

Exam Essentials

for AQA Science



- Everything you need for the exam... and nothing else
- A complete revision and exam preparation programme
- Written by teachers and examiners
- Follows the specification topic by topic
- Content for Foundation and Higher learners
- Timed Summary activities at the end of each topic
- AQA Science programme launching Autumn 2019



Comprehensive Coverage

AQA Biology	
Topic	No. of Activities
4.1 Cell Biology	27
4.2 Organisation	26
4.3 Infection and Response	30
4.4 Bioenergetics	24
4.5 Homeostasis and Response	42
4.6 Inheritance, Variation and Evolution	56
4.7 Ecology	48

AQA Chemistry	
Topic	No. of Activities
4.1 Atomic Structure and the Periodic Table	32
4.2 Bonding, Structure and the Properties of Matter	31
4.3 Quantitative Chemistry	19
4.4 Chemical Changes	29
4.5 Energy Changes	11
4.6 Rate of Reaction	24
4.7 Organic Chemistry	28
4.8 Chemical Analysis	30
4.9 Chemistry of the Atmosphere	22
4.10 Using Resources	24

AQA Physics	
Topic	No. of Activities
4.1 Energy	23
4.2 Electricity	26
4.3 Particle Model of Matter	13
4.4 Atomic Structure	26
4.5 Forces	70
4.6 Waves	36
4.7 Magnetism and Electromagnetism	26
4.8 Space Physics	10



Separate activities for Foundation and Higher

4.1.1.2 Changes in Energy 1F

4.1.1.2 Changes in Energy 1F

Kinetic energy is energy that is related to moving.

You should be able to calculate the amount of energy associated with a moving object, a stretched spring and an object raised above ground level.

During this activity, you will focus on **moving objects**.

The kinetic energy of a moving object can be calculated using the equation:

$$\text{Kinetic energy} = 0.5 \times \text{mass} \times \text{speed}^2$$
$$E_k = 0.5 \times m \times v^2$$

Where:

Kinetic energy, E_k , is measured in joules, J

mass, m , is measured in kilograms, kg

speed, v , is measured in metres per second, m/s

You must be able to recall and apply this equation.

Mapped by
specification
code.

Info screen at the start of
each activity laying out the
learning objectives from the
specification.



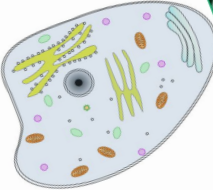
Mix of multiple choice question types.



Question 1 / 27 marks

Which of the following would you not find in an animal cell?


- Cell membrane
- Cell wall
- Cytoplasm
- Nucleus



Question 1 / 19 marks

Q2: Which is the correctly balanced equation for when magnesium reacts with oxygen?


- $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$
- $\text{Mg} + \text{O} \rightarrow \text{MgO}$
- $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}_2$
- magnesium + oxygen \rightarrow magnesium oxide



Question 4 / 27 marks

Tick all the organelles that you might find a prokaryotic cell.

- Cell wall
- Cytoplasm
- Mitochondria
- Plasmid
- Nucleus
- Flagellum



Question 3 / 16 marks

Q4: Match the substance or mixture to the correct separation technique below.

Substance and mixture	Separation technique
Ethanol from ethanol and water	<input type="text"/>
Salt from sea water	<input type="text"/>
The different colours in black ink	<input type="text"/>

Filtration Crystallisation
 Electrolysis Chromatography
 Combustion Fractional distillation

...are falling, the energy

...the bungee cord is stretched, the cord stores energy.

... as ... energy.

(Illustration, e.g. bungee jumper)

gravitational potential	elastic potential
sound	kinetic
nuclear	thermal

Difficult builds as each activity progresses.



Question **Mark your answer!** Scroll down or [click here](#)

Q4: In the early twentieth century, scientists developed an alpha particle scattering experiment. The diagram shows the paths of some of the alpha particles in the alpha particle scattering experiment. [Diagram of paths of alpha particles, most travelling straight, those hitting the nucleus being deflected at large angles]

Explain how the paths of the alpha particles were used to develop the nuclear model of the atom.

Tick a box for each mark scored

Most alpha particles pass straight through the atom	<input type="checkbox"/>
This shows that the atom is mostly empty space	<input type="checkbox"/>
A very small number of alpha particles are deflected through a large angle	<input type="checkbox"/>
This shows that the atom contains a nucleus where the mass / charge is concentrated	<input type="checkbox"/>

Your answer π

Question **Mark your answer!** Scroll down or [click here](#)

Q1: Explain how lubricating the wheels of a skateboard can increase its speed. Use ideas about energy in your explanation.

Tick a box for each mark scored

Lubrication reduces the amount of friction (not between the wheels and the ground)	<input type="checkbox"/>
Less energy is wasted and <u>converted</u> to <u>thermal energy</u> .	<input type="checkbox"/>
More energy is <u>converted</u> to <u>kinetic energy</u> , increasing the <u>stores</u> of energy.	<input type="checkbox"/>

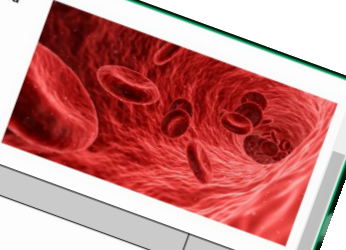
Your answer π

Q6: The average diameter of a real red blood cell is 0.008 millimetres. On the photograph, the diameter of the red blood cell is 100 millimetres.

What is the magnification of the image?

Tick a box for each mark scored

100 divided by 0.0008 (1 mark)	<input type="checkbox"/>
12,500 (gains both marks)	<input type="checkbox"/>



Your answer π



Free text questions with step-by-step mark schemes for learners to self-mark.



Summary activity at the end of each topic.



4.1 Energy Summary Assessment F

Information 0 / 41 marks

30:00

4.1 Energy Summary Assessment F

- There are changes in the way energy is **stored** when a system changes.
- There are eight stores in which energy can be increased or decreased: thermal, kinetic, gravitational potential, elastic potential, nuclear, chemical, magnetic and electrostatic.
- For the other energy types, light and sound, the stores don't change; energy is just converted to these.

Key equations:

Kinetic energy = $0.5 \times \text{mass} \times \text{speed}^2$ OR $E_k = 0.5 \times m \times v^2$

Elastic potential energy = $0.5 \times \text{spring constant} \times \text{extension}^2$ OR $E_e = 0.5 \times k \times e^2$

$gpe = \text{mass} \times \text{gravitational field strength} \times \text{height}$ OR $E_p = m \times g \times h$

Change in thermal energy = $\text{mass} \times \text{specific heat capacity} \times \text{temperature change}$ OR $\Delta E = m \times c \times \Delta\theta$

Power = energy transferred \div time OR $P = E \div t$

Screens: 1/14

BACK NEXT



Timed to simulate exam conditions.

4.1 Energy Summary Assessment F

Good score

You're so close to the goal of 80% or above. Why not try the activity again?

YOU SCORED 76% (GRADE 5)

Points: 100 pts
Bonus: 26 pts

TOTAL: 126 pts

REVIEW



Graded in line with exam board boundaries.

Separate summaries for Foundation and Higher



4.1 Energy Summary Assessment H

Information 0 / 29 marks

30:00

4.1 Energy Summary Assessment H

- There are changes in the way energy is **stored** when a system changes.
- There are eight stores in which energy can be increased or decreased: thermal, kinetic, gravitational potential, elastic potential, nuclear, chemical, magnetic and electrostatic.
- For the other energy types, light and sound, the stores don't change; energy is just converted to these.

Key equations:

Kinetic energy = $0.5 \times \text{mass} \times \text{speed}^2$ OR $E_k = 0.5 \times m \times v^2$

Elastic potential energy = $0.5 \times \text{spring constant} \times \text{extension}^2$ OR $E_e = 0.5 \times k \times e^2$

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Change in thermal energy = $\text{mass} \times \text{specific heat capacity} \times \text{temperature change}$ OR $\Delta E = m \times c \times \Delta\theta$

Power = energy transferred \div time OR $P = E \div t$

Screens: 1/10

BACK NEXT

4.1 Energy Summary Assessment H

Excellent work

Keep it up!

YOU SCORED 97% (GRADE 9)

Points: 90 pts
Bonus: 42 pts

TOTAL: 132 pts

REVIEW



How learners can find them...

The screenshot shows the SAM Learning interface. At the top, it says 'SAM Learning | Oscar Adlington SAM Learning College' with links for 'Support', 'Contact Us', and 'Log out'. Below this is a progress bar with 'READY. SET. GO!' and 'GO!' buttons. The main content area has three sections: 'Things to do' (a field with sheep), 'places to go' (a building), and 'people to see' (a person's face). Below these are user avatars and a navigation bar with 'Home', 'Activities', 'My Set Tasks', 'My Progress', and 'My Profile'. A search bar contains 'Keyword search...'. Below the search bar are filters: 'Show activities by Key Stage', 'Additional filters', and 'Exam Essentials'. The 'Exam Essentials' filter is highlighted with a purple box. Below this are more filters: 'GCSE', 'Biology', 'AQA', and 'Cell Structure'. A table below shows 11 activities found, with columns for 'Activity', 'Exam Board', 'Score', and 'Set Task'. The activities listed are:

Activity	Exam Board	Score	Set Task
4.1.1.1 Eukaryotes and Prokaryotes F			
4.1.1.1 Eukaryotes and Prokaryotes H			
4.1.1.2 Animal and Plant Cells 1F			
4.1.1.2 Animal and Plant Cells 1H			

← Select 'Exam Essentials' as the Activity Type

← Filter by key stage, subject, exam board and topic.

