

A central collage of physics concepts and formulas. The word "Physics" is written in large, bold, black letters in the center. Surrounding it are various diagrams and equations:

- Top Left:** A diagram of a block on an inclined plane with forces F_1 and F_2 , and a pressure formula $P = \frac{F}{A}$.
- Top Center:** A diagram of a ball rolling down a curved path with formulas $W = mg$, $t = \frac{s}{v}$, and $v = u + at$.
- Top Right:** A diagram of an atom with a central nucleus and orbiting electrons, and a formula $PE = mgh$.
- Middle Left:** A diagram of a point source emitting waves in all directions, labeled "Point Source".
- Middle Center:** A diagram of a ball on a curved path with the formula $PE = m \times g \times h$.
- Middle Right:** A diagram of a lens focusing parallel rays of light, with formulas $S_o = V_o t$ and $S_o = \left(\frac{u \times v}{2}\right) t$.
- Bottom Left:** A diagram of a battery connected to a magnet and a coil, illustrating electromagnetic induction.
- Bottom Center:** A diagram of a ball on a curved path with the formula $s = ut + \frac{1}{2}at^2$.
- Bottom Right:** A diagram of a pendulum with the formula $T = \frac{2\pi r}{v}$.

Biology

B1 Cell Level systems

B2 Scaling up

B3 Organism Level systems

Chemistry

C1 Particles

**C2 Elements, compounds
and mixture**

C3 Chemical reactions

Physics

P1 Matter

P2 Forces

P3 Electricity

**P4 Magnetism and
magnetic fields**

- **ALL PAPERS HAVE MULTI CHOICE, STRUCTURED SHORT ANSWER AND LONGER RESPONSE QUESTIONS.**
- **THERE WILL BE ONE 6 MARK QUESTION PER PAPER WHICH IS THE LONGEST EXTENDED RESPONSE IN SCIENCE**

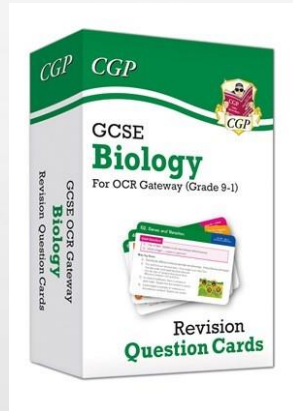
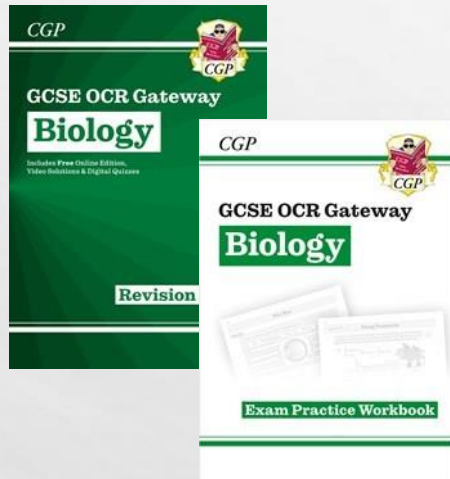


**Stop thinking about learning as trying
to get information into your brain,
concentrate instead on getting
information out!**

REVISION GUIDES

MUST BE OCR GATEWAY IF EXAM BOARD SPECIFIC

- **CGP EXAMPLES**



- **NON-EXAM BOARD SPECIFIC**



REVISION

SENECA

- **TEACHERS WILL SET TASKS BUT STUDENTS CAN ALSO ACCESS INDEPENDENTLY**
- **THEY MUST CREATE AN ACCOUNT BEFORE FOLLOWING THE LINKS**

KERBOODLE

- **ALL STUDENTS HAVE THEIR OWN LOG IN. TEACHERS CAN RESET PASSWORDS IF THEY FORGET**
- **ONLINE TEXTBOOK AND MANY OTHER RESOURCES AVAILABLE**

- **WE HAVE ALSO PRODUCED SOME BOOKLETS AND SENT VIA SACHEL TO SUMMARISE THE KEY POINTS**



**DO NOT JUST READ THROUGH REVISION
NEEDS TO BE ACTIVE**

- **READ – COVER – RECALL - CHECK**
- **MAKE NOTES**
- **MAKE POSTERS OR MIND MAPS**
- **ANSWER PRACTICE WRITTEN QUESTIONS. PAST PAPERS AVAILABLE FROM THE OCR WEBSITE**
- **ASK A FRIEND/RELATIVE TO ASK YOU QUESTIONS FROM YOUR REVISION GUIDE/BOOKLET**

B1.4 - PHOTOSYNTHESIS

What is the equation for photosynthesis?



Where in the plant does it occur?

In the leaf (mainly palisade cells) and in algae

How are leaves adapted to perform photosynthesis?

They are broad and thin

Explain how plants use glucose for the following:

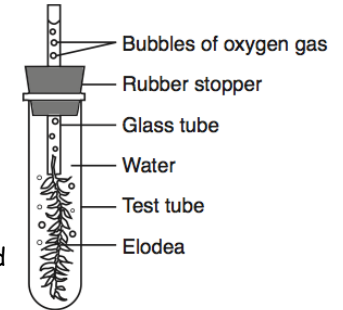
Respiration - all living cells respire using glucose and oxygen to make energy.

Making other substances - cellulose walls are made from glucose. Fats and oils and proteins are also made from glucose. Nitrates from the soil are needed to make proteins.

Storage - glucose is converted to starch for storage.

How do we know what the rate of photosynthesis is?

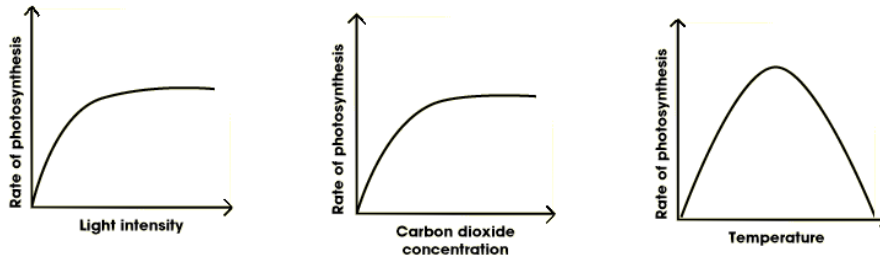
We can measure the rate of photosynthesis by measuring the volume of oxygen produced in a set time.



Can we increase the rate?

Conditions can be manipulated in a greenhouse for better growth. Artificial light, increased carbon dioxide, fertilisers and heat all affect the rate of photosynthesis and therefore growth but they can be expensive too!

Explain how light, CO₂ and temperature are limiting factors of photosynthesis



Increasing light increases the rate of photosynthesis. Increasing the concentration of carbon dioxide increases the rate of photosynthesis. While the slope is increasing that substance is the limiting factor, when the graph is flat something else is the limiting factor.

At lower temperatures the rate of photosynthesis is very slow, it increases until it gets to the optimum temperature. The rate decreases rapidly beyond this temperature as the enzymes are denatured.

Maths skills - the rule linking light intensity and distance (H only)

With the pondweed experiment we know that as the distance increases the light intensity decreases. They are inversely proportional BUT if we look more closely we see it follows the inverse square law.

$$\text{light intensity} \propto \frac{1}{\text{distance (d)}^2}$$




You might be asked to calculate a value using this equation or to explain the pattern you see in results that are provided.

KEY WORDS:


Photosynthesis	Chlorophyll
Glucose	Inverse square law
Starch	
Limiting factors	
Rate	

PRIORITY FOR REVISION





Good morning, Gemma!





Overview


Exam Prep New


Assignments


Ask Amelia











^ 1 Matter 


^ 1.1 Particle Model of Matter 


1.1.1 The Atom 


1.1.2 The Atom 2 

^ 1.2 Density 


^ 1.3 Latent Heat 



^ 1.4 Pressure 


^ 2 Forces 

^ 3 Electricity 

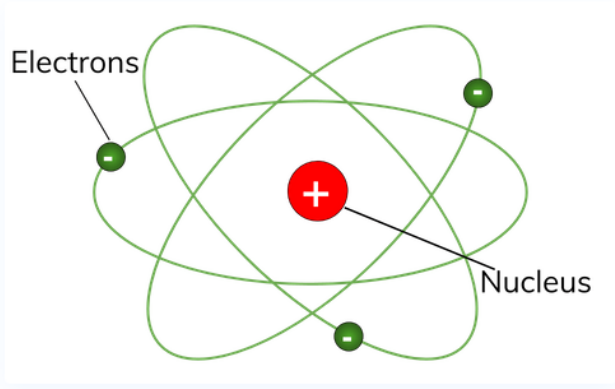
How do you want to learn?

**Adaptive**
Notes and questions adapted to you →


**Quiz**
No notes, just the questions. Test yourself! 

**Wrong answers**
Recap and retry your wrong answers →

Atomic Model



An atom has a small, positively-charged nucleus surrounded by orbiting negatively-charged electrons.

 Feedback?

Continue

USING THE KERBOODLE TEXTBOOK

C3.4 Electrolysis

C3.4.1 Electrolysis of molten salts

Learning outcomes

After studying this lesson you should be able to:

- describe electrolysis in terms of the ions present and reactions at the electrodes
- predict the products of electrolysis of molten ionic compounds.

Specification reference: C3.4b, C3.4d



Figure 1 A nineteenth-century engraving of Sir Humphry Davy (right) using electrolysis to isolate reactive metals.

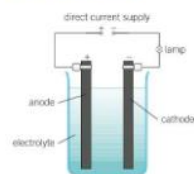


Figure 2 The lamp is included so you can see if a current is flowing.

Cations

The word cation is pronounced 'cat ion' not 'cayshun'.

Imagine it is 1807. You are a respected chemist who has just become the first person to see potassium (Figure 1). What would you do next? Sir Humphry Davy decided to dance around his laboratory when this happened to him. Health and Safety, and electrolysis, have come on a long way since then!

What is electrolysis?

Electrolysis is a process in which an electric current is passed through a compound, causing a chemical change. You need three components for electrolysis to work, arranged as shown in Figure 2:

- 1 An **electrolyte**, a compound in its liquid state or in solution, which contains mobile ions and conducts electricity.
- 2 Two **electrodes**, made from a metal or graphite, which conduct electricity to the electrolyte.
- 3 An electrical supply such as a power pack or battery.

There are two electrodes:

- the negative electrode, the **cathode**
- the positive electrode, the **anode**.

During electrolysis:

- positive ions gain electrons at the cathode and become atoms.
- negative ions lose electrons at the anode, and become atoms.

If the atoms formed are non-metal atoms, covalent bonds may form between them, making molecules. In electrolysis, positive ions are called **cations** and negative ions are called **anions**.

- A** Suggest where the terms 'cation' and 'anion' come from.

How do you predict the products of electrolysis?

A **binary ionic compound** contains just two elements. **Molten** lead bromide, $\text{PbBr}_2(\text{l})$, consists of lead ions and bromide ions. You can model what happens at the electrodes using half equations:

- lead is produced at the cathode: $\text{Pb}^{2+} + 2\text{e}^- \rightarrow \text{Pb}$
- bromine is produced at the anode: $2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}^-$

When ions become atoms or molecules at an electrode, you say that the ions have been **discharged**.

Overall, ions move to an oppositely charged electrode during electrolysis (Figure 3). The concentration of ions close to each electrode goes down as ions gain or lose electrons to become atoms. Other ions in the electrolyte can move to replace them by **diffusion** and **convection**. This could not happen in ionic compounds in the solid state, which is why ionic compounds in the solid state cannot conduct electricity.

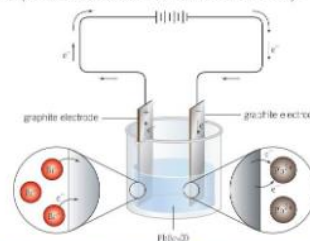


Figure 3 Lead bromide must be heated so that it melts to form an electrolyte.

- B** Suggest why the electrolysis of molten lead bromide is usually carried out in a fume cupboard.
- C** Predict the products formed during the electrolysis of molten sodium chloride.

The importance of new technology

Alessandro Volta invented the battery in 1800. This allowed chemists to explore new ways to carry out chemical reactions. Just seven years later, Humphry Davy used an electric current to isolate potassium. Molten potassium hydroxide was decomposed to molten potassium at the cathode, and oxygen gas at the anode. Using electrolysis, Davy also became the first person to isolate sodium, magnesium, boron, and barium.

- 1 Explain why molten potassium hydroxide is an electrolyte but potassium hydroxide in the solid state is not. (3 marks)
- 2 Name the products formed at the anode and cathode during the electrolysis of the following substances, justifying your answers:
 - a molten potassium iodide (2 marks)
 - b molten calcium chloride. (2 marks)
- 3 Explain, in terms of electron transfer, why the electrolysis of molten aluminium oxide is a redox reaction. In your answer, identify the products formed and include half equations to model the reactions at the electrodes. (6 marks)

USING THE KERBOODLE TEXTBOOK

Resources

This Page

All Resources

C3.4.1 Interactive: Electrolysis

INTERACTIVE PLENARY | ZIP

C3.4.1 Literacy skills: Electrolysis

LITERACY SKILLS | ZIP

C3.4.1 Maths skills: Writing half equations

MATHS SKILLS | ZIP

C3.4.1 Practical: Electrolysis of zinc chloride

STUDENT PRACTICAL SHEET (WORD) | DOC

C3.4.1 Student book spread answers

STUDENT BOOK ANSWERS – SPREAD ANSWERS | PDF

C3.4.1 Teacher and technician notes: Electrolysis of zinc chloride

TEACHER PRACTICAL SHEET (WORD) | DOC

C3.4 Electrolysis

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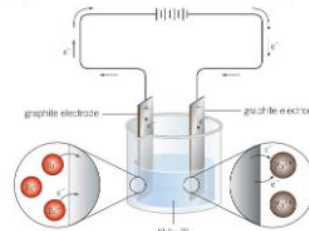


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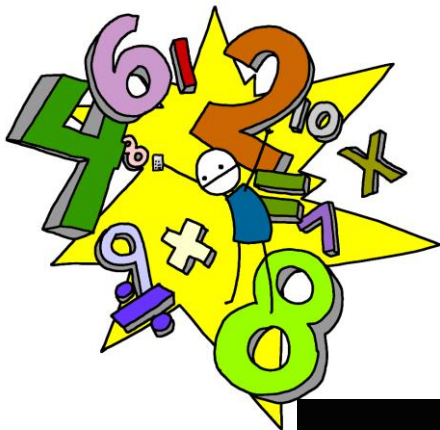
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Resources

Go to page

SKILLS TESTED

- AO1: DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF: **40%**
 - SCIENTIFIC IDEAS
 - SCIENTIFIC TECHNIQUES AND PROCEDURES.
- AO2: APPLY KNOWLEDGE AND UNDERSTANDING OF: **40%**
 - SCIENTIFIC IDEAS
 - SCIENTIFIC ENQUIRY, TECHNIQUES AND PROCEDURES.
- AO3: ANALYSE INFORMATION AND IDEAS TO: **20%**
 - INTERPRET
 - EVALUATE
 - MAKE JUDGEMENTS
 - DRAW CONCLUSIONS
 - DEVELOP EXPERIMENTAL PROCEDURES
 - IMPROVE EXPERIMENTAL PROCEDURES.



MATHEMATICAL SKILLS AND PRACTICAL KNOWLEDGE

- TESTED THROUGHOUT ALL SCIENCE EXAMS
- 15% OF THE MARKS IN EACH PAPER ARE BASED ON PRACTICAL ACTIVITIES
- MATHS QUESTIONS
 - 10% IN BIOLOGY
 - 20% IN CHEMISTRY
 - 30% IN PHYSICS

SCIENCE EXAM TIPS

- ALWAYS READ THE WHOLE QUESTION BEFORE YOU START ANSWERING
- JOT DOWN ANY FORMULAE OR MNEMONICS YOU NEED TO REMEMBER
- DON'T WASTE TIME – MOVE ON IF YOU DON'T KNOW AN ANSWER THEN RETURN TO IT AT THE END
- **HIGHLIGHT COMMAND WORDS** IN THE QUESTION
- LOOK FOR WORDS IN **BOLD** THEY TELL YOU IMPORTANT INFORMATION ABOUT HOW TO ANSWER. CIRCLE OR HIGHLIGHT THEM
- FOR LONGER QUESTIONS TICK OFF EACH PART AS YOU DO IT
- LOOK AT THE NUMBER OF MARKS – YOUR ANSWER NEEDS THE SAME NUMBER OF POINTS
- WRITE **ALL** OF YOUR WORKING OUT DOWN WHEN DOING CALCULATIONS
- LOOK CAREFULLY AT THE DETAILS GIVEN IN TABLES AND GRAPHS
- BE CONCISE AND ACCURATE WHEN ANSWERING QUESTIONS. BULLET POINTS ARE FINE

IMPORTANT WEBSITES

WWW.OCR.ORG.UK

- **STUDENTS SHOULD BE FAMILIAR WITH SPECIFICATION FOR EACH EXAM.**
- **SPECIMEN AND PAST PAPERS ARE AVAILABLE ON THIS SITE.**

ANY QUESTIONS?

GMITCHELL@BRADFIELD.SHEFFIELD.SCH.UK

WWW.BBC.CO.UK/BITESIZE

- **REVISION NOTES, VIDEO CLIPS, PODCASTS AND EXAM STYLE QUESTIONS**

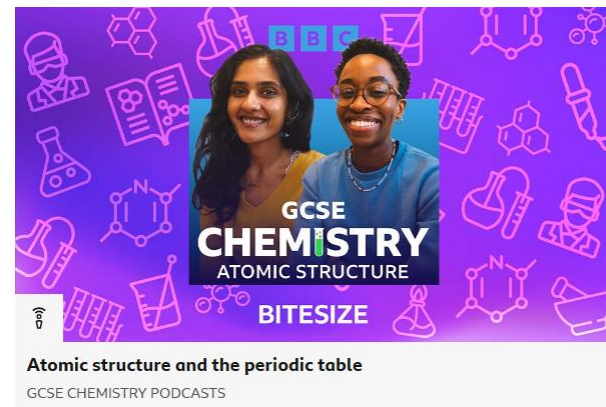
WWW.SENECALEARNING.COM

WWW.KERBOODLE.COM

GCSE Chemistry Revision Podcasts

Revise core GCSE Chemistry topics with science experts Tulela Pea and Dr Sunayana Bhargava.

Episodes within the series explain the key points on you need to know for your GCSE in Chemistry or Combined Science - including **atomic structure**, **bonding** and **chemical changes**. Listen to all the GCSE Chemistry podcasts on **BBC Sounds**.



GRADES

- **SEPARATE SCIENCE STUDENTS RECEIVE 3 SEPARATE GRADES IN THE 3 SCIENCE SUBJECTS.**
- **COMBINED SCIENCE STUDENTS RECEIVE A DOUBLE GRADE (2 GCSES)**
- **FOUNDATION**
GRADES 1 TO 5 OR 1-1 TO 5-5
- **HIGHER**
GRADES 4 TO 9 OR 4-4 TO 9-9

GCSE COMBINED SCIENCE

DOUBLE AWARD GRADE COMBINATIONS

