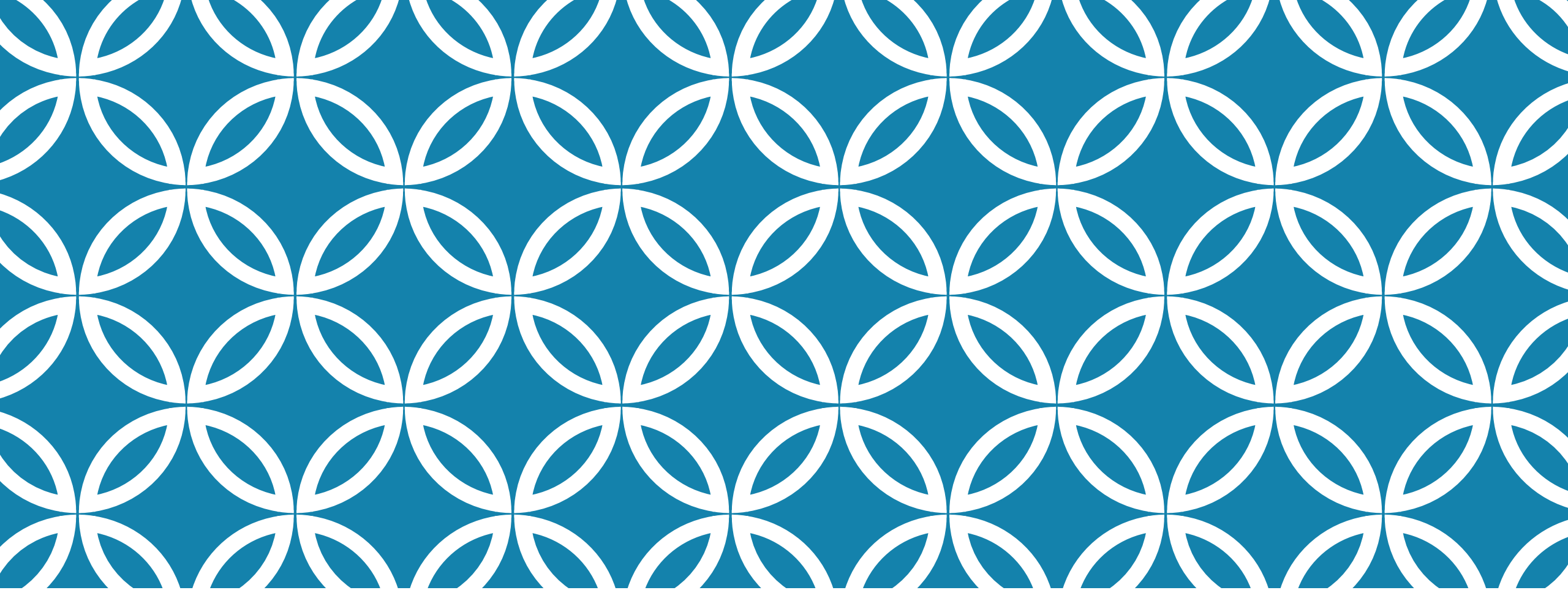


SCIENCE

COMBINED SCIENCE: TRILOGY

We are following the **AQA Combined Science: Trilogy** specification. Assessment consists of 6 papers altogether, two biology, two chemistry and two physics, each will assess different topics.

Duration: all the papers are 1 hour 15 minutes.

Tiers: Foundation and Higher.

Weighting: Each paper consists of 70 marks and is worth 16.7% of the grade.

Question types: multiple choice, structured, closed, short answer and open response. 15% of GCSE marks in exams come from questions relating to practicals.

Combined Science will have a 17 point grading scale, from 9–9, 9–8 through to 2–1, 1–1.

SEPARATE SCIENCES

We are following the **AQA specifications.** Each science is assessed separately, leading to the award of three separate GCSEs. For **each** of the sciences assessment consists of 2 papers: each paper will assess knowledge and understanding from different topics.

Duration: both papers are 1 hour 45 minutes. **Tier:** Foundation and Higher.

Weighting: the papers are equally weighted. Each is worth 50% of the grade and has 100 marks available.

Question types: multiple choice, structured, closed short answer and open response. 15% of GCSE marks in exams come from questions relating to practicals.

The A* to G grades will be replaced by 9 to1 for Biology, Chemistry and Physics

EXAM DATES

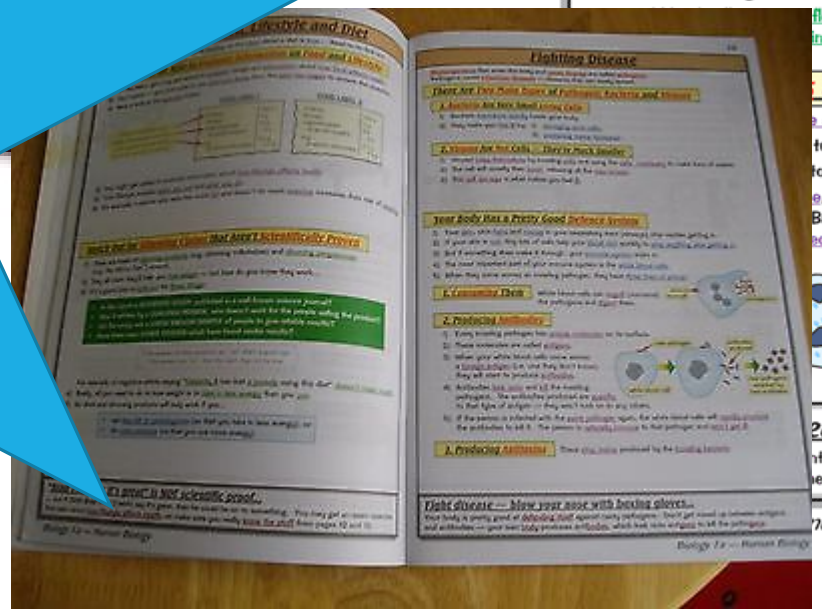
Combined Science and Triple Science

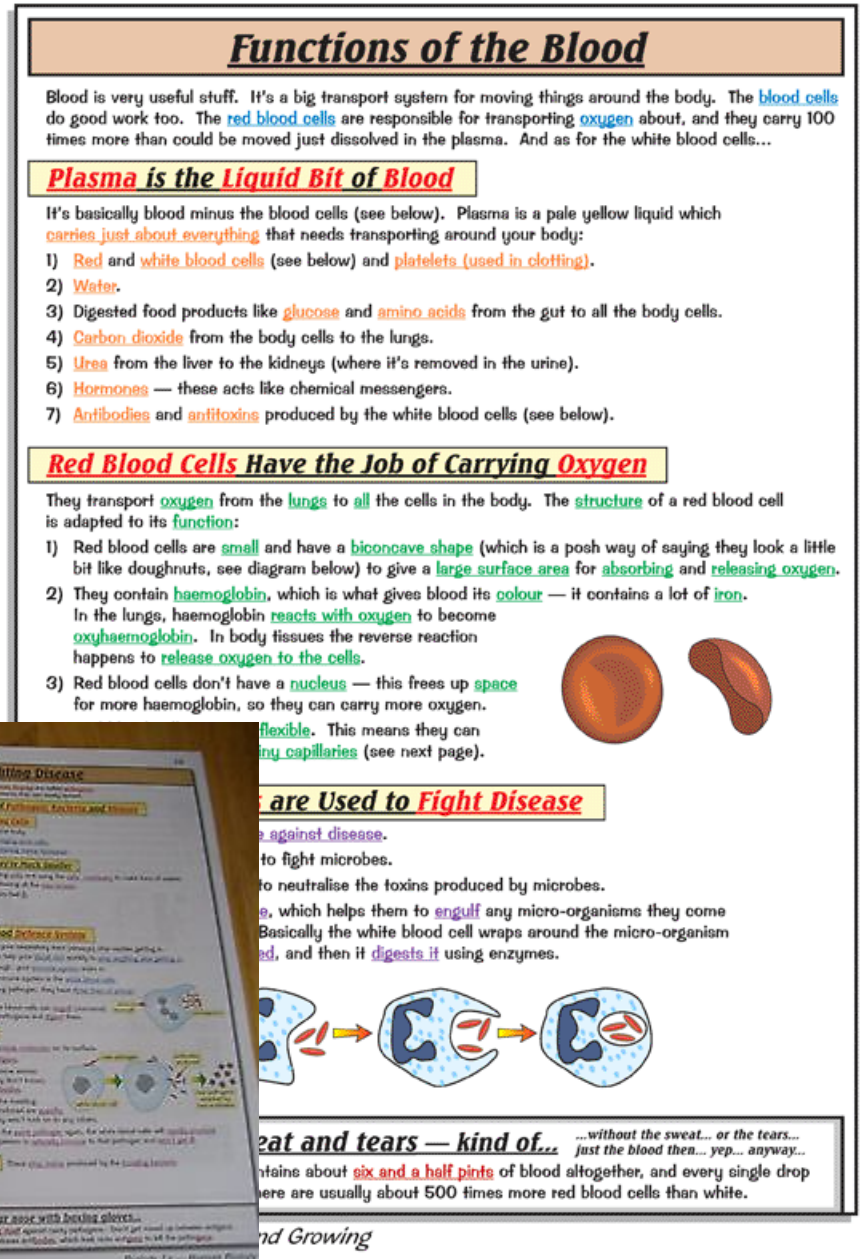
Biology	Paper 1/1	B1-4	Tuesday 12th May 2020
Chemistry	Paper 2/1	C1-5	Thursday 14th May 2020
Physics	Paper 3/1	P1-4	Wednesday 20th May 2020
Biology	Paper 4/2	B5-7	Monday 1st June 2020
Chemistry	Paper 5/2	C6-10	Wednesday 10th June 2020
Physics	Paper 6/2	P5-7 or 8	Friday 12th June 2020

REVISION GUIDES

Purchase a science specific revision guide
(from school - if you haven't already done so)

Comes with free online access





42

Functions of the Blood

Blood is very useful stuff. It's a big transport system for moving things around the body. The blood cells do good work too. The red blood cells are responsible for transporting oxygen about, and they carry 100 times more than could be moved just dissolved in the plasma. And as for the white blood cells...

Plasma is the Liquid Bit of Blood

It's basically blood minus the blood cells (see below). Plasma is a pale yellow liquid which carries just about everything that needs transporting around your body:

1) Red and white blood cells (see below) and platelets (used in clotting).
2) Water.
3) Digested food products like glucose and amino acids from the gut to all the body cells.
4) Carbon dioxide from the body cells to the lungs.
5) Urea from the liver to the kidneys (where it's removed in the urine).
6) Hormones — these acts like chemical messengers.
7) Antibodies and antitoxins produced by the white blood cells (see below).

Red Blood Cells Have the Job of Carrying Oxygen

They transport oxygen from the lungs to all the cells in the body. The structure of a red blood cell is adapted to its function:

1) Red blood cells are small and have a biconcave shape (which is a posh way of saying they look a little bit like doughnuts, see diagram below) to give a large surface area for absorbing and releasing oxygen.
2) They contain haemoglobin, which is what gives blood its colour — it contains a lot of iron. In the lungs, haemoglobin reacts with oxygen to become oxyhaemoglobin. In body tissues the reverse reaction happens to release oxygen to the cells.
3) Red blood cells don't have a nucleus — this frees up space for more haemoglobin, so they can carry more oxygen.

flexible. This means they can
ny capillaries (see next page).

are Used to Fight Disease

against disease.
to fight microbes.
o neutralise the toxins produced by microbes.
, which helps them to engulf any micro-organisms they come
Basically the white blood cell wraps around the micro-organism
d, and then it digests it using enzymes.

eat and tears — kind of...

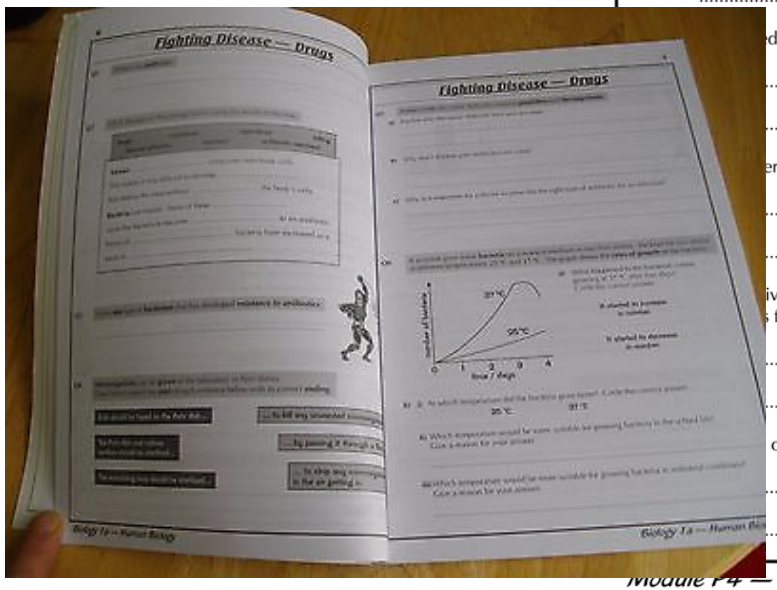
...without the sweat... or the tears... just the blood then... yep... anyway...

ntains about six and a half pints of blood altogether, and every single drop
ere are usually about 500 times more red blood cells than white.

nd Growing

REVISION WORKBOOKS

Some students may benefit from using a dedicated science specific workbook (available with answer booklet from the school shop)



Static Electricity

Q1 **Circle** the pairs of charges that would attract each other and **underline** those that would repel.

positive and positive positive and negative negative and positive negative and negative

Q2 Fill in the **gaps** in these sentences with the words below.

electrons	positive	static	insulating	negative

..... electricity can build up when two ..... materials are rubbed together. The ..... move from one material onto the other. This leaves a ..... charge on one of the materials and a ..... charge on the other.

Q3 The sentences below are wrong. Write out a **correct** version for each.

Polythene is an insulating material.

a) An insulating rod becomes negatively charged when rubbed with a duster because it loses electrons.

.....

.....

d polythene rod will repel small pieces of paper if they are placed near it.

.....

.....

er two charged objects are together, the less strongly they attract or repel.

.....

.....

ively charged object is connected to earth by a metal strap, flow through the strap from the object to the ground.

.....

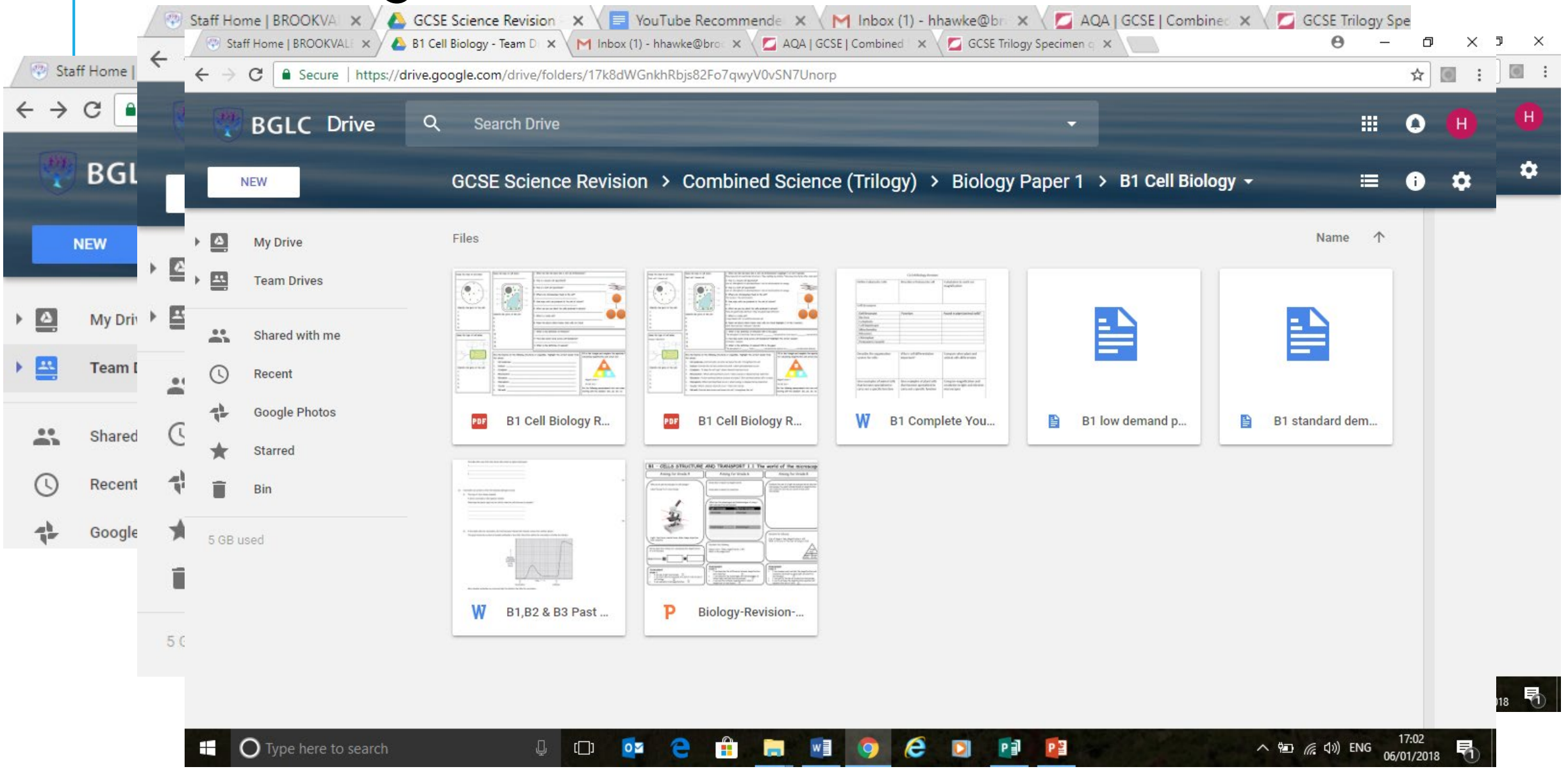
.....

of static can cause sparks if the distance between the object and the earth is big enough.

.....

.....

Google drive – revision materials



(b) When sodium chloride solution is electrolysed the products are hydrogen and chlorine.

(i) What is made from chlorine?

Tick (✓) **one** box.

Bleach ☐

Fertiliser ☐

Soap ☐

(ii) Sodium chloride solution contains two types of po
sodium ions (Na^+).

Why is hydrogen produced at the negative electr

Tick (✓) **one** box.

3. I can calculate total magnification. ☐

Describe the
Plum puddin

Alpha particl

Neutron relative mass:
Electron relative charge

What the formula means

- HCl
  - Each capital letter shows a new element
  - If there are o numbers this means there is one of each
  - 1 H and 1 Cl
- $CaCO_3$
  - A little number only applies to the number it follows
  - 1 Ca, 1 C but 3 O's
- 2KI
  - A big number means that it applies to everything after it
  - So this has 2 K's and 2 I's
- $Mg(OH)_2$
  - Numbers in the brackets times by the number outside the brackets
  - So this has 1 Mg, 2 O and 2 H

Secure | https://app.

SENECA BETA

Biology: AQA GCSE Higher

- 2 Organisation
  - 2.1 Principles of Organis...
  - 2.2 Enzymes
  - 2.3 Circulatory System
    - 2.3.1 Blood Vessels
    - 2.3.2 Blood Vessels 2
    - 2.3.3 The Heart
    - 2.3.4 Circulatory System & Gas Exchange
    - 2.3.5 Blood
    - 2.3.6 Blood Cells
  - 2. Share Free Teacher CPD Course
  - 2.

YouTube Recommended Channels

Helpful channels for revision tips or Science Topics

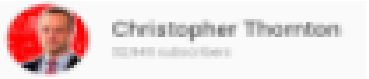
Below are a list of recommended channels on YouTube that have videos that would be helpful in your Science revision:

YouTubers recommended for Science topics and revision tips:

Revision with Eve

Primrose Kitten

Christopher Thornton



YouTubers recommended for Science topics:

My GCSE Science

Free Science Lessons

YouTubers recommended for Revision skills:

Study with Jess

cular organ that pumps
ly.
ambers: the left and
t and right ventricles.
s and a pacemaker.
he body's left, but the
eart from a doctor's

Teacher recommended

GCSE GOOGLE REVISION CLASSROOM

Mr Dixey has invited all students to the revision classroom, please encourage your child to participate.

Questions will be posted on various topic weekly (answers the following week)

REVISION IN SCHOOL

Most classes will finish formal teaching of content by mid march

Mock exams shortly after covering the most recent modules

Approx. 6 weeks for revision in class:

Re-teaching of difficult topics

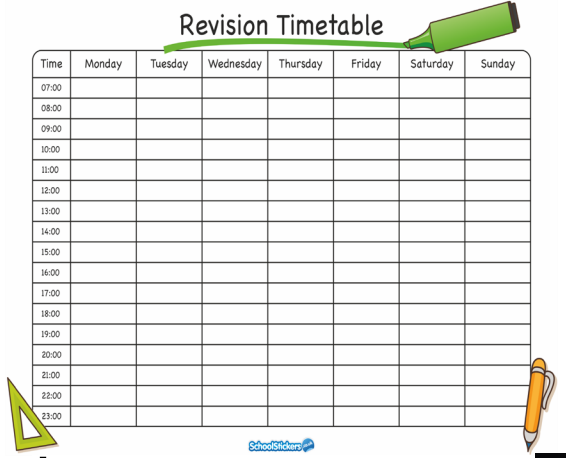
Independent study

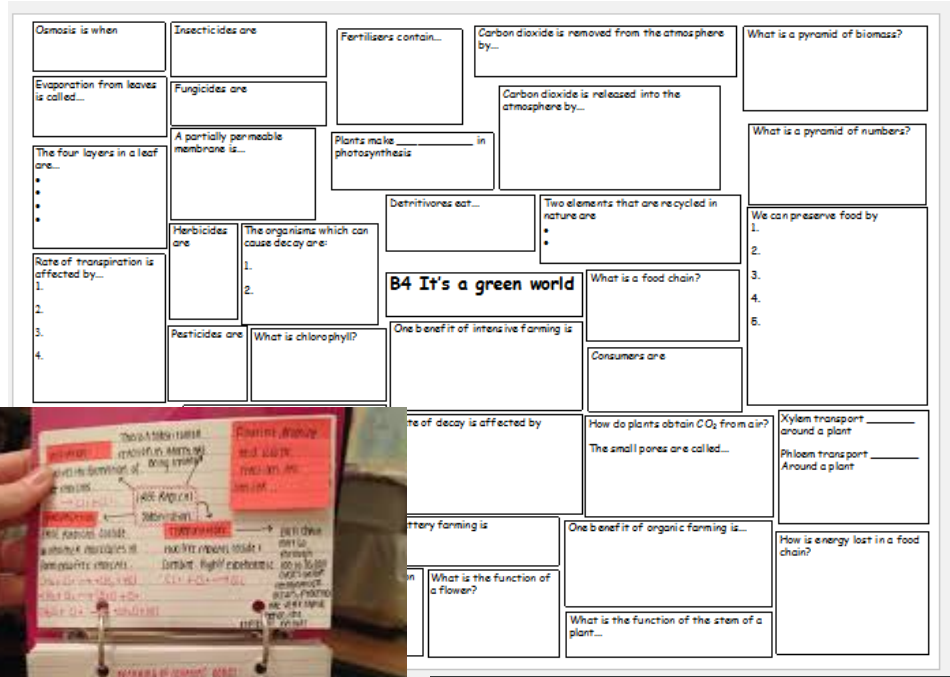
Focussed exam question prep

NO HEADPHONES SO DON'T ASK!

PLAN AHEAD

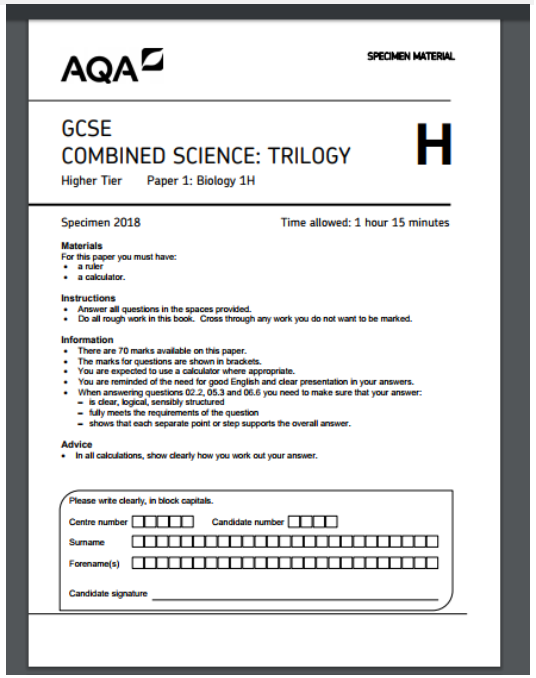
- ❑ Revision timetable
- ❑ Make mind maps for each topic or use the ones on the google drive
- ❑ Make revision cards with key ideas
- ❑ Practice past paper questions
- ❑ Ask your teacher for help!!!





Higher

- Paper 1 (Higher): Specimen mark scheme (208.0 KB)
- Paper 1 (Higher): Specimen question paper (521.5 KB)
- Paper 2 (Higher): Specimen mark scheme (174.6 KB)
- Paper 2 (Higher): Specimen question paper (457.1 KB)
- Paper 3 (Higher): Specimen mark scheme (176.6 KB)
- Paper 3 (Higher): Specimen question paper (344.8 KB)
- Paper 4 (Higher): Specimen mark scheme (161.2 KB)
- Paper 4 (Higher): Specimen question paper (517.3 KB)
- Paper 5 (Higher): Specimen mark scheme (139.8 KB)
- Paper 5 (Higher): Specimen question paper (272.3 KB)
- Paper 6 (Higher): Specimen mark scheme (150.8 KB)
- Paper 6 (Higher): Specimen question paper (418.4 KB)


AQA

SPECIMEN MATERIAL

GCSE
COMBINED SCIENCE: TRILOGY

H

Higher Tier Paper 1: Biology 1H

Specimen 2018 Time allowed: 1 hour 15 minutes

Materials
For this paper you must have:
- a ruler
- a calculator.

Instructions
- Answer all questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- There are 70 marks available on this paper.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions 02.2, 05.3 and 06.6 you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.

Advice
- In all calculations, show clearly how you work out your answer.

Please write clearly, in block capitals.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Forename(s) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

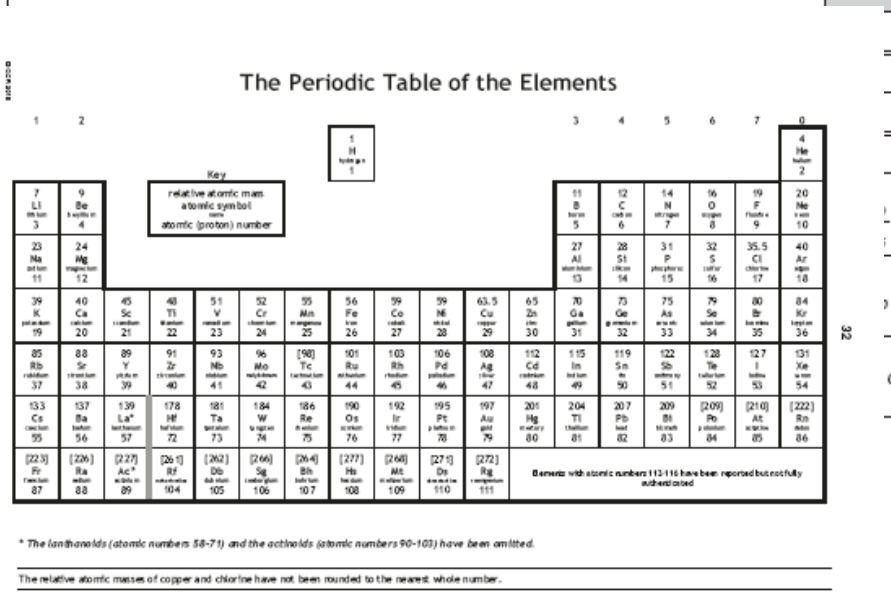
Candidate signature _____

EXAM TIPS

There are 21 formula (23 for Separates) to he exam

More difficult scientific formula (Physics papers) and a periodic table (Chemistry papers) are given in the exams

1	pressure due to a column of liquid = height of column × density of liquid × gravitational field strength (g)	$p = h \rho g$
2	(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance	$v^2 - u^2 = 2 a s$
3	force = $\frac{\text{change in momentum}}{\text{time taken}}$	$F = \frac{m \Delta v}{\Delta t}$
4	elastic potential energy = 0.5 × spring constant × (extension)^2	$E_e = \frac{1}{2} k e^2$
5	change in thermal energy = mass × specific heat capacity × temperature change	$\Delta E = m c \Delta \theta$
6	period = $\frac{1}{\text{frequency}}$	$T = \frac{1}{f}$
7	magnification = $\frac{\text{image height}}{\text{object height}}$	



@crumptonn

Trilogy - You must memorise all of these formulae

Eqn	Word Equation	Symbol Equation
1	weight = mass × gravitational field strength	$W = m \times g$
2	work done = force × distance (along the line of action of the force)	$W = F \times s$
3	force applied to a spring = spring constant × extension	$F = k \times e$
		$s = v \times t$
		$a = \frac{\Delta v}{t}$ or $a = \frac{(v-u)}{t}$
		$F = m \times a$
		$p = m \times v$
		$E_k = \frac{1}{2} \times m \times v^2$
	gravitational field strength × height	$E_p = m \times g \times h$
		$P = \frac{E}{t}$
		$P = \frac{W}{t}$
12	$efficiency = \frac{useful\ output\ energy\ transfer}{total\ input\ energy\ transfer}$	
13	$efficiency = \frac{useful\ power\ output}{total\ power\ input}$	
14	wave speed = frequency × wavelength	$v = f \times \lambda$
15	charge flow = current × time	$Q = I \times t$
16	potential difference = current × resistance	$V = I \times R$
17	power = potential difference × current	$P = V \times I$
18	power = (current)^2 × resistance	$P = I^2 \times R$
19	energy transferred = power × time	$E = P \times t$
20	energy transferred = charge flow × potential difference	$E = Q \times V$
21	$density = \frac{mass}{volume}$	$\rho = \frac{m}{v}$

EXAM TIPS

Rough guide is 1 mark per minute!

Have a go, if in doubt put something it down (no answer = no mark)

9 Enzymes have many industrial uses.

(a) Draw straight lines to join each **enzyme** with the correct **use of the enzyme**.

Draw only **three** lines.

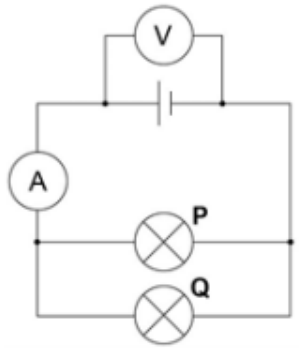
Enzyme	Use of the enzyme
	used in the production of milk for people with intolerance to dairy products
sucrase	
	used on reagent strips to detect lactose
lactase	
	used to join strands of DNA together
ligase	
	used to produce sweeter sugars for food

[2]

0 1 **Figure 1** shows a circuit diagram containing two identical lamps arranged in parallel.

The reading on the ammeter is 186 mA.

Figure 1



0 1 . 1 Which statement about the current through the lamps is true?

[1 mark]

Tick **one** box.

- The current through both lamp **P** and lamp **Q** is **0.093 A** ☐
- The current through both lamp **P** and lamp **Q** is **0.186 A** ☐
- The current through both lamp **P** and lamp **Q** is **0.93 A** ☐
- The current through both lamp **P** and lamp **Q** is **1.86 A** ☐

LONGER ANSWER QUESTIONS

Don't be daunted by the 4 - 6 mark questions.

Read the stem of the question, it often has vital information.

Read the command words carefully – describe, explain, compare, evaluate

If data/graph is given, use it!

It is OK to bullet point your answer.

Read through what you have written!!!

Dare to have a go!

3 Look at the picture of a firefly.

The firefly is able to give out flashes of bright light to attract a mate.

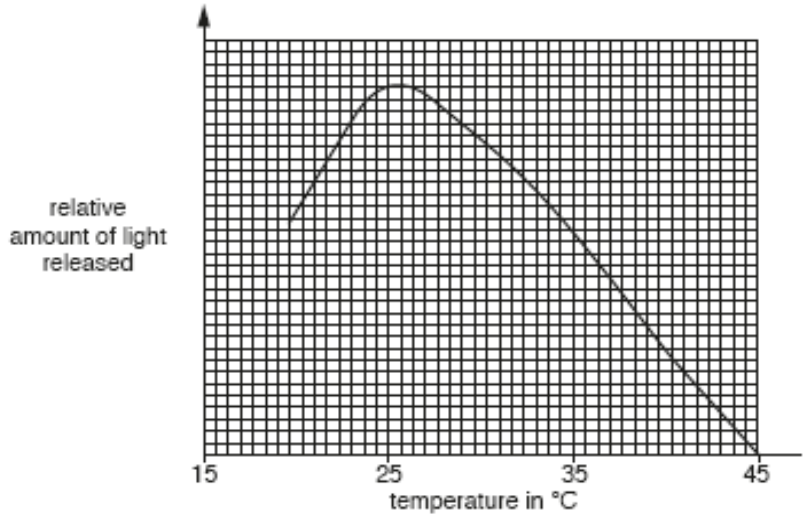
Just after dark is the best time to see fireflies flashing light.

The reaction that releases the light involves the breakdown of a chemical.

An enzyme called luciferase is needed for this reaction.

Look at the graph.

It shows how temperature affects the reaction that releases light.



(a) Use data from the graph to **explain** the effect of temperature on luciferase and explain why it is **only** luciferase enzyme that will catalyse this reaction.

If data is given, use it!

Mark Scheme June 2015

Answer	Marks	Guidance
[Level 3] **Explains the effects of temperature on luciferase AND explains the specificity of enzymes.** Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** **Explains the effects of temperature on luciferase OR explains the specificity of enzymes.** Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** **Describes the effects of temperature on luciferase AND describes the specificity of enzymes.** Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to A.** <u>Levels 2 and 3</u> **Indicative scientific points to explain specificity include:** • 'lock and key' mechanism named & explained • **substrate** shape matches (active site of) luciferase only • a different **substrate** shape does not match (active site of) luciferase **allow** correctly labelled diagram showing 'lock' and key' **ignore** only luciferase enzyme catalyses this reaction (in question) **Indicative scientific points to explain effects of temperature include:** • active site changes shape when denatured (so substrate won't fit) • denaturing may start to occur at around 28°C / occurs at any temperature above optimum • lower collision rates at temperatures around 15°C • higher collision rates at temperatures around 27°C <u>Level 1</u> **Indicative scientific points to describe specificity include:** • enzymes only work with one substance • enzymes have an active site **Indicative scientific points to describe effects of temperature include:** • rate of reaction increases between 20°C and 26°C • rate of reaction decreases between 26°C and 45°C • optimum temperature quoted as 25°C or 26°C or 27°C • reaction stops at 45°C **allow** rate increase or decrease anywhere within the range given above **Use the L1, L2, L3 annotations in Scoris. Do not use ticks.**

0 5 . 3 In coronary heart disease (CHD) layers of fatty material build up inside the coronary arteries. This can cause a heart attack.

Statins and stents can be used to reduce the risk of a heart attack in people with CHD.

Evaluate the use of statins and stents in people with CHD.

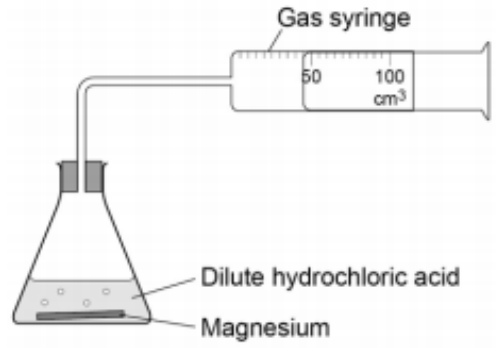
Remember to include a justified conclusion.

[6 marks]

Evaluation – remember to give balanced arguments and a **conclusion**

0 3 A student investigated the rate of the reaction between magnesium and dilute hydrochloric acid.
The student used the apparatus shown in **Figure 4** to collect the gas produced.

Figure 4



0 3 . 1 Outline a plan to investigate how the rate of this reaction changed when the concentration of the hydrochloric acid was changed.

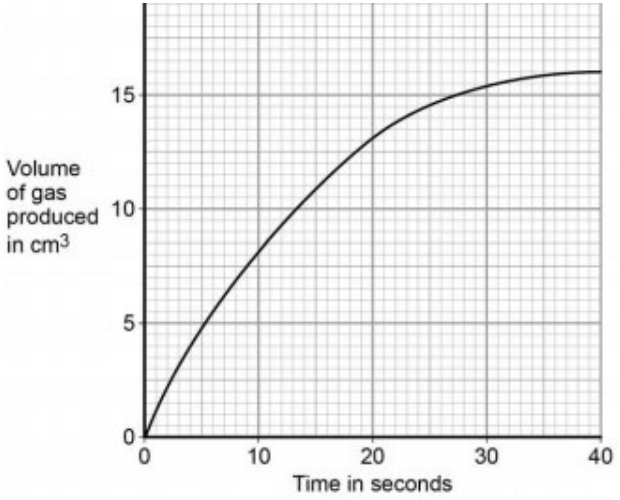
- Describe how you would do the investigation and the measurements you would make.
- Describe how you would make it a fair test.

You do **not** need to write about safety precautions.

[6 marks]

15% of GCSE marks in exams come from questions relating to practicals.

DATA ANALYSIS AND EVALUATION



Draw a tangent to the curve at 20 seconds.

Determine the rate of the reaction at 20 seconds by calculating the gradient of the tangent.

Give the unit.

[4 marks]

Rate of reaction = _____

Unit = _____

If data is given, use it!

0 2 . 5 A driver wishes to buy a new car.

Table 1 gives some data about an electric car and one with a petrol engine.

Table 1

	Electric car	Petrol engine car
Cost (£)	27 000	15 000
Running cost per year (£)	250	2 000
Average lifetime (years)	12	12

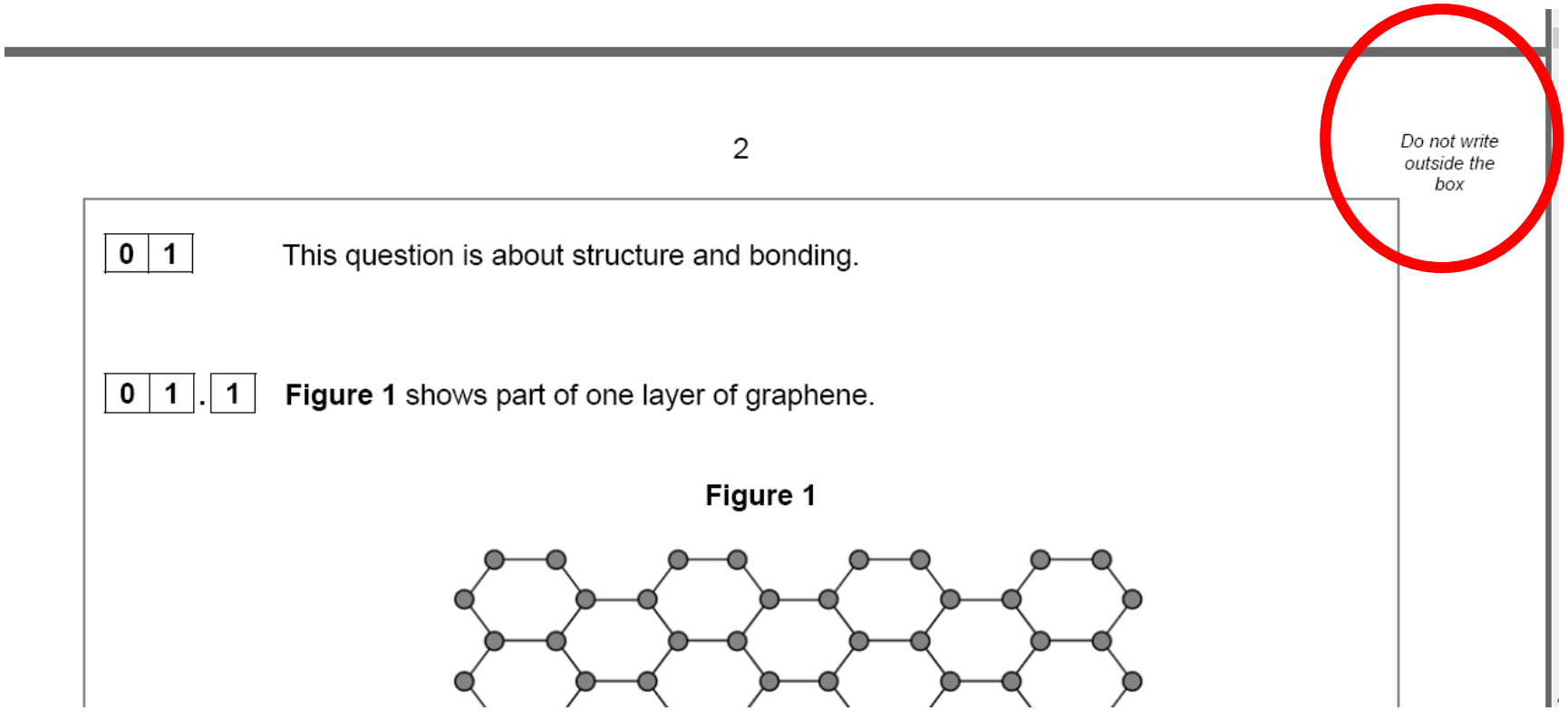
Which car would be the most economic over its 12 year lifetime?

Use data from **Table 1** to support your answer.

You should include the difference in cost in your answer.

[4 marks]

THE EXAM PAPER



2

Do not write outside the box

0 1 This question is about structure and bonding.

0 1 . 1 **Figure 1** shows part of one layer of graphene.

Figure 1

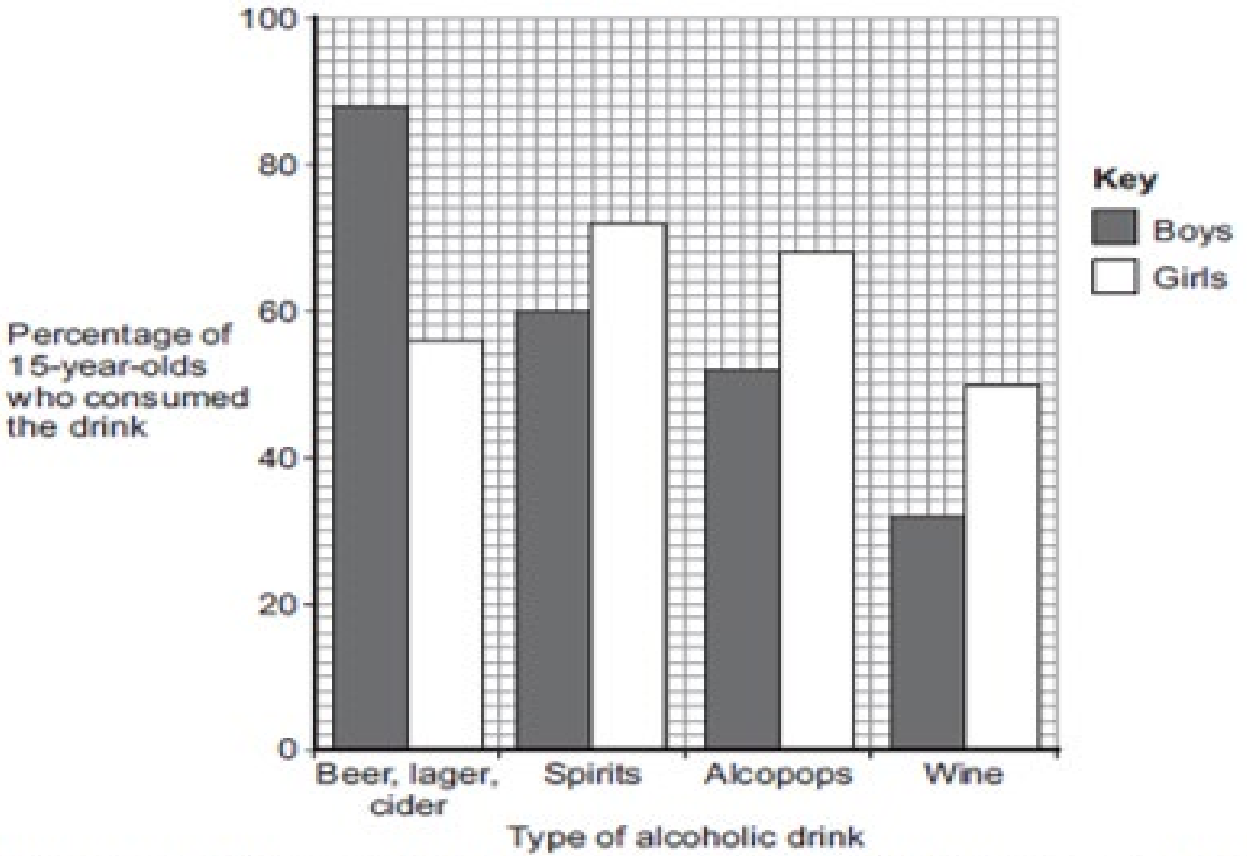
Do not write outside the box may be missed and will not get marked

AQA - INSIGHT FROM THE LAST PREVIOUS EXAMS

Prepare

Figure 1 shows the results of a survey into the different types of alcoholic drinks consumed by one hundred 15-year-old boys and one hundred 15-year-old girls in the UK.

Figure 1



Describe the differences between the **types** of alcoholic drink consumed by boys and by girls.

Use **only** information from **Figure 1**.

[2 marks]

AQA - INSIGHT FROM THE LAST PREVIOUS EXAMS

Prepare for unfamiliar contexts

Read the question carefully too ensure you know what is being asked, understand the command words

Don't waste space repeating the question

Read through your work to check for errors

Be specific in your responses don't use 'it' or 'they'

Make sure you understand why each step in the practical is important

Maths - Show your working out in maths questions

- including the formula you are using if it isn't already given
- don't round answers until you reach the final answer

POSSIBLE TOPICS – COMBINED SCIENCE HIGHER

Biology 1

Cell specialization
Enzymes (PRAC)
Blood
Cancer
Drug development
Respiration

Chemistry 1

Development of atom
Metallic bonding
States of matter
Polymers
Graphite/fullerenes
Metals reduction

Physics 1

Energy changes - Kinetic, gravitational potential, elastic potential energy
Efficiency
National grid
Electricity generation

Biology 2

Contraception/infertility
Genetic inheritance
Genetic disorders
Evidence of evolution
Food chains
Biodiversity

Chemistry 2

Cracking
Waste water management
Reducing resources
Rate of reaction - temp

Physics 2

Work done
Energy transfers
Infra red radiation (PRAC)

POSSIBLE TOPICS – COMBINED SCIENCE FOUNDATION

Biology 1

Active transport
Enzymes (PRAC)
Blood
Cancer
Drug development
Respiration

Chemistry 1

Development of atom
Separating mixtures
Structure of diamond

Physics 1

Electricity generation
Radioactive contamination

Biology 2

Control of blood glucose
Contraception/infertility
Genetic disorders
Evolution and fossils
Genetic engineering
Classification
Maintaining biodiversity

Chemistry 2

Waste water management
Reducing resources
Rate of reaction - temp

Physics 2

Energy transfers
Infra red radiation (PRAC)

WHAT YOU CAN DO AS A PARENT - GET INVOLVED!

Help them **plan** their revision – small chunks

Question them using the revision guides

Mark the papers for them, the answers are available on exam board websites

Provide a calm environment…….. remove distractions

Controlled access to electronic devices

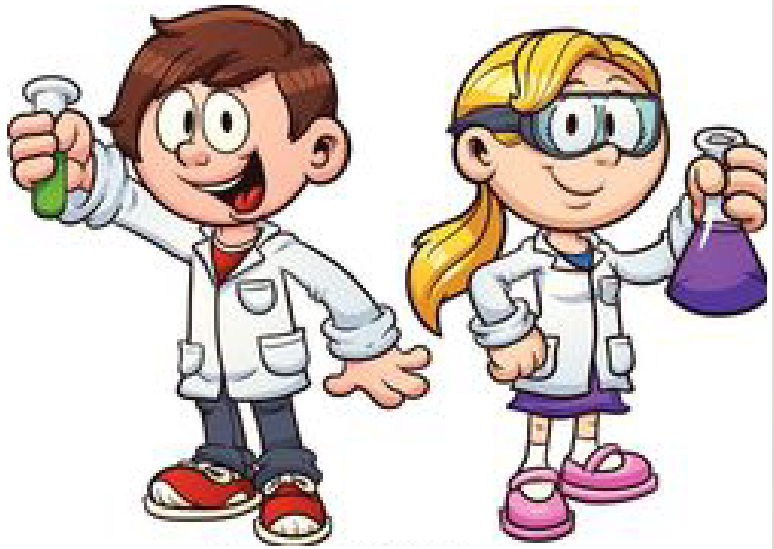
Food, water and exercise

Breakfast before exams!

Right equipment on the day……. Calculator!

Sleep!

ANY QUESTIONS



Good Luck in your EXAMS!

You'll be AMAZING,
I asked around -
we all agreed!