Sugee's Science Tutoring

SAMPLE REVISION NOTES

GCSE Science

AQA · Physics, Chemistry and Biology

Included in this preview

Physics	P8 Space Physics
Chemistry	C10 Using Resources
Biology	B2 Organisation

Enquire about the full programme

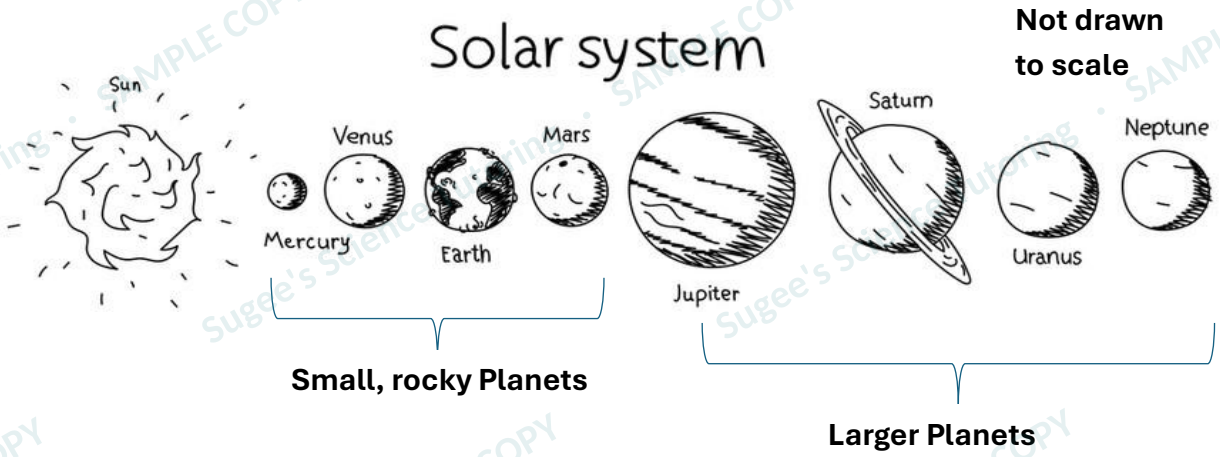
sugeessciencetutoring.co.uk

hello@sugeessciencetutoring.co.uk · WhatsApp 07889 824030

P8 Space Physics

The Solar System and the Universe

- Solar System: Consists of one s_____ (the Sun), eight planets, dwarf planets, and natural satellites (m_____) that orbit the Sun.



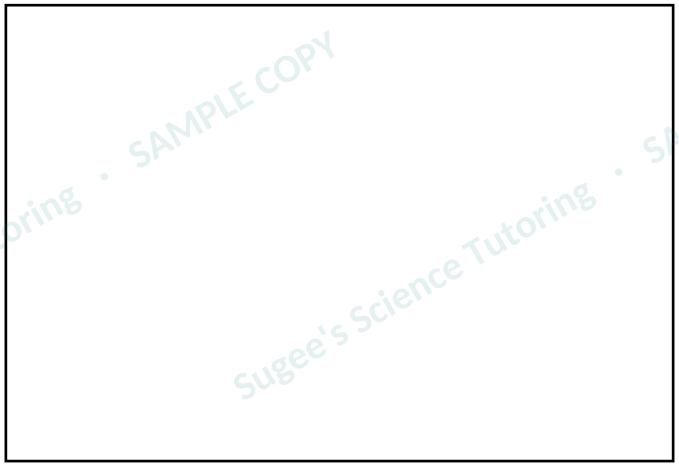
- Galaxy: The Sun, solar system, and billions of other stars are part of the m_____ w_____ galaxy. A galaxy is a massive group of stars.
- The Universe contains hundreds of billions of galaxies.

Life Cycle of a Star

Formation of a Main Sequence Star

Stars are formed from a cloud of **dust** and **gas** (a **nebula**), which is primarily **hydrogen**.

1. **Protostar:** G_____ causes the cloud of dust and gas to collapse inwards. The gravitational collapse causes the t_____ to rise drastically.
2. **Fusion Begins:** If the temperature gets high enough, h_____ nuclei f_____ together to form helium through n_____ f_____.
3. **Main Sequence Star:** The outward force created by the energy released from nuclear fusion is now in balance (equilibrium) with the inward force of g_____. The star remains stable in this state.



Life Cycle of a Star the Size of the Sun

Stage	Process
M_____ **S_____ Star**	Stable phase (millions of years) maintained by equilibrium between force of fusion and gravity.
R_____ **G_____**	When hydrogen runs out, fusion stops. Gravity collapses the core, raising the temperature. Helium fusion begins, the star expands and elements up to i_____ forms in this phase.
W_____ **D_____**	When the star runs out of h_____, the star shrinks, leaving a dense, hot core. Fusion stops; it no longer releases a huge amount of energy.
B_____ **D_____**	The white dwarf gradually cools down and stops emitting l_____, becoming a cold, dense mass.

Included in the full notes

Pages 3 to 4 of 5

This section is part of the complete set of notes,
shared with students enrolled at Sugee's Science Tutoring.

Enquire about the full programme

sugeessciencetutoring.co.uk

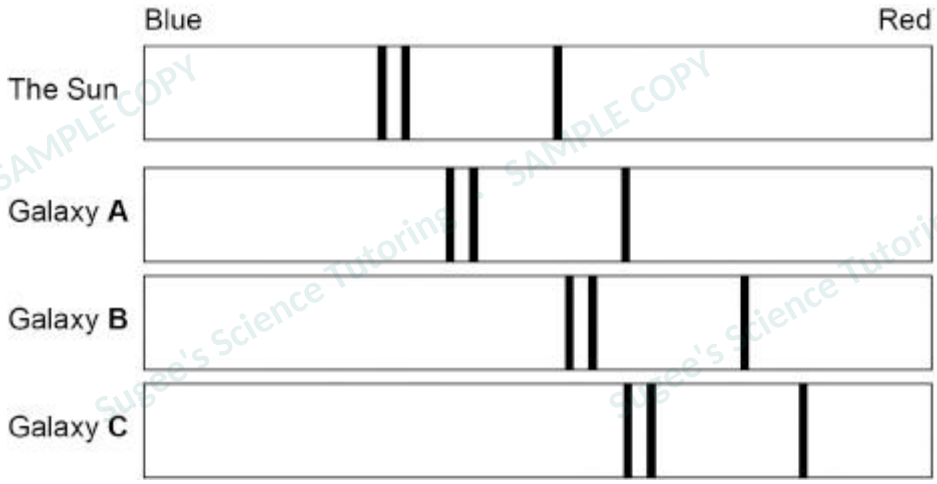
hello@sugeessciencetutoring.co.uk

WhatsApp 07889 824030

Red-shift and The Big Bang Theory

Red-shift

- Observation: Light from distant galaxies show increased/decreased wavelength, shifting towards the _____ end of the spectrum. This is Red-shift.
- This shift means the source of the light (the distant galaxy) is moving away from us.
- Speed and Distance: The further away a galaxy is, the _____ the red-shift, meaning it is moving _____.



Evidence for the Expanding Universe

- The observed red-shift in light from distant galaxies provides evidence that the universe is e_____.
- The fact that more distant galaxies are moving _____ than closer ones strongly supports the idea that space itself is expanding.

The Big Bang Theory

- The Theory: The Big Bang theory suggests that the universe began from a single, extremely s_____, h_____, and d_____ region, which then expanded outwards.
- Current Research: Observations show that the universe's expansion is s_____ up, rather than slowing down as initially assumed.
- Uncertainty: Scientists currently cannot easily explain this acceleration. This has led to the theories of d_____ m_____ and d_____ e_____, which are hypothetical forms of matter and energy that we cannot detect but that may explain the a_____ expansion.

C10 Using Resources

Potable Water

- Potable water is water that is safe to d_____.
- For humans, potable water must have sufficiently low levels of dissolved s_____ and m_____.
- It is not p_____ water (chemically speaking) as it contains dissolved substances.

Producing Potable Water

In the UK, fresh water is typically treated using a three-step process:

1. Source Choice: Choose an appropriate source of f_____ water (e.g., r_____).
2. Filtration: Water is passed through f_____ b_____ to remove large materials (leaves and suspended particles).
3. Sterilisation: The water is sterilised to kill harmful microbes. Common sterilising agents used: c_____, o_____, or _____ light.

Desalination

Desalination is required when fresh water supplies are limited, such as in very dry countries, and involves reducing the levels of dissolved minerals (salts) to an acceptable level.

Method	Description	Disadvantage
D_____	Boiling the salt water to turn it into steam, then condensing the steam to collect pure water (leaving salts behind).	High energy requirement
R_____ O_____	Uses special membranes and high pressure to separate the water molecules from the dissolved salt ions.	High energy requirement

Required Practical 8: Water Analysis and Purification

Part 1: Testing for Dissolved Solids

Procedure	Observation/Result
1. Weigh and record the m_____ of an empty evaporating basin.	Baseline m_____
2. Fill the basin with the water sample and h_____ gently until all the water has evaporated.	Water turns to s_____
3. Allow the basin to cool and weigh it again.	_____ mass (compared to step 1) indicates the presence of dissolved solids left behind as crystals.
4. Test the pH of the sample using universal indicator or a pH probe.	Pure water has pH _____. Deviation from this indicates dissolved acid or alkali (impurity), but pH 7 does *not* guarantee purity (still could have neutral dissolved solids/gases).

Note: Chemically pure water has a fixed melting point _____^{0}C and boiling point of _____^{0}C. Impurities cause melting and boiling point to take place over a r_____ of temperatures.

Part 2: Purifying Water by Distillation

1. Heat the impure water sample in a c_____ f_____ or distillation flask using a Bunsen burner.
2. The water e_____ (turns to steam), leaving non-volatile impurities (like salts) behind.
3. The steam travels through a delivery tube or condenser and is c_____ (turns back into liquid water) by cooling.
4. The pure w_____ (the distillate) is collected in a separate container.
5. The resulting distilled water will have a pH of _____ and ideally no dissolved s_____ (mass test result would be zero mass gain).

Included in the full notes

Pages 4 to 13 of 16

This section is part of the complete set of notes,
shared with students enrolled at Sugee's Science Tutoring.

Enquire about the full programme

sugeessciencetutoring.co.uk

hello@sugeessciencetutoring.co.uk

WhatsApp 07889 824030

Haber Process (Triple)

_____ is used to make nitrogen-based fertilisers for farming. _____ is produced by the Haber process.

The raw materials for Haber process are _____ and _____. Nitrogen is extracted from _____ whereas hydrogen is obtained by reacting _____ with _____. The purified nitrogen and hydrogen are passed over an _____ at around _____ ^{0}C and _____ atmospheric pressure. This causes some of the nitrogen and hydrogen to react to form ammonia.

Since this is a reversible reaction, some of the _____ breaks down into _____ and _____. To increase the yield, the ammonia produced is _____ into a liquid and removed. The unreacted nitrogen and hydrogen are recycled back over the catalyst.

Le Chatelier's Principle states that :

_____

_____

_____

Condition of Haber process chosen to increase the yield:

1. Relatively cooler temperatures: The forward reaction is exothermic. Relatively cooler temperature will shift the equilibrium to the _____ - hand side. However, a cool temperature will _____ (speed up/slow down) the reaction therefore we have to trade-off between the rate of reaction and the position of the equilibrium. _____ is a compromise temperature where it is high enough for a relatively faster reaction but also provide a high yield.
2. _____ catalyst
3. Increasing pressure: high pressure will shift the equilibrium to the _____-hand side. There are _____ molecules on the left and _____ on the right. If the reaction shifts to the _____ this lowers the pressure to counteract the high pressure.

Included in the full notes

Pages 15 to 16 of 16

This section is part of the complete set of notes,
shared with students enrolled at Sugee's Science Tutoring.

Enquire about the full programme

sugeessciencetutoring.co.uk

hello@sugeessciencetutoring.co.uk

WhatsApp 07889 824030

Sugee's Science Tutoring

SAMPLE REVISION NOTES

B2 Organisation

GCSE Biology · AQA

A preview of the structured, exam focused revision notes used with students at Sugee's Science Tutoring.

Some pages have been removed and this sample is watermarked.

Enquire about the full programme

sugeessciencetutoring.co.uk

hello@sugeessciencetutoring.co.uk

WhatsApp 07889 824030

Organ	Function
Salivary Glands	Produce s_____ which contains the enzyme a_____ to start the digestion of s_____.
Oesophagus	A muscular tube that connects the mouth to the stomach. Food moves down by p_____.
Stomach	A muscular organ that mechanically breaks down food. It produces p_____ enzyme and h_____ acid to kill b_____ and provide a pH of 2.
Liver	Produces b_____, which n_____ stomach acid and e_____ fats. Emulsification: breaks down larger fat droplets into smaller ones to increase the s_____ a_____.
Gall Bladder	Store b_____ before releasing it into the small intestine.
Pancreas	Produces p_____, a_____, and l_____ enzymes and releases them into the small intestine.
Small Intestine	Continues digestion and is where small, soluble digested molecules of food are a_____ into the blood.
Large Intestine	Absorbs excess w_____ from the remaining undigested food.
Rectum	Stores f_____ before they are passed out of the body.

Digestive Enzymes

Enzymes are **b_____ c_____** that **speed up** the breakdown of large food molecules.

Enzyme Type	Example	Produced In	Substrate (Food)	Product(s)
Carbohydrase	Amylase		C_____ (Starch)	G_____
Protease	You do not need to know examples		P_____	A_____ a_____
Lipase	You do not need to know examples		F_____ (Lipids)	F_____ & g_____

Included in the full notes

Pages 4 to 9 of 13

This section is part of the complete set of notes,
shared with students enrolled at Sugee's Science Tutoring.

Enquire about the full programme

sugeessciencetutoring.co.uk

hello@sugeessciencetutoring.co.uk

WhatsApp 07889 824030

The Blood

Component	Description	Primary Function
Plasma	Pale yellow liquid	T_____ everything (cells, CO_2, glucose, urea).
Red Blood Cells	Biconcave discs, no nucleus	Contain h_____ to carry o_____.
White Blood Cells	Part of the immune system	D_____ p_____ (by phagocytosis or producing antibodies).
Platelets	Small cell fragments	Help the blood to c___ at a wound.

Cardiovascular Disease

C_____ h____ d_____ (CHD) is when the c_____ a_____ become blocked by a build-up of f____ m_____. This restricts blood flow, meaning the heart muscle receives less o_____, which can lead to a h____ a_____.

Treatments:

- **Statins**: Drugs that l____ c_____ in the blood, slowing down the rate at which fatty deposits form.
- **Stents**: A wire-mesh t___ inserted into a narrowed artery to h___ i_ o___ and restore blood flow.

Included in the full notes

Pages 11 to 13 of 13

This section is part of the complete set of notes,
shared with students enrolled at Sugee's Science Tutoring.

Enquire about the full programme

sugeessciencetutoring.co.uk

hello@sugeessciencetutoring.co.uk

WhatsApp 07889 824030