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Mrs C Money
Head of Faculty

Jesmond Park Academy

What will my child be studying this year?

At Jesmond Park Academy we have developed a curriculum based on the AQA KS4 specifications.

Our aim is to deliver a knowledge rich spiral curriculum, which allows continuous learning from Y7 to Y13.

Year 10 GCSE Science

All students take science at GCSE.

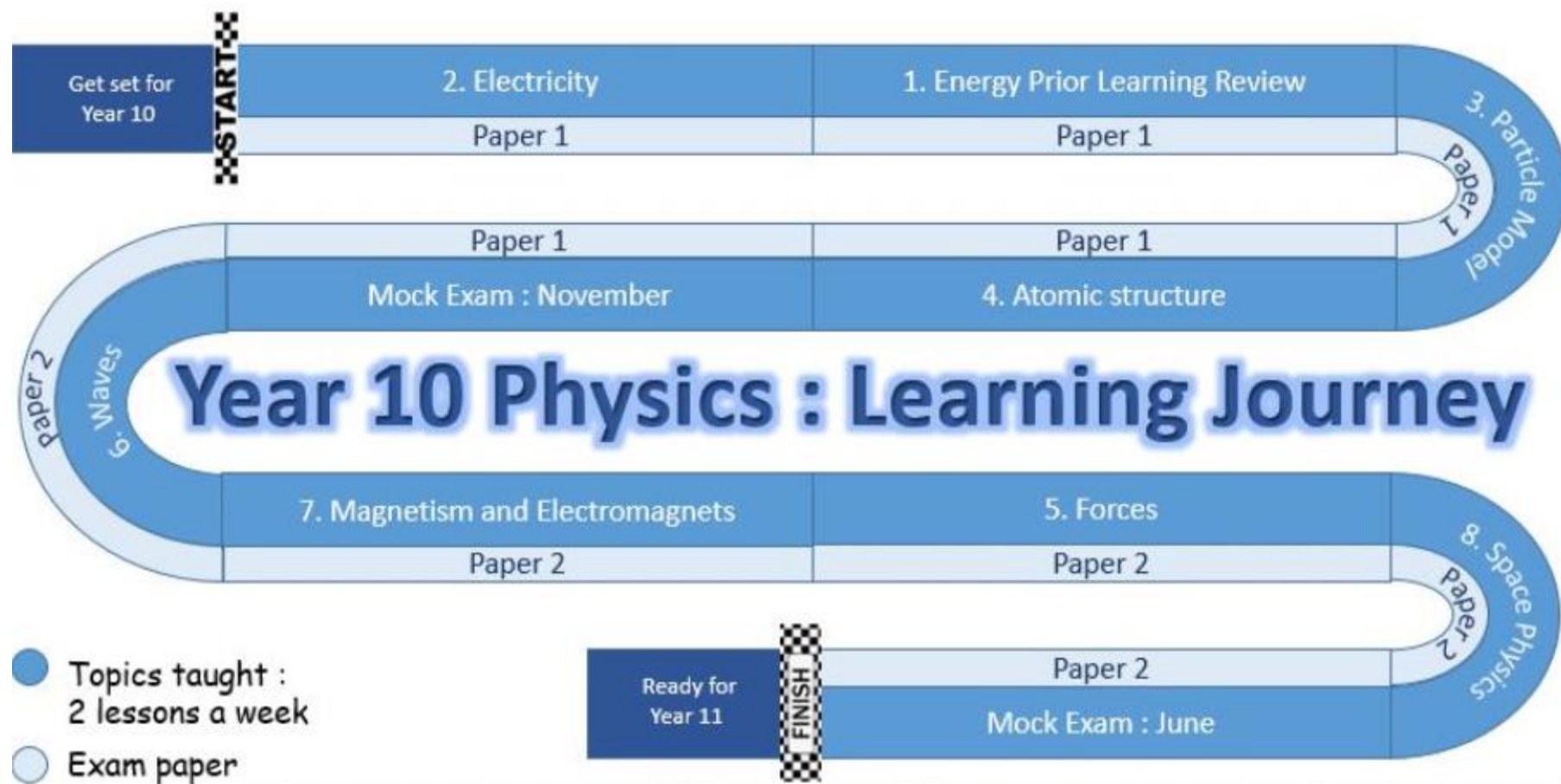
All students must study all 3 subjects as part of their science curriculum.

All students study 6 lessons of science a week, 2 Biology, 2 Chemistry, 2 Physics.

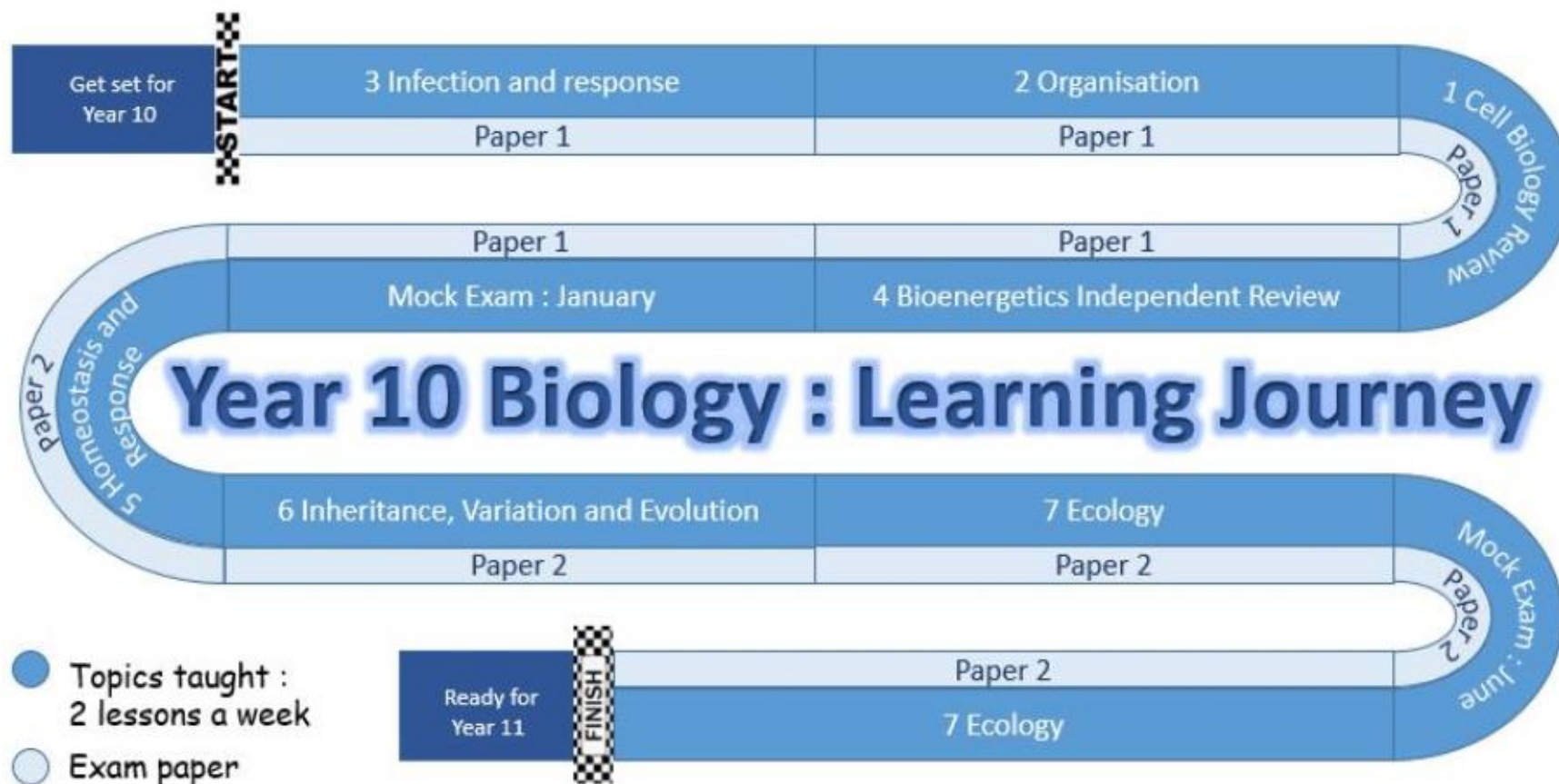
Most will study Trilogy science where they are awarded two "Science" GCSE's at the end of Year 11.

Some students will be selected to study Separate Sciences in the same time as Trilogy, resulting in a Biology, a Chemistry and a Physics GCSE.

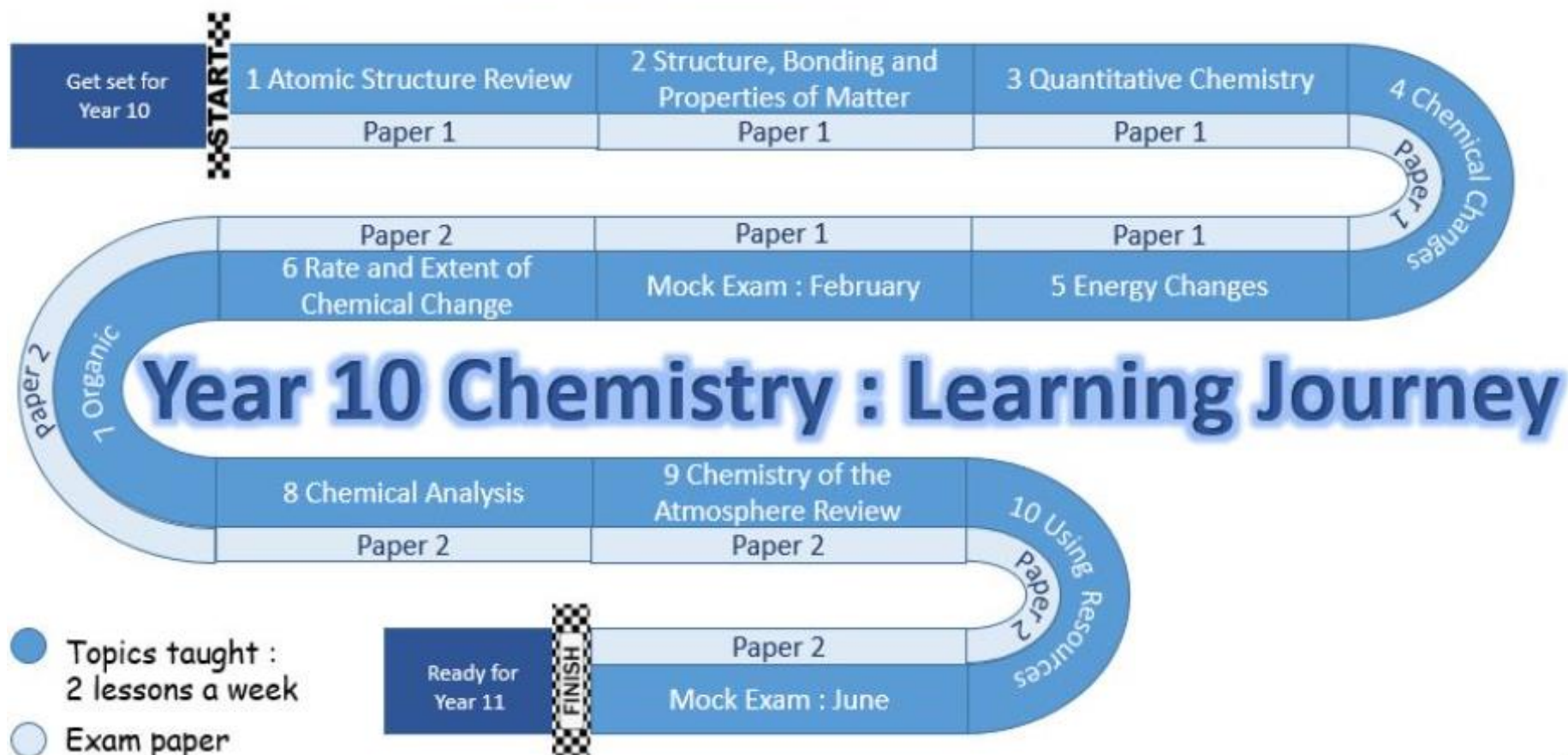
YEAR 10 Teaching Overview - Physics



YEAR 10 Teaching Overview - Biology



YEAR 10 Teaching Overview - Chemistry



How will my child be assessed in science?

Assessment is a very important part of our curriculum.

2 types of assessment at Jesmond Park Academy

1. Formative assessment

- Designed to be low stakes for the students (not graded)
- Allow staff to easily identify and address any gaps in knowledge and/or areas of misconception.

2. Summative assessment

- Graded assessments
- Used to track student progress and encourage and support all students to be successful in science.

Trilogy Science - The Exams across year 10

Subject	Exam 1	Exam 2
Biology	January 2027	June 2027
Chemistry	Feb 2027	June 2027
Physics	November 2026	June 20267

Your child we be examined by 2 exams in each subject. Each exam will be 1hr 15min.

Trilogy Science - The Exams across year 11

Subject	Exam 1 Mock	Exam 2 Mock	GCSE Exams Paper 1	GCSE Exams Paper 2
Biology	w/c 11 th January 2027	w/c 15 th March 2027	Tuesday 11 th May 2027	Thursday 10 th June 2027
Chemistry			Monday 17 th May 20267	Tuesday 15 th June 2027
Physics			Tuesday 25 th May 2027	Friday 18 th June 2027

Your child we be examined by 2 exams in each subject. Each exam will be 1hr 15min.

Trilogy Science - Biology

Paper 1

What's assessed

Topics 1 - 4: Cell biology;
Organisation; Infection and
response; and
Bioenergetics.

How it's assessed

- written exam: 1 hour 15 minutes Foundation and Higher Tier
- 100 marks 16.7% of the GCSE

Questions

Multiple choice, structured,
closed short answer and open
response

Paper 2

What's assessed

Topics 5 - 7: Homeostasis
and response; Inheritance,
variation and evolution; and
Ecology.

How it's assessed

- written exam: 1 hour 15 minutes Foundation and Higher Tier
- 100 marks 16.7% of the GCSE

Questions

Multiple choice,
structured, closed short
answer and open response

Trilogy Science - Chemistry

Paper 1

What's assessed

- Topics 1-5: Atomic structure and the periodic table; Bonding, structure and the properties of matter; Quantitative chemistry; Chemical changes; and Energy changes

How it's assessed

- written exam: 1 hour 15 minutes
- 70 marks 16.7% of the GCSE

Questions

Multiple choice, structured, closed short answer and open response

Paper 2

What's assessed

- Topics 6-10: The rate and extent of chemical change; Organic chemistry; Chemical analysis, Chemistry of the atmosphere; and Using resources.

How it's assessed

- written exam: 1 hour 15 minutes
- 70 marks 16.7% of the GCSE

Questions

Multiple choice, structured, closed short answer and open response

Trilogy Science - Physics

Paper 1

What's assessed

Physics topics 18-21: Energy; Electricity; Particle model of matter; and Atomic structure.

How it's assessed

- Written exam: 1 hour 15 minutes
- Foundation and Higher Tier
- 70 marks
- 16.7% of GCSE

Questions

Multiple choice, structured, closed short answer and open response

Paper 2

What's assessed

Physics topics 22-24: Forces; Waves; and Magnetism and electromagnetism

How it's assessed

- Written exam: 1 hour 15 minutes
- Foundation and Higher Tier
- 70 marks
- 16.7% of GCSE

Questions

Multiple choice, structured, closed short answer and open response

Foundation or Higher - Tiers of entry for exams

Students will sit either a higher or foundation level paper during their GCSEs. These differ in difficulty, grading and the suitability of each paper for each individual's ability. Very careful monitoring and tracking occurs to make sure this is right for each individual.

Difficulty Level:

Foundation Tier: Covers easier, more straightforward questions and concepts, which focus on ensuring students have a solid understanding of the basics.

Higher Tier: Includes more challenging questions, requiring a deeper understanding of scientific concepts and more complex problem-solving.

Foundation or Higher - Tiers of entry for exams

Grades Available:

Foundation Tier: Students can achieve grades 1 to 5. This means the maximum grade possible is a 5.

Higher Tier: Students can achieve grades 4 to 9, where a 9 is the highest possible grade.

Choosing the Right Level:

If a student is struggling with science or tends to score lower in tests, Foundation may be better suited to help them achieve a pass (grades 1-5).

For students aiming for higher grades and who consistently achieve a grade 5 or higher in all sciences, Higher might be a better fit to help them access grades 6 to 9.

Foundation or Higher - Tiers of entry for exams

Risk of the Higher Paper:

If a student sits the Higher Tier exam but does not perform well, they risk getting a U (unclassified), if they don't reach at least a grade 4. This can be risky for students who are borderline between the two levels.

Our aim is always to secure the best possible grade for our students and allow as many as possible progression to A level. For A level sciences students need at least two grade 6's in science, it does not make a difference if those 6s come from separate sciences or from trilogy combined science. Our entry for A-Level sciences also requires a 5 or above on the higher maths paper.



Knowledge Goals

COMBINED SCIENCE (H/F)

PARTICLE MODEL OF MATTER

Why we study this topic?

The particle model is widely used to predict the behaviour of solids, liquids and gases and this has many applications in everyday life. It helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft. It also explains why it is difficult to make a good cup of tea high up a mountain!

Lesson Sequence

1. Density
2. Internal Energy
3. Specific Latent Heat
4. Particle Motion
5. Specific Heat Capacity



Knowledge Goals To Know...

- ❑ that properties of solids, liquids and gases in terms of the particles in each state of matter. Particles are moving and have kinetic energy.
- ❑ that density is the mass which is contained in a given volume. A denser material will sink in a less dense material.
- ❑ that displacement can be used to find the volume of an irregular object.
- ❑ that If enough energy is added to or removed from an arrangement of particles a change of state can occur. Evaporation occurs when particles near the surface of the liquid have enough energy to escape.
- ❑ ..why some substances have higher/lower melting and boiling points than others.
- ❑ ...that the total kinetic energy and potential energy of all the particles (atoms and molecules) that make up a system is known as the internal energy.
- ❑ that Specific Latent Heat is the energy absorbed by a substance during a change of state
- ❑ that The amount of energy needed to heat a material is known as Specific Heat Capacity.



I know how to... section

Formative assessment

- Mainly working content-based questions from past lessons.
- Looking to address misconceptions and gaps in knowledge.

LINKING  Misconceptions about the particle model 					
	Particle model	A	B	C	D
Question 1	A solid is heated up to become a liquid. Which statements are true?	Particles break free from the bonds that hold them together.	The solid particles expand.	The solid particles stay the same size.	The bonds holding the particles together weaken.
Question 2	When comparing a solid to a gas, which statement is true?	The solid particles are larger than the gas particles.	The solid particles are smaller than the gas particles.	They are different particles.	The solid particles are the same size as the gas particles.
Question 3	Why does steam take up more space than ice at room pressure?	The ice particles have no energy and cannot move around.	The steam particles are free to move around.	The steam particles are larger than the ice particles.	The ice particles are larger than the steam particles.



I know that... section

Formative assessment

- Test based on the knowledge goals for each topic, every lesson.
- Self-assessed by student in red pen
- Staff to review longer answers and highlight in green 3 EBIs questions that students should focus on when revising the topic.

KNOWLEDGE CHECK



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DEEPER MARKING TASK: RP Specific Heat Capacity

Write the equation for working out Specific Heat Capacity (1)

Water in a kettle is boiled then cooled and the temperature of the water decreases by 22°C . The mass of water in the kettle is 0.50 kg .

The specific heat capacity of water is $4200\text{ J/kg }^{\circ}\text{C}$. Calculate the energy transferred to the surroundings from the water.

Energy = _____ joules (2)

The energy transferred from the water in the kettle to the surroundings in 2 hours is

$46\,200\text{ J}$.

The mass of water in the kettle is 0.50 kg .

The specific heat capacity of water is $4200\text{ J/kg }^{\circ}\text{C}$.

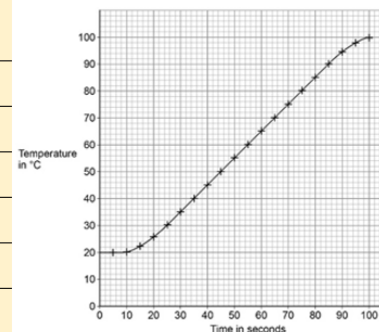
The initial temperature of the water is 100°C .

Calculate the temperature of the water in the kettle after 2 hours.

A student heated water in an electric kettle. The student investigated how quickly the kettle could increase the temperature of 0.50 kg of water.

The graph below shows the results of the investigation.

Describe a method the student could have used to obtain the results shown in the graph.



(6)



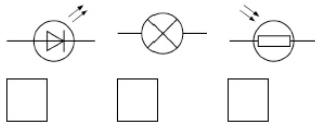
I know how to... section

Formative assessment

- Mainly working scientifically skills-based questions from past GCSE papers.
- Maximum 20 marks and teacher assessed in green pen.

Q1. A filament lamp breaks if the electric current in the filament becomes too big.

- (a) What is the correct symbol for a filament lamp? Tick (✓) **one** box.



(1)

- (b) What is meant by an electric current? Tick (✓) **one** box.

The energy carried by each unit of charge

☐

The flow of electrical charge

☐

The number of electrons in a circuit

☐

The speed at which charge moves

☐

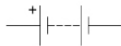
(1)

A manufacturer investigated the maximum current value of some filament lamps.

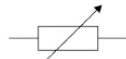
- (c) The figure below shows the symbols for an ammeter, a battery and a variable resistor.



Ammeter



Battery



Variable resistor

The manufacturer connected an ammeter, battery, filament lamp and variable resistor in series.

Draw a circuit diagram to show the manufacturer's circuit. Include the symbol for a filament lamp from part (a)

(1)

- (e) When the potential difference across a filament lamp was 0.75 V, the current in the filament lamp was 0.16 A.

Calculate the power of the filament lamp.

Use the equation: power = potential difference $\times$ current

Power = _____ W

(2)

- (f) Write down the equation which links charge flow (Q), current (I) and time (t).

(1)

- (g) The manufacturer increased the current in the filament lamp to 200 mA.

Calculate the charge flow through the filament lamp in 15 s.

Charge flow = _____ C

(3)

- (h) The manufacturer increased the current in the filament lamp from 200 mA.

The filament in the lamp broke when the current reached 320 mA.

How many times greater than 200 mA was the current at which the filament broke?

6 * 1hr 15min minute exam papers

- Consists of multiple exam style questions from past GCSE papers.
- Assessments will test knowledge and understanding of content while also assessing working scientifically skills.
- Questions will increase in demand from grade 1 to 5 on the foundation paper and 4 to 9 on the higher paper.

Q4. The drawings below show six ways of providing energy.

coal fire

turbine

burns coal to provide heat

A

gas boiler

burns gas to provide heat

D

uses solar provide

E

The pupil then plays her flute at a higher pitch and more quietly.

Which diagram below shows the pattern that would be seen on the oscilloscope?

A

B

C

D

Q6. (a) The diagram below shows a ray of red light entering

air

glass block

air

ray of red light

Q9. (a) The diagram shows a sperm cell. Sperm cells are adapted for fertilisation.

cytoplasm

membrane

nucleus

tail

Sperm cells use their tails to swim towards an ovum (egg). Give one other way the sperm cell is adapted for fertilisation.

.....

.....

(b) The diagrams below show two other cells.

cell wall

chromosome

cytoplasm

a bacterium

folded membrane

chromosomes

cytoplasm

cell from the inner lining of the intestine

(i) Look at the diagrams above. What is the difference between the location of the genetic material in the bacterium and in the cell from the lining of the intestine?

.....

.....

(ii) What is the function of the genetic material in a cell?

.....

.....

(c) Cells in the lining of the intestine are adapted to absorb digested food. How does the folded membrane of these cells enable them to absorb the maximum amount of digested food?

.....

.....

How can I support my child with their science?

General advice

1. Check your child's planner and frog each week.

- Discuss any planner comments with a focus on how to improve.
- Talk to them about their homework.

2. Ask them what they have been learning in science.

- Ask them to bring home their books to show you.
- If they open up and say they are struggling then email their teacher.

3. Encourage them to attend P7's - these will become compulsory at the end of year 10 and during year 11.

How can I support my child with their science?

Revision Support

Before any summative assessment, students will be given a revision list. This is a list of all the topics that may be assessed in the test.



Jesmond Park Academy

Revision Homework: SUMMATIVE ASSESSMENT 1

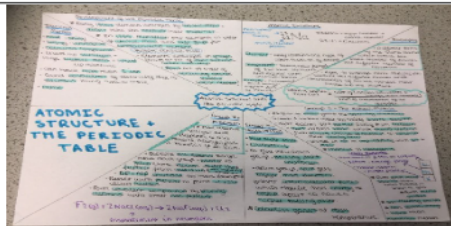
Task Objective: To revise the key concepts required for your summative assessment

To prepare for your forthcoming science test you will need to revise the following topics:

MATTER: Periodic table • Atomic structure • What are elements • Structure of the periodic table	ECOSYSTEMS: Photosynthesis • Word equation • What photosynthesis is • Factors affecting photosynthesis
MATTER: types of reaction • What are compounds • Writing word equations • Balancing equations • Chemical and physical changes • Reactivity of metals • Displacement reactions	Digestive system • Balanced diet • Food labels • Digestive system • Enzymes and how they work • Digestive enzymes

Revision Tips:

- Make a revision poster to summarise all key points
- Make small flashcards to help memorise content
- Use BBC Bitesize to revise the key ideas and the end of topic quizzes to test your knowledge
- Don't forget to see you teacher if you have any questions!



YOU MUST PROVIDE EVIDENCE OF YOUR REVISION

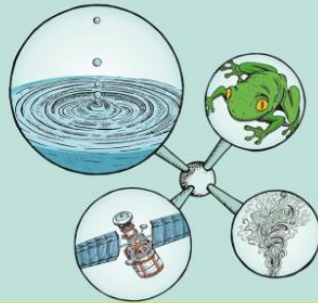
AQA GCSE (9-1)

Combined Science: Trilogy

Higher tier

Revision Guide

Includes
FREE
online book



Unbeatable revision and exam preparation

AQA GCSE (9-1)

Combined Science: Trilogy

Foundation tier

Revision Workbook



AQA

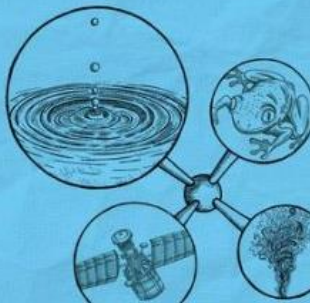
exam preparation

GCSE Combined Science: Trilogy REVISION GUIDE

Higher

For the
9-1
exams

Includes free online edition



Had a look ☐

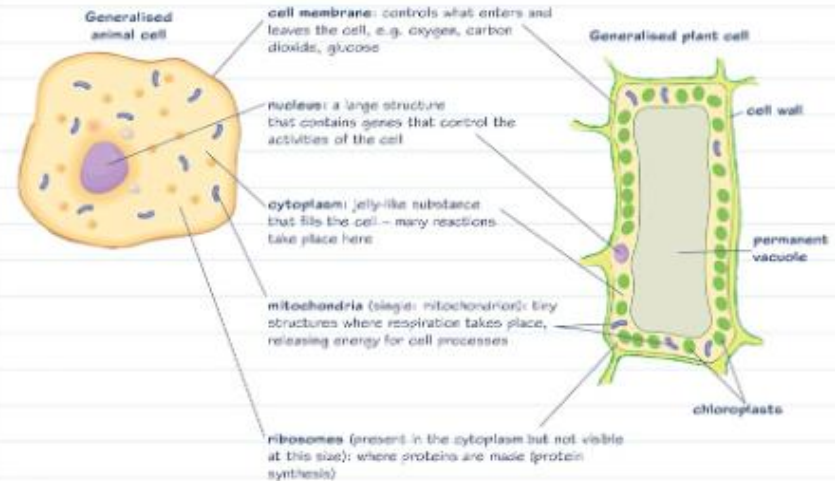
Nearly there ☐

Nailed it! ☐

Animal and plant cells

Animal cells and plant cells contain smaller structures which have different functions.

Structures of animal cells and plant cells



Worked example

Name the three structures that are present in most plant and algal cells, but are not present in animal cells. Describe the function of each structure. (3 marks)

Plant and algal cells contain a permanent **vacuole**. This is filled with cell sap and helps to keep the cell rigid.

They have a **cell wall** made of cellulose, which strengthens the cell.

They also contain **chloroplasts**. These are the structures where photosynthesis takes place to make food for the cell.

Algae are simple aquatic organisms. Their cells have a similar structure to plant cells, so algae used to be classified as plants. They are now classified as protists (see pages 34 and 74).

Take care not to confuse the cell wall with the cell membrane. Bacterial cells also have cell walls, but these are not made from cellulose.

Now try this

- 1 Name the cell structures that are found in both animal cells and plant cells. (5 marks)
- 2 Muscle cells contain more mitochondria than skin cells. Suggest an explanation for this. (2 marks)
- 3 Cells found in plant roots do not usually contain chloroplasts. Suggest an explanation for this. (2 marks)

Revision

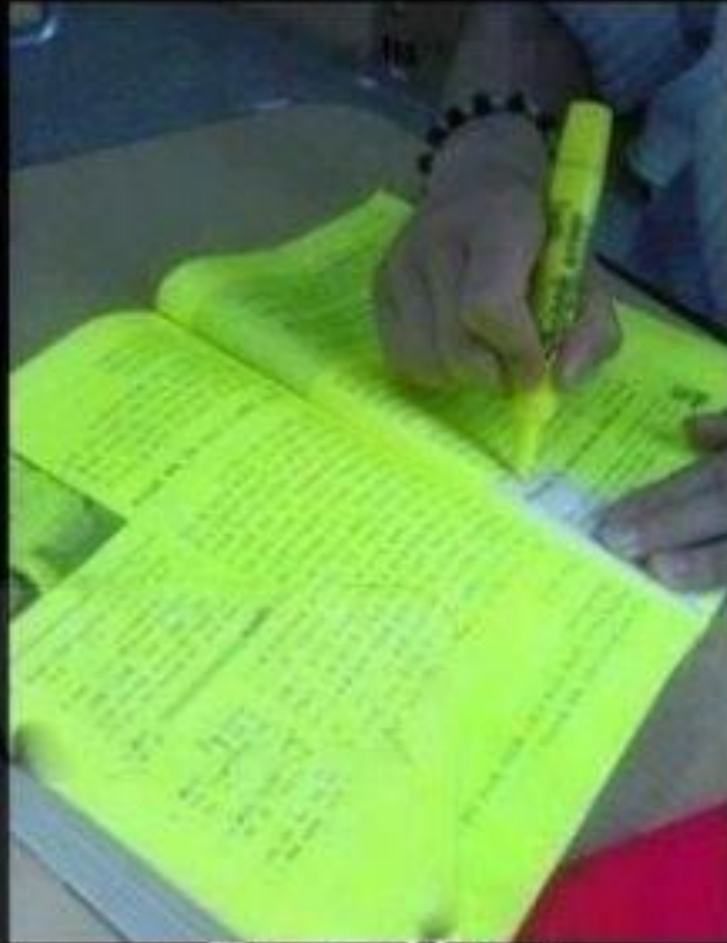
What students think happens with revision...



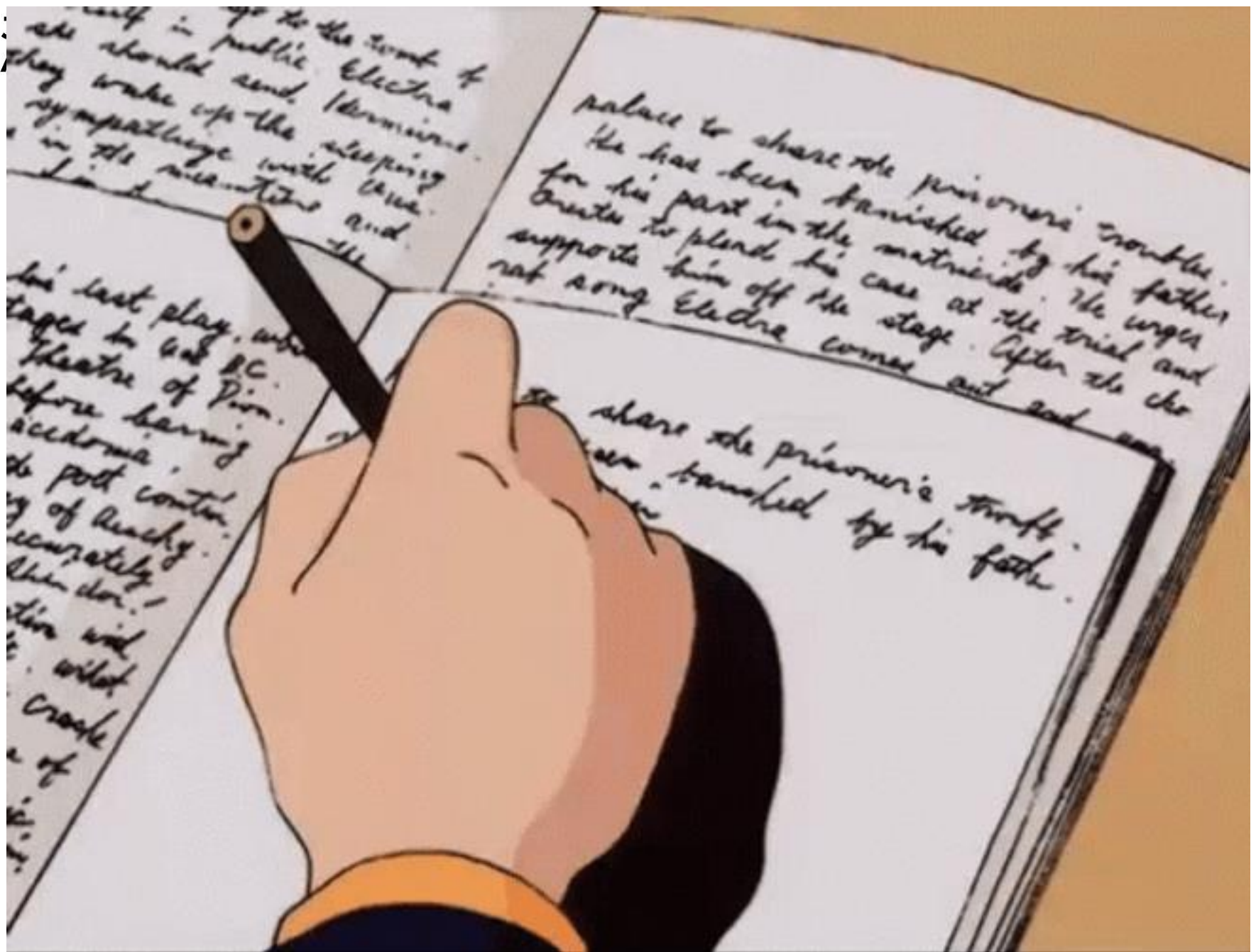
Summarizing before exam.



expectation



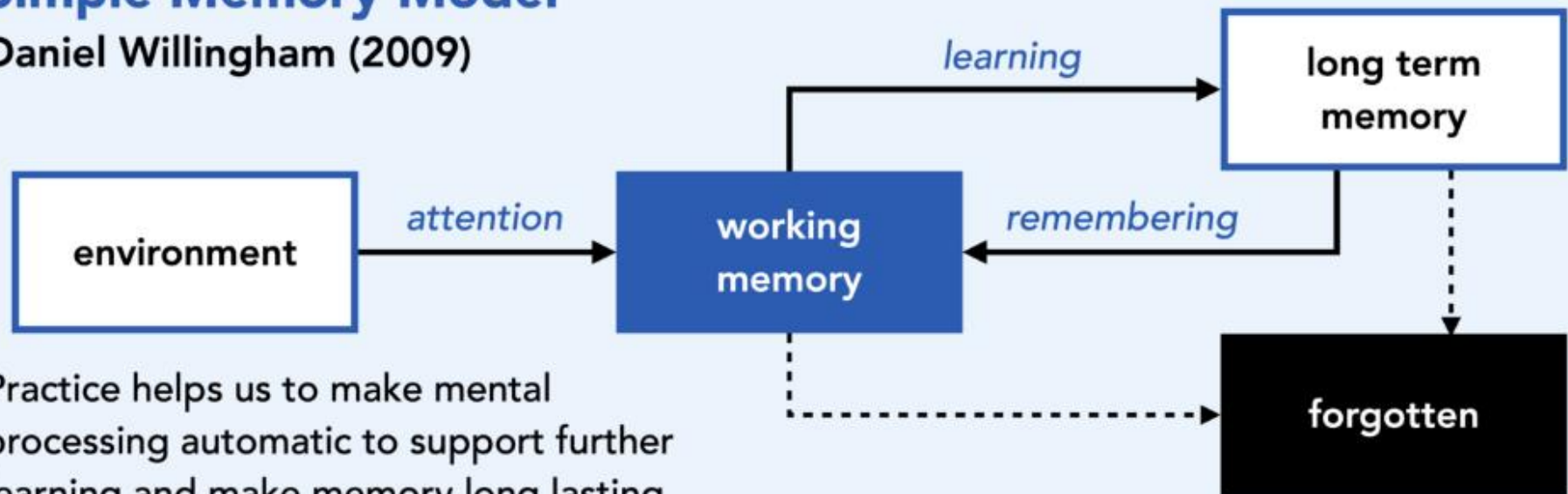
Reality



Best form of revision is retrieval practice ...

Simple Memory Model

Daniel Willingham (2009)



Practice helps us to make mental processing automatic to support further learning and make memory long lasting.

3 'R's: Remember It, Recall It, Retain It.

Promote revision strategies that get your child to actively retrieve their learning.

Example: Flashcards.

Cards with question and the front and answers on the back.

ORGANISM: Digestion

Food

You need to eat a wide variety of foods to get all the food substances that we need. When we do this, we are said to have a **balanced diet**. Carbohydrates, proteins, fats and oils (lipids), vitamins and minerals are **nutrients**, which means that they provide the raw materials for making other substances that the body needs.

Substance needed	Examples	Why it is needed	Good source
carbohydrates	starch, sugars	For energy (in respiration)	bread, cereal, rice, potatoes
protein		For growth and repair (building new substances)	meat, fish, beans
vitamins	vitamin C	For health	fruits and vegetables (e.g. oranges contain lots of vitamin C)
minerals	calcium	For health	fruits, vegetables and dairy products (e.g. milk contains calcium)
fibre		For health (helps to stop constipation)	wholemeal bread, wholegrain rice, celery and other fibrous vegetables
water		For health (water dissolves substances and fills up cells)	

We can use tests to find out which substances are in foods. For example, starch makes iodine solution go a blue-black colour.

Nutrition information labels on foodstuffs tell us what the food contains. The labels also tell us how much energy is stored in the substances that make up the food. The amount of energy is measured in kJ.

- levels of a
- age (name)
- whether it's

Food labels tell us how many calories (energy) are in the food. People often use the word 'calories' to mean 'energy'.

Digestion

Digestion is the process by which food is broken down into small molecules that the body can use.

Summary Sheets

ORGANISM: Digestion

The gut

Food is digested in the gut.



Putting food in the mouth is called **ingestion**. The food is then swallowed and moves down the **oesophagus**. Digestive juices contain enzymes.

Saliva is produced by the **salivary glands**. Saliva makes food easier to swallow.

In the stomach, strong acids are added to the food and more digestive juices are added to break down proteins.

Food is swallowed down the **gullet** (oesophagus) into the **stomach**. The muscles along the oesophagus get smaller (they contract).

FOLD HERE AND GLUE INTO BOOK

Y8 Periodic table Assessment

- I know that an element is made from...
 - ☐ A. several different types of atoms.
 - ☐ B. only one type of atom.
 - ☐ C. made of two different types of atoms joined together.
 - ☐ D. made of different types of compounds.
- I know that an atom is made from...
 - ☐ A. Protons, neutrons, and molecules
 - ☐ B. Protons, electrons, and neutrons
 - ☐ C. Neutrons, electrons, and compounds
 - ☐ D. Electrons, neutrons, and cells
- I know that the atomic number of an element tells us...
 - ☐ A. the number of neutrons in an atom.
 - ☐ B. the number of protons in an atom.
 - ☐ C. the number of electrons in an atom.
 - ☐ D. the mass of the atom.
- I know how to calculate the number of neutrons in an atom.
 - ☐ A. Subtract the atomic number from the mass number.
 - ☐ B. Add the atomic number to the mass number.
 - ☐ C. Subtract the mass number from the atomic number.
 - ☐ D. Divide the mass number by the atomic number.
- I know that the electrons are...
 - ☐ A. located in the nucleus and have a positive charge.
 - ☐ B. located on the shells/orbitals and have a positive charge.
 - ☐ C. located in the nucleus and have a negative charge.
 - ☐ D. located on the shells/orbitals and have a negative charge.
- I know that the periodic table is a...
 - ☐ A. list of all known molecules
 - ☐ B. a list of all known elements
 - ☐ C. a chart of all known compounds
 - ☐ D. a table of all known atoms

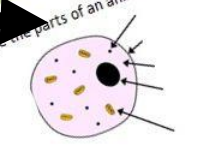
Name: _____ Class: _____

- I know that the periodic table is arranged in...
 - ☐ A. Rows called groups and columns called periods.
 - ☐ B. Rows called periods and columns called groups.
 - ☐ C. Rows called elements and columns called atoms.
 - ☐ D. Rows called atoms and columns called elements.
- I know that the elements in group 1 known as the...
 - ☐ A. Halogens
 - ☐ B. Alkali metals
 - ☐ C. Noble gases
 - ☐ D. Transition metals
- I know that as you go down group 1 the reactivity of the element...
 - ☐ A. decreases.
 - ☐ B. It increases.
 - ☐ C. It stays the same.
 - ☐ D. It disappears.
- I know that the elements in group 7 known as the?
 - ☐ A. Halogens
 - ☐ B. Alkali metals
 - ☐ C. Noble gases
 - ☐ D. Transition metals
- I know that as you go down group 1 the reactivity of the element...
 - ☐ A. decreases
 - ☐ B. It increases.
 - ☐ C. It stays the same.
 - ☐ D. It disappears.

Cell Biology

Biology Paper 1

Name the parts of an animal cell



Cell Biology

Biology Paper 1

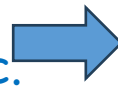
What is the definition of diffusion?

The movement of particles from an area of high concentration to an area of low concentration.

Promote revision strategies that get your child to actively retrieve their learning.

Example: Brain dump

On an A4 piece of paper, write down what you can remember from the topic.



Use the summary sheet (one drive) to add any info in red that they couldn't recall.



RETRIEVAL PRACTICE – NO NOTES ALLOWED!

Without looking in your books, write down everything you remember about _____



REPEAT

!

Hopefully, each time they will remember more.

ORGANISM: Digestion **Summary Sheets**

Food

We need to eat a wide variety of foods to get all the food substances that we need. When we do this, we are said to have a **balanced diet**. Carbohydrates, proteins, fats and oils (lipids), vitamins and minerals are **nutrients**, which means that they provide the raw materials for making other substances that the body needs.

Substance needed	Examples	Why it is needed	Good sources
Carbohydrates	starch, sugars	For energy (respiration)	pasta, bread, rice, potatoes
Proteins	meat, fish, beans	For repair (tissues)	meat, fish, beans
Fats and vegetables	(e.g. oranges contain lots of vitamin C)	For energy and health	fruits and vegetables
Fruits, vegetables and dairy products	(e.g. milk contains calcium)	For health and energy	fruits, vegetables and dairy products
Wholemeal bread, wholegrain rice, celery and other fibrous vegetables		For health and energy	wholemeal bread, wholegrain rice, celery and other fibrous vegetables

Food is swallowed down the gullet (oesophagus or food pipe). The muscles above the swallowed food get smaller (they contract) pushing the food down.

The large intestine removes water from the food that cannot be digested.

Food that cannot be digested forms **faeces**. Faeces are stored in the **rectum**.

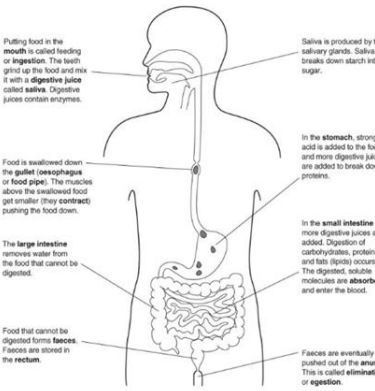
To help absorb the digested food, the wall of the small intestine is folded and covered with **villi**. The cells have **microvilli**. These features all increase the **surface area**. The wall of the small intestine is also only one-cell thick, meaning that it is easy for small molecules to **diffuse** out of the small intestine and into the blood. The digested food molecules are carried in the **blood plasma**.

The surface area is the total area of the faces of a three-dimensional object.

ORGANISM: Digestion **Summary Sheets**

The gut

Food is digested in the gut.



Putting food in the mouth is called **feeding** or **ingestion**. The teeth grind up the food and mix it with a **digestive juice** called **saliva**. Digestive juices contain enzymes.

Saliva is produced by the **salivary glands**. Saliva breaks down starch into sugar.

In the **stomach**, strong acid is added to the food and more digestive juices are added to break down proteins.

In the **small intestine** more digestive juices are added. Digestion of carbohydrates, proteins and fats (lipids) occurs. The digested, soluble molecules are **absorbed** and enter the blood.

Faeces are eventually pushed out of the anus. This is called **elimination** or **egestion**.