DT Classroom shape: a retrieval starter, then each key term below in turn, worked examples, exam-style practice, then an exit ticket. Use these lines as you reach each part - they are the same facts as above, just phrased as something you can say out loud.

When the deck reaches "Kinetic energy": say — The energy of something moving. Ask: "can someone give me an example?"

When the deck reaches "Potential energy": say — Stored energy due to position, such as water held high or a stretched spring. Ask: "can someone give me an example?"

When the deck reaches "Alkaline battery": say — A single-use battery, cheap and widely available. Ask: "can someone give me an example?"

When the deck reaches "Rechargeable battery": say — A battery that can be recharged many times, such as lithium-ion or NiMH. Ask: "can someone give me an example?"

When the deck reaches "Pumped storage": say — Water pumped uphill when demand is low and released through turbines when demand is high. Ask: "can someone give me an example?"

When the deck reaches "Mechanical energy": say — Energy stored or transferred by moving parts, such as a spring or flywheel. Ask: "can someone give me an example?"

Worked answers to this lesson's questions

The same question bank used for this lesson's knowledge organiser self-check and worksheet exam practice. Use this page as the answer key, or cover the right-hand explanation and hand out the questions as a silent task (see the cover lesson box below).

1. How does a pumped storage system store energy?

a) Compressing air in underground caverns, b) Charging very large lithium-ion batteries, c) Storing heat in underground rocks, d) Pumping water up to a high reservoir

Answer: d) Pumping water up to a high reservoir. Water held high has potential energy that is released through turbines when it flows down.

2. What is an advantage of a rechargeable battery over an alkaline one?

a) It gives a higher voltage than an alkaline cell, b) It holds its charge for longer on the shelf, c) It can be reused many times, reducing waste, d) It costs less to buy in the first place

Answer: c) It can be reused many times, reducing waste. One rechargeable battery replaces many single-use ones, reducing waste over its life.

3. A wind-up torch stores energy in a spring. What type of energy is this?

a) Mechanical (elastic potential), b) Chemical (stored in a cell), c) Kinetic (energy of movement), d) Electrical (static charge)

Answer: a) Mechanical (elastic potential). Winding the spring stores elastic potential energy while it is still; it becomes kinetic energy as it unwinds and turns a generator.

4. Why do energy companies need ways of storing energy?

a) Supply and demand do not always match, b) Storing electricity increases the energy produced, c) Storage lets the grid run with no power stations, d) Stored energy is cheaper to generate

Answer: a) Supply and demand do not always match. Storage lets energy generated at quiet times be used at peak times.

5. Which product is most likely to use a lithium-ion battery?

a) A mobile phone, b) A smoke alarm, c) A wall clock, d) A TV remote control

Answer: a) A mobile phone. Phones need light, high-capacity rechargeable cells; low-drain devices often use alkaline cells.

READY-TO-RUN COVER LESSON

Project the existing lesson slides as normal; read the key facts and talking points above before the lesson starts.

Low-prep silent task (needs no workshop tools or machinery): write or display the numbered questions above without the "Answer:" line, and have pupils answer them in silence on paper. Mark from the answers above at the end, or next lesson.

If the lesson plan calls for tools, machinery, heat or anything hands-on, do not run that part as a non-specialist cover teacher - set the silent task above instead and leave the practical for the subject teacher. See the general workshop safety guide in the Teachers hub.