

GCSE Combined Science: Trilogy

Worksheet: Energy stores and systems

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Energy stores and systems

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0	1
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0	1	.	1
---	---	---	---

 A cup of tea cools down on a table.
Which energy store of the tea decreases?

Tick (✓) **one** box.

Chemical

☐

Elastic potential

☐

Kinetic

☐

Thermal

☐

[1 mark]

0	1	.	2
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 State the energy store that decreases in a torch's battery as it powers a lamp.

.....

.....

.....

.....

[1 mark]

0 1 . 3

Which **two** of the following describe energy being dissipated to the surroundings?

Tick (✓) **two** boxes.

A car engine getting hot

☐

A fully charged battery

☐

Sound from a running motor

☐

A stationary book on a shelf

☐

[2 marks]

0 2

0 2 . 1

Which energy store increases when a battery is charged?

Tick (✓) **one** box.

Chemical

☐

Elastic potential

☐

Gravitational potential

☐

Kinetic

☐

[1 mark]

0 2 . 2

Name the energy store of a stretched elastic band.

.....

.....

.....

[1 mark]

0 2 . 3

Which **two** of these involve an increase in the gravitational potential energy store?

Tick (✓) **two** boxes.

A ball rolling along flat ground

☐

A lift moving upward

☐

A skydiver falling

☐

A child climbing up a slide

☐

[2 marks]

0 3

0 3 . 1

Which energy store is associated with two magnets held close together, repelling each other?

Tick (✓) **one** box.

Chemical

☐

Elastic potential

☐

Kinetic

☐

Magnetic

☐

[1 mark]

0 3 . 2

The dome of a Van de Graaff generator becomes charged.
Which energy store of the dome has increased?

Tick (✓) **one** box.

Chemical

☐

Electrostatic

☐

Nuclear

☐

Thermal

☐

[1 mark]

0 3 . 3

Name the energy store of the uranium fuel used in a nuclear power station.

.....

.....

.....

[1 mark]

0 3 . 4

Which **two** of these are examples of energy stored chemically?

Tick (✓) **two** boxes.

A charged phone battery

☐

A compressed spring

☐

Food in a cupboard

☐

A hot cup of tea

☐

[2 marks]

0 4

Energy can be stored in different ways.

0 4 . 1

A student stretches a rubber band.

Which energy store of the rubber band increases?

Tick (✓) **one** box.

Chemical

☐

Elastic potential

☐

Gravitational potential

☐

Kinetic

☐

[1 mark]

0 4 . 2

The student heats some water in an electric kettle.

Name the energy store of the water that increases.

.....

.....

.....

[1 mark]

0 4 . 3

Energy is transferred to the kettle electrically, by a current.

Give **two** other ways that energy can be transferred from one store to another.

.....

.....

.....

.....

[2 marks]

0 5

A student throws a tennis ball vertically upwards. The ball rises, stops for an instant at its highest point and then falls back down.

0 5 . 1

Describe the changes in the way energy is stored as the ball moves from the student's hand to its highest point.

[2 marks]

0 5 . 2

Explain why the ball has no kinetic energy at its highest point.

[1 mark]

0 5 . 3

Air resistance acts on the ball as it moves.

Explain how air resistance affects the maximum height the ball reaches.

[2 marks]

0 5 . 4

The student catches the ball at the same height it was thrown from.
Compare the kinetic energy of the ball just before it is caught with its kinetic energy just after it was thrown.
Give a reason for your answer.

[2 marks]

0 6

A cyclist is moving along a flat road. The cyclist stops pedalling and applies the brakes. The bicycle slows down and stops.

0 6 . 1

Which energy store of the cyclist and bicycle decreases as they slow down?

Tick (✓) **one** box.

Chemical

☐

Elastic potential

☐

Gravitational potential

☐

Kinetic

☐

[1 mark]

0 6 . 2

Describe how energy is transferred as the bicycle slows down.

[3 marks]

0 6 . 3

Later, the cyclist rides up a hill at a steady speed.
Describe the changes in the energy stores while the cyclist rides up the hill.

.....

.....

.....

.....

.....

.....

[3 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Energy stores and systems · 31 marks

Question 1 (4 marks)

01.1 [1 mark]

Correct: Thermal

01.2 [1 mark]

Answer: Chemical

- chemical (energy store) (1)
-

01.3 [2 marks]

Correct: A car engine getting hot; Sound from a running motor

Question 2 (4 marks)

02.1 [1 mark]

Correct: Chemical

02.2 [1 mark]

Answer: Elastic potential

- elastic potential (energy store) (1)
-

02.3 [2 marks]

Correct: A lift moving upward; A child climbing up a slide

Question 3 (5 marks)

03.1 [1 mark]

Correct: Magnetic

03.2 [1 mark]

Correct: Electrostatic

03.3 [1 mark]

Answer: Nuclear

- nuclear (energy store) (1)
-

03.4 [2 marks]

Correct: A charged phone battery; Food in a cupboard

Question 4 (4 marks)

04.1 [1 mark]

Correct: Elastic potential

04.2 [1 mark]

Answer: Thermal (internal) energy store

- thermal / internal (energy store) (1)

Notes: Do not accept 'heat' or 'kinetic'.

04.3 [2 marks]

Answer: Any two of: by heating; mechanically (by a force doing work); by radiation (e.g. light or sound waves)

- by heating (1)
- mechanically / by (a) force(s) doing work (1)
- by radiation / (light or sound) waves (1)

Any 2 of the points above.

Question 5 (7 marks)

05.1 [2 marks]

Answer: The kinetic energy store of the ball decreases and its gravitational potential energy store increases.

- kinetic energy (store of the ball) decreases (1)
- gravitational potential energy (store of the ball) increases (1)

Notes: Allow 'kinetic energy is transferred to gravitational potential energy' for 2 marks.

05.2 [1 mark]

Answer: Its speed is zero at the highest point.

- the speed / velocity of the ball is zero (at the highest point) (1)
-

05.3 [2 marks]

Answer: Work is done against air resistance, so some energy is dissipated to the thermal store of the surroundings and less is transferred to the gravitational potential store — the ball does not rise as high.

- (work is done against air resistance so) some energy is dissipated / transferred to the thermal store of the surroundings / air (1)
 - so less energy is transferred to the gravitational potential energy store (so the maximum height is lower) (1)
-

05.4 [2 marks]

Answer: The kinetic energy is less when it is caught, because energy has been dissipated by air resistance on the way up and on the way down.

- kinetic energy is less (when it is caught) (1)
- (because) energy has been dissipated (to the surroundings) due to air resistance / work done against air resistance (1)

Notes: Second mark depends on the first.

Question 6 (7 marks)

06.1 [1 mark]

Correct: Kinetic

06.2 [3 marks]

Answer: Friction between the brake pads and the wheel does work, transferring energy from the kinetic store to the thermal store of the brakes, which then dissipates energy to the surroundings by heating.

- (the force of) friction between the brake pads and the wheel does work (1)
- (energy is transferred from the kinetic store) to the thermal energy store of the brakes / the brakes get hotter (1)
- energy is then dissipated to the surroundings (by heating) (1)

Notes: Allow some energy is transferred as sound for the third mark.

06.3 [3 marks]

Answer: The chemical store of the cyclist decreases; the gravitational potential store increases; the kinetic store stays the same; the thermal store of the cyclist and surroundings increases.

- the chemical energy store of the cyclist (muscles) decreases (1)
- the gravitational potential energy store (of cyclist and bicycle) increases (1)
- the kinetic energy store stays the same (because the speed is constant) (1)
- the thermal energy store of the cyclist / surroundings increases (1)

Any 3 of the points above.
