

Combined science - Physics - Key stage 4 - Energy

# Energy transfers - worksheet

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# Exam style question

1. A car has a energy in its kinetic store as it is moving at  $20 \text{ m/s}$ . The driver applies the brakes and brings the car to a stop.

Describe the energy transfers that take place.

2



# Answers

3



**Q1.**

Energy is transferred from the kinetic  
store of the car to the thermal store

**1**

by mechanical working

**1**



# Match the store to the description

Store	Description
Chemical	an object where the height has changed.
Elastic potential	an object that is moving.
Electric-magnetic	the state or temperature of an object.
Gravitational potential	an object moving back and forth.
Kinetic	objects that are being stretched or compressed.
Nuclear	energy stored in the molecules of an object.
Thermal	stored within the nuclei of atoms.
Vibrational	stored between charges or magnets being separated.



# Independent practice

1. What are the 8 stores of energy?
2. What are the 4 pathways for transferring energy?
3. Which of the 4 pathways involves a force doing work on an object?
4. Which of the 4 pathways can involve light shining on an object?



# Independent practice

Identify the stores and pathways involved in the following examples

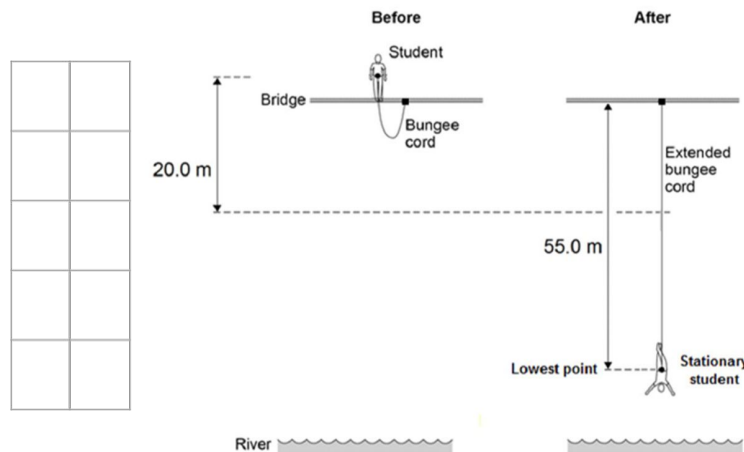
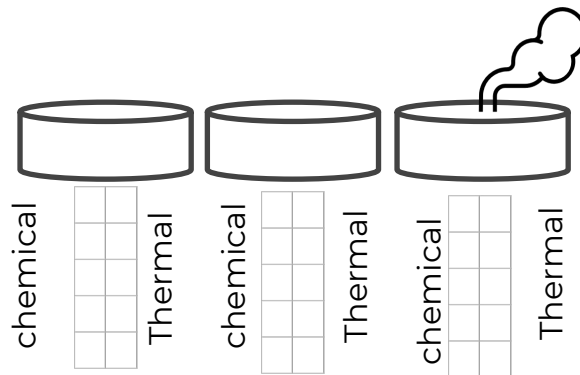
1. **Describing a ball being dropped:** Before we let go the ball has a gravitational store of energy. As the force of gravity does mechanical work on the ball making it fall, the gravitational store empties and the kinetic store increases. When it hits the ground, the thermal store of the surroundings increases by heating and the kinetic store of the ball decreases.
2. **Describing a mass being lifted by a battery powered motor** Before being turned on, the battery has a filled chemical store. When turned on, the chemical store is decreased by electrical working to turn the motor. This causes the mass to raise by mechanical work and increase its gravitational store.



# Independent practice

Describe the stores and transfers for each. Represent the changes in a chart

1. A candle is lit, and burned before being blown out.
2. A bungee jumper jumping from a height and stopping at the bottom of the jump

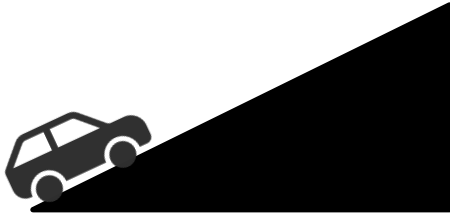




# Independent practice

1. A wind up car going up a ramp. When it is wound up, a spring inside is stretched. When the spring is released it causes the car to move.

Spring is wound  
up at the  
bottom



Car travels up  
ramp



Car is stationary  
at top of ramp



# Exam question practice



# Answers



# Review

Store	Description
Gravitational potential	an object where the height has changed.
Kinetic	an object that is moving.
Thermal	the state or temperature of an object.
Vibrational	an object moving back and forth.
Elastic potential	objects that are being stretched or compressed.
Chemical	energy stored in the molecules of an object.
Nuclear	stored within the nuclei of atoms.
Electric-magnetic	stored between charges or magnets being separated.



# Review

1. What are the 8 stores of energy?
  - **Electric-magnetic, kinetic, thermal, vibrational, elastic potential, gravitational potential, chemical, nuclear**
2. What are the 4 pathways for transferring energy?
  - **Radiation, heating, mechanical, electrical**
3. Which of the 4 pathways involves a force doing work on an object?
  - **mechanical**
4. Which of the 4 pathways can involve light shining on an object?
  - **radiation**



# Review

Identify the stores and pathways involved in the following examples

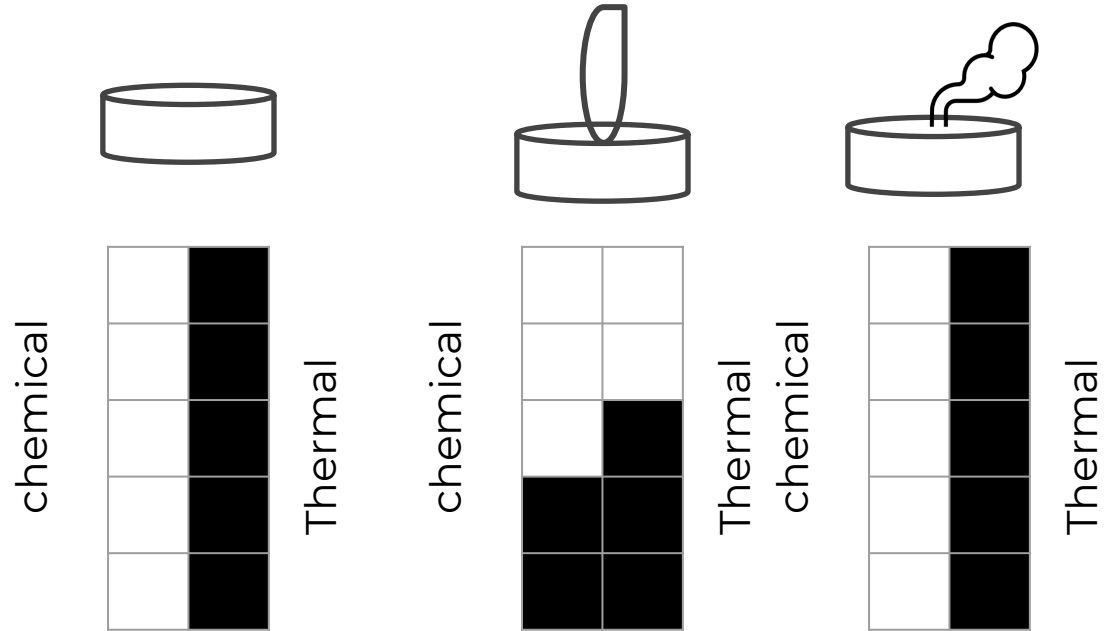
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2. **Describing a mass being lifted by a battery powered motor** Before being turned on the battery has a filled chemical store. When turned on the chemical store is decreased, by electrical working to turn the motor. This causes the mass to raise by mechanical work and increase its gravitational store.



# Review

Stores  
pathways

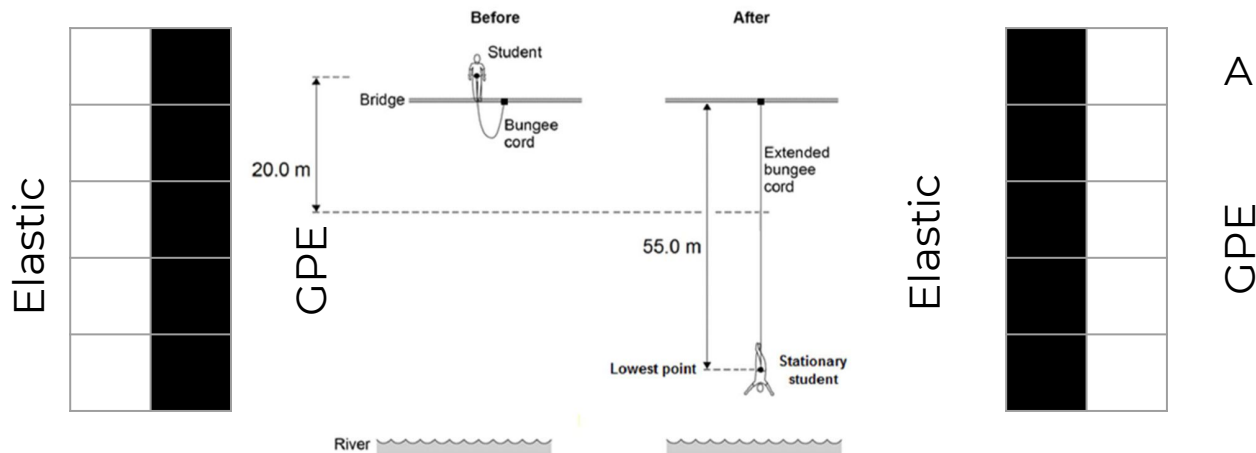
1. Energy is stored in the **chemical store** of the candle, it is then transferred by heating to the **thermal store** of the surroundings.



# Review

Stores  
pathways

1. Energy is initially stored in the gravitational store of the person. It is then transferred by mechanical working as the student falls to eventually filling the elastic store of the rope.



A question from Exampro





# Review

## Stores pathways

The energy is initially stored in the **elastic potential** store of the spring. When this is released it does mechanical work and causes the car to move, increasing its **kinetic store**. As the car moves up the hill mechanical work is done against gravity to transfer this energy to the **gravitational store** of the car. When it has stopped all the energy is now stored in the **gravitational store** of the car.

