

Topic 3.5 Energy

Exercise 3.5A Describing energy

Elastic – energy stored in an object that has changed shape.

Gravitational potential – energy in objects that are lifted higher.

Electrical – energy carried by current in wires.

Chemical – energy stored in fuel.

Sound – energy transferred from vibrations.

Thermal – energy in hot objects.

Light – energy that we can see.

Kinetic – energy of moving objects.

Exercise 3.5B Examples of energy

- Food is a store of **chemical** energy.
 - A book lifted up onto a shelf has a store of **gravitational potential** energy.
 - The Sun transfers **thermal** energy and **light** energy to Earth (words can be in either order).
 - A musical instrument transfers **sound** energy to our ears.
- Gravitational potential and chemical are stored.
Thermal and light are transferred.

Exercise 3.5C Energy investigations

- Kinetic
- A prediction
- Two reasons from: too dangerous/unsafe; temperature difference was too small for them to detect; too difficult to measure the temperature at the top and bottom at the same time.

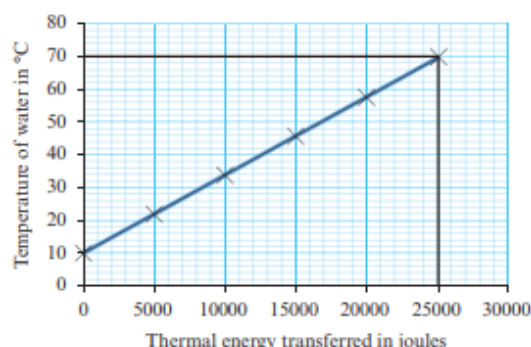
Topic 3.6 Changes in energy

Exercise 3.6A Energy diagrams

- Electrical → **light**
- Electrical → **sound**
- Chemical** → kinetic
- Gravitational potential** → kinetic

Exercise 3.6B Reading from a graph

- As the thermal energy transferred **increases** the temperature of the water **increases**.
Cannot be decreases in both because energy is being transferred to the water.
- 10 °C
- Vertical line drawn down from a line at 70 °C to the 25 000 J on the *x*-axis.



- Mass of water used.

Exercise 3.6C Series of energy changes

- Elastic energy is stored in the (compressed) spring (when the toy is pushed down); elastic energy is changed to kinetic energy; kinetic energy is changed to gravitational potential as the toy jumps up; gravitational potential is changed back to kinetic energy as the toy falls down.

Topic 3.7 Where does energy go?

Exercise 3.7A Energy word search

T	D	E	S	T	R	O	Y	E	D	D	T	D	T
U	E	D	E	T	S	A	W	W	I	W	D	E	L
D	G	U	E	A	E	Y	U	L	I	T	S	T	I
S	S	E	T	S	F	A	S	U	L	H	L	A	G
T	R	E	G	R	E	E	P	F	S	E	W	P	H
O	E	D	L	A	T	I	D	E	R	R	N	I	T
R	A	R	S	A	N	E	Y	S	A	M	D	S	U
E	I	S	H	S	S	I	E	U	T	A	O	S	E
D	R	E	C	O	V	E	R	E	D	L	T	I	U
N	C	L	S	F	D	N	U	O	S	E	D	D	E
I	E	E	L	I	R	U	G	O	R	R	W	S	E
D	O	E	N	E	R	G	Y	D	E	W	D	E	D
S	E	S	E	U	E	E	D	R	H	T	I	T	H
E	U	D	O	T	D	A	R	F	G	D	G	U	S

- 1 Energy (example)
- 2 Stored
- 3 Useful
- 4 Wasted
- 5 Recovered
- 6 Dissipated
- 7 Light, thermal, sound
- 8 Destroyed

Exercise 3.7B Energy loss

- 1 Two from: same volume/mass of water (do not accept amount), same shape of beaker/same surface area, same material of beaker, set up in same place, take temperatures at the same times.
- 2 Thermal
- 3 Two from: (surrounding) air, container, surface that the container is on, e.g. bench/ table.
- 4 Measure the temperature of the surroundings before, during and after placing the hot water. The temperature will have increased (if thermal energy has gone there).
- 5 One from: do not touch hot beakers/hot water, stay away from steam, use glassware/container material that will not shatter/melt when hot water is added.

Exercise 3.7C Wasted energy

- 1 $100 - 80 = 20\%$
- 2
 - a $100 - 25 = 75\%$
 - b Two from: thermal; sound/vibration, chemical if clearly referring to unburned fuel/chemicals in exhaust.
 - c Diesel engine is more efficient; idea that it will be more cost-effective/cheaper in the long-term; make more profit as less money spent on fuel.