



Unit 7 • Energy in Daily Life: forms of energy and heat

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. energy

K • 4

2. joule

3. mechanical energy

4. potential energy

5. kinetic energy

6. lower

7. more

8. less

Each carries 0.5 mark.

2 Label the diagram

1. potential energy

3. electrical energy

U • 2

2. kinetic energy

4. light energy

Each carries 0.5 mark.

3 Multiple choice

i. d. a flying bird

K • 1

A flying bird is moving, so it has kinetic energy. A stretched spring, a lifted leg and still water high up store potential energy.

ii. b. (1) and (2) are true

U • 1

By the law of conservation of energy, energy can be neither **created** nor **destroyed**, so (1) and (2) are true. But it **can** change from one form to another, so (3) is false.

iii. b. electrical energy into kinetic energy

U • 1

A fan takes in **electrical** energy and turns its blades, so it gives out **kinetic** energy (and a little sound and heat). A generator does the opposite: kinetic into electrical.

iv. d. from a body at a higher temperature to a body at a lower temperature

K • 1

Heat flows from **higher** temperature to **lower** temperature (from hot to cold), whatever the size of the bodies. A big pot of warm water still takes heat from a small red-hot nail dropped into it.

v. d. water in a black plate

A • 1

Both factors help: **black** absorbs more heat than white, and a **plate** spreads the water over a larger surface than a glass. So water in a black plate warms fastest.

4 True or false

MARKING SCHEME

U • 2

✓ i. true; ii. false.

✓ iii. false; iv. false.

5 Very short answers

a. MARKING SCHEME

K • 1

✓ Energy can neither be created nor destroyed, only changed from one form to another.



- b. MARKING SCHEME K · 1
✓ Light energy into electrical energy.
- c. MARKING SCHEME K · 1
✓ A body taking in heat from hotter things around it.

6 Short answers

- a. MARKING SCHEME K · 2
✓ Kinetic energy: the energy a body has because of its motion.
✓ Potential energy: the energy stored in a body because of its position, or a change in its position or shape.
- b. MARKING SCHEME U · 2
✓ Its mass: a heavier body has more kinetic energy at the same speed.
✓ Its speed: a faster body has more kinetic energy.
- c. MARKING SCHEME U · 2
✓ White clothes reflect most of the sunlight and absorb little heat.
✓ Black clothes absorb much more heat, so white ones keep us cooler.
- d. MARKING SCHEME A · 2
✓ Spreading out gives a larger surface facing the sun.
✓ A larger surface absorbs more heat, so the bedding gets warm and dry.

7 Long answer

ANSWER

A · 4

- i. The black plate.
- ii. The white glass.
- iii. A black surface absorbs more heat than a white one, which reflects most of the light. A plate spreads the water over a larger surface facing the sun than a glass, and a larger surface absorbs more heat. The black plate has both, the white glass neither.

MARKING SCHEME

- ✓ i. The black plate.
- ✓ ii. The white glass.
- ✓ iii. Black absorbs more heat than white (white reflects most of the light).
- ✓ A larger surface area (the plate) absorbs more heat than a smaller one (the glass).

8 Think

ANSWER

HA · 2

Green plants take in **light energy** from the sun and use it to make food in their leaves (photosynthesis). The light energy is changed into **chemical energy** and stored in the food: in grains, fruit, vegetables and leaves. We eat these plants, or animals that ate plants. So the chemical energy in all our food first came from **sunlight** that a plant transformed. The statement is true.

MARKING SCHEME

- ✓ Green plants change the sun's light energy into chemical energy stored in food (photosynthesis).
- ✓ We eat plants, or animals that ate plants, so the energy in all our food first came from the sun.



9 Activity: Appliances that change energy (Activity 7.6)

(not marked)

WHAT STUDENTS SHOULD FIND

Bulb: electrical → light (and some heat). Heater: electrical → heat. Radio: electrical → sound. Torch: chemical (in its cells) → electrical → light. LP gas stove: chemical (in the gas) → heat (and some light).

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	11	10	7	2	30





Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. straight
2. ray
3. opaque
4. shadow
5. screen
6. sound
7. solid
8. vacuum

K • 4

Each carries 0.5 mark.

2 Label the diagram

1. candle
2. black paper with a pinhole

3. tracing paper (screen)
4. image, upside down

K • 2

Each carries 0.5 mark.

3 Multiple choice

- i. c. a transparent object

K • 1

A shadow needs a source of light, an **opaque** object to block it, and a screen for the shadow to fall on. A **transparent** object lets light through, so it makes no shadow.

- ii. b. inverted (upside down)

U • 1

The rays from the top and bottom of the object cross at the pinhole, so the image is **inverted**.

- iii. d. both i and ii

A • 1

Bringing the object and the source **closer together** (either one moved) makes the shadow **bigger**. Moving the screen closer to the object makes it **smaller**.

- iv. a. about 332 m/s

K • 1

In air, sound travels at about **332 m/s** (at 0 °C; a little faster, about 340 m/s, on a warm day). About 1500 m/s is its speed in water, and 5200 m/s in steel.

- v. d. solid > liquid > gas

K • 1

Sound is fastest in **solids**, slower in **liquids** and slowest in **gases**.

4 Very short answers

- a. MARKING SCHEME

K • 1

✓ An object that produces sound.

- b. MARKING SCHEME

K • 1

✓ One correct transparent and one correct opaque object.

- c. MARKING SCHEME

K • 1

✓ About three lakh km (300,000 km).

5 Short answers

- a. MARKING SCHEME

U • 2

✓ Umbra: the dark part; penumbra: the paler part round it.

✓ In the umbra light is blocked completely; in the penumbra only partly.



- b. MARKING SCHEME** U • 2
- ✓ A ray from the top of the object goes straight through the pinhole to the bottom of the screen, and a ray from the bottom to the top.
 - ✓ The rays cross at the hole, so top and bottom swap and the image is inverted.
- c. MARKING SCHEME** U • 2
- ✓ Sound needs a medium; there is no air on the Moon, so a voice can't travel.
 - ✓ Radio waves can travel through a vacuum, so a radio is used.
- d. MARKING SCHEME** U • 2
- ✓ In a solid the molecules are very close together.
 - ✓ Each passes the push to the next at once, so sound travels fastest.

6 Long answer

ANSWER

U • 4

A shadow is the dark area formed behind an opaque object when it blocks the light from a source. It needs a source of light, an opaque object and a screen. In the morning the sun is low in the sky and its light comes in at a slant, so the shadow is long; at midday the sun is high and its light comes down steeply, so the shadow is short.

MARKING SCHEME

- ✓ The dark area behind an opaque object that blocks the light from a source.
- ✓ A source of light, an opaque object and a screen.
- ✓ In the morning the sun is low, its light comes at a slant, so the shadow is long.
- ✓ At midday the sun is high, its light comes down steeply, so the shadow is short.

7 Think

ANSWER

HA • 2

The lightning and the thunder happen at the **same time**, but light travels much faster than sound. Light travels about **3 lakh km** in a second, so the flash reaches us almost at once. Sound travels only about **332–340 m** in a second in air, so the thunder takes several seconds to reach us. That is why we hear it later.

MARKING SCHEME

- ✓ The lightning and the thunder happen at the same time.
- ✓ Light travels much faster (about three lakh km a second) than sound (about 332 m a second in air), so the thunder reaches us later.

8 Activity: Make a shadow

(not marked)

WHAT STUDENTS SHOULD FIND

Clear glass is transparent and makes almost no shadow; butter paper is translucent and makes a faint shadow; the board and the hand are opaque and make dark shadows. Moving the hand closer to the torch makes its shadow bigger.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	12	13	1	2	28

