STOKE DAMEREL
Community College

Cycle 1

SCIENCE

Year 11

Name: _____

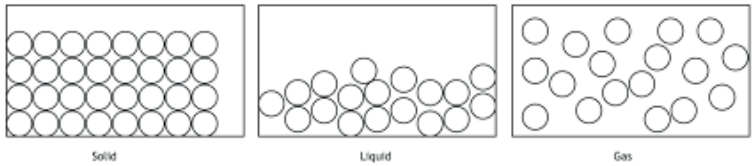
Tutor: _____

Aspire | Achieve | Thrive

GREENSHAW LEARNING TRUST

Science Y11 Cycle 1 - Homework Plan

Week / Date	Homework task	Exam Question
Week 1 September 6th	**Cornell Notes:** The particle model	**Question 1:** Explain the changes in the arrangement and movement of the particles of a gas as the temperature decreased. (6)
Week 2 September 13th	**Revision Card:** The Particle Model	**Question 2:** Explain how the motion of the air molecules causes the pressure of a container to change as the temperature decreases. (3)
Week 3 September 20th	**Cornell Notes:** Genetic Engineering	**Question 3:** Scientists have genetically engineered a variety of wheat to be resistant to herbicides. The herbicide resistant variety of wheat will give a higher yield than the non-herbicide resistant variety. Explain why. (3)
Week 4 September 27th	**Revision Card:** Genes and Selection	**Question 4:** Doctors give antibiotics to patients to kill bacteria in their bodies. Explain how the overuse of antibiotics has led to the evolution of antibiotic-resistant bacteria. (3)
Week 5 October 4th	**Cornell Notes:** Electrolysis	**Question 5:** Sodium chloride solution contains sodium ions (Na^+) and chloride ions (Cl^-). Sodium chloride solution is electrolysed. Explain why the sodium ions are attracted to the negative electrode. (2)
Week 6 October 11th	**Revision card:** Electrolysis	**Question 6:** Explain how copper is produced from copper(II) sulfate solution by electrolysis. (4)
Week 7 and 8 October 18th/ November 1st	**Revision**: Cornell Notes / Mind map / Revision Card	**Revision**
Week 9 November 8th	**Plug the gaps**	

Cycle 1 Physics Year 11 Knowledge Organiser Week 1 and 4		
Keyword	**Definition**	**Key Ideas**
Density	Density is a measure of the amount of mass inside a fixed volume.	Density compares the mass of materials with the same volume. For example a piece of lead is heavier than a piece of Iron with the same volume. To work out density we can use the following formula, density = mass/volume (mass in kg, volume in m^3, density in kg/m^3). Everything is made up of particles. The particles in a substance are the same whether it is in the solid, liquid or gas state, but their arrangement and movement changes. We can use the particle model to explain the properties of solids, liquids and gases. Particles in a solid are very closely together and vibrating. In a liquid particles have a random motion but in contact. In a gas, particles have a random motion and are widely spaced. When a substance changes state energy must be supplied to break the bonds or energy is released to its surroundings. The diagram below, shows the particle model of a solid, liquid and gas. 
Bonds	Particles are held together by strong **intramolecular** forces of attraction called bonds.	
Evaporating	Changing state from a liquid to a gas when the temperature is less than boiling point.	
Condensing	Changing state from a gas to a liquid.	
Boiling	Changing state from liquid to gas at the boiling point.	
Sublimating	Changing state from solid to gas without going through the liquid state.	
Particle Model	Model in which all substances contain large numbers of very small particles (atoms, ions or molecules).	
Conservation of mass	When a substance changes state (for example, solid to liquid) the mass of the material stays the same.	
Internal Energy	The total kinetic energy and potential energy of all the particles in a system.	We know that everything is made of small particle. The particles are very hard. They cannot be squashed (compressed) or stretched. What can change is the distance (the gap) between the particles. The particles are always moving. Due to this movement, they have kinetic energy and the faster they move the more kinetic energy they have. If we increase the temperature of a substance the faster these particles move. The total internal energy of a system is the total amount of kinetic and potential energy of the particles in a system. In a gas the particles are free to move much more. Imagine a gas in a container, the particles are free to move randomly around the container until they hit the wall of the container. When the particles hit the sides they exert a force. The pressure of a gas is the sum of all the forces exerted by the particles. If we increase the temperature the particles move faster leading to more pressure. If we reduce the size of a container or compress the gas (but leave the same number of particles) then this also increase the pressure as the particles hit the wall of their container much more frequently. Equations: Thermal energy for a change of state = mass x Specific latent heat ($E = m \times L$) Change in thermal energy = mass x specific heat capacity x temperature change ($E = m \times c \times \Delta T$)
Kinetic energy	The energy stored in a moving object.	
Pressure	Pressure is a force acting over an area.	
Gas pressure	The total force exerted by all the particles (molecules) against the walls of a container.	
Compress	Squashing something into a smaller volume.	
Randomly	Movement that cannot be predicted.	
Specific Heat Capacity	The energy needed to raise the temperature of 1 kg of a substance by 1 ^0C.	
Specific Latent Heat	The energy needed to change 1 kg of a substance completely from one state to another.	
Latent Heat	The energy needed for a substance to change state without changing temperature.	

Cycle 1 Biology Year 11 Knowledge Organiser Week 2 and 5		
Keyword	**Definition**	**Key Ideas**
Gene	A section of DNA which contains a the code for making a protein.	Genes form the foundation for life. Made up of a simple 4 letter DNA code they lead to the production of the unique set of proteins that makes each of us individual and unique. Your genome is specific to YOU and no-one else, unless you have an identical twin or are part of a clone army! The inheritance of genes from our parents is a source of variation for our species, as the genes which they pass to us are randomly selected from the ones they themselves inherited. Knowing our parents' genes and our grandparents' genes (their genotypes) can allow us to predict aspects of our own phenotype (the outward expression of our genes). Medical Science has made many advances since the discovery of DNA in order to begin to find cures for disorders which are caused by defective alleles. In addition genetic engineering and gene therapy are beginning to become useful tools for editing and adjusting genomes, either to cure illness or to produce more valuable crops/produce. Genetic engineering is a more modern equivalent for the selective breeding that mankind has been practising for at least 10,000 years, through the domestication of animals such as the wolf and grasses which have lead to wheat.
Genome	All of the genes in the genetic material of an organism.	
Chromosome	Thread-like structures found in the nucleus which are made up of coiled DNA.	
Migration	The movement of individuals or populations from one are to another.	
Allele	Alternate forms of the same gene. A diploid organism will have two different alleles for any one gene.	
Recessive	A recessive allele is only expressed in the phenotype if two identical copies are held. Shown using lower case letters. E.g a, c and d	
Dominant	A dominant allele is always expressed in the phenotype, even if the second copy is recessive. Shown using capital letters. E.g A, C and D	
Heterozygous	Having two different alleles for a gene at a specific position on the chromosome. E.g Bb or Aa	
Homozygous	Having two identical alleles for a gene at a specific position on the chromosome. E.g BB, AA or tt	Evolution occurs through a process known as natural selection. This can be described in stages: 1. All organisms show variation, meaning they have slightly different characteristics. 2. Environmental changes can increase competition. 3. The organisms with characteristics best suited to the new environment, will be more likely to survive. 4. Surviving organisms reproduce and their genes are passed on to the next generations. 5. As time passes, the advantageous genes become more common in the population, until they are the only ones. We say the species has evolved. Selective breeding takes advantage of the process of natural selection and uses it for the benefit of humans. Organisms with advantageous characteristics are selected and made to breed. The offspring with the best characteristics are then selected and this process is repeated over many generations. Genetic engineering involves inserting genes from one organism, into the DNA of other organisms. This is much faster than selective breeding and can introduce characteristics that are not normally found in organisms. Examples include sheep that produce spider silk in their milk and fluorescent fish!
Carrier	A person has a recessive allele for a disease, but is not affected due to being heterozygous and having a second, dominant allele.	
Variation	The differences between individuals brought about by genetics and/or the environment.	
Adaptation	Features possessed by organisms which help them to survive and reproduce in their environment.	
Evolution	The gradual process of change in a species over many generations.	
Binomial System	System of naming species first devised by Linnaeus.	
Selective Breeding	Process of breeding plants or animals from parents chosen for desirable characteristics.	
Genetic Engineering	The transfer of specific genes from one organism to another.	
Vector (in genetics)	A carrier, usually a bacterial plasmid, used to transfer a desired gene from one organism to another.	

Cycle 1 Chemistry Year 11 Knowledge Organiser Week 3 and 6

Keyword	Definition
Ore	Rock containing a metal compound, used to extract metals from.
Oxidation	When a reactant gains oxygen or loses electrons
Reduction	When a reactant loses oxygen or gains electrons
Electrode	Ions are discharged at the electrodes during electrolysis
Electrolysis	The process of breaking apart a compound using an electric current.
Electrolyte	A liquid or solution that conducts electricity and breaks down during electrolysis
Ion migration	The movement of ions towards the oppositely charged electrode.
Half Equation	A redox reaction is made up of two half equations, one in which electrons are lost and one in which electrons are gained.
Inert	A substance that does not react is inert.
Cathode	The negative electrode in electrolysis. The cation is attracted to the cathode.
Anode	The electrode in electrolysis with a positive charge. The anion is attracted to the anode.
Ionic Equation	An equation showing changes to the ions involved in a reaction.
Reversible reaction	A chemical reaction where the reactants form products that, in turn, react together to remake the reactants.
Endothermic reaction	Chemical reaction which takes in thermal energy
Exothermic reaction	Chemical reaction in which thermal energy is given out
Equilibrium (HT)	During a reversible reaction, when the forwards and backwards reactions are occurring at the same rate in a closed system.
Le Chateliers Principle (HT)	If a system is at equilibrium and a change is made to any of the conditions, then the system responds to counteract the change.

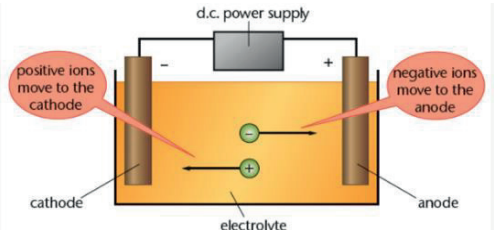
Key Ideas

Iron does not exist naturally on its own, but combined with other compounds as minerals. These minerals form **ores** that can be dug out of the ground. Iron ore is mined as a red-brown rock.

During an oxidation reaction, the metal atoms lose electrons to make positive ions. The electrons are transferred to a negative ion, usually an oxide ion.

Metals such as gold are found in the Earth as the metal itself because it is unreactive. Most metals, however, are found as compounds because they react with other elements. Chemical reactions are needed to extract the metal. The reactions needed depend on the **reactivity** of the metal.

In electrolysis, all the **ions migrate** towards the two electrodes. The positive ions (cations) are attracted to the negatively charged electrode (cathode). All the negative ions (anions) are attracted to the positively charged electrode (anode).



In a chemical reaction, reactants react to make products. **reactants → products** However, in some chemical reactions, the products of the reaction can react to make the original reactants again. These reactions are called **reversible** reactions and are represented with a double half-headed arrow. **reactants ⇌ products** There is a **forward** reaction and a **backward** reaction. These take place at the same time.

Higher Tier:

If a reversible reaction is **exothermic** in one direction, it is endothermic in the opposite direction. The same amount of energy is transferred in each case. **Equilibrium** is reached when the forward and reverse reactions occur at exactly the *same* rate but the apparatus must prevent the escape of the reactants and the products. This is called a closed system. At equilibrium: the rate of the forward reaction equals the rate of the backward reaction the concentrations of reactants and products do not *change*. The effects of changing conditions on a system at equilibrium can be predicted using Le Chatelier's principle. **The reaction: A + B ⇌ C + D is at equilibrium. If the concentration of A + B is increased then the system will respond by making more C + D and so reducing the amount of A + B. The system will respond to the change by counteracting it.**

WEEK 1

Date……

Question Title……

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Answer:

WEEK 2

Date……

Question Title……

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Answer:

WEEK 3

Date……

Question Title……

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Answer:

Date……

Question Title……

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Answer:

WEEK 5

Date……

Question Title……

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Answer:

Date……

Question Title……

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Answer:

STEP 2: CREATE CUES

What: Reduce your notes to just the essentials.

What: Immediately after class, discussion, or reading session.

How:

- Jot down key ideas, important words and phrases
- Create questions that might appear on an exam
- Reducing your notes to the most important ideas and concepts improves recall. Creating questions that may appear on an exam gets you thinking about how the information might be applied and improves your performance on the exam.

Why: Spend at least ten minutes every week reviewing all of your previous notes. Reflect on the material and ask yourself questions based on what you've recorded in the Cue area. Cover the note-taking area with a piece of paper. Can you answer them?

STEP 1: RECORD YOUR NOTES

What: Record all keywords, ideas, important dates, people, places, diagrams and formulas from the lesson. Create a new page for each topic discussed.

When: During class lecture, discussion, or reading session.

How:

- Use bullet points, abbreviated phrases, and pictures
- Avoid full sentences and paragraphs
- Leave space between points to add more information later

Why: Important ideas must be recorded in a way that is meaningful to you.

STEP 3: SUMMARISE & REVIEW

What: Summarise the main ideas from the lesson.

What: At the end of the class lecture, discussion, or reading session.

How: In complete sentences, write down the conclusions that can be made from the information in your notes.

Why: Summarising the information after it's learned improves long-term retention.

Date / / Topic

WEEK 1

Questions	Notes

Summary

Date / / **Topic**

Questions	Notes

Summary

Date / / Topic

WEEK 3

Questions	Notes

Summary

Date / / **Topic**

Questions	Notes

Summary

Date / / Topic

WEEK 5

Questions	Notes

Summary

Date / / **Topic**

Questions	Notes

Summary

Revision Page

Revision Page

Revision Page

Revision Page

Revision Page

Revision Page

Revision Page

Revision Card on The Particle Model

1. How are particles arranged in solids, liquids and gases?
2. How do particles move in solids, liquids and gases?
3. Why can gases be compressed, when solids and liquids cannot?
4. What does ‘density’ mean and how is it calculated?
5. Explain what happens to gas pressure when temperature increases.
6. What is specific heat capacity?
7. What is specific latent heat?

Answers

Revision Card on Genes and Selection

1. What are the stages in the process of evolution?
2. What is the structure of DNA?
3. Why are some characteristics inherited from parents that do not have them (e.g two brown eyed parents having a blue eyed baby)
4. What are the different types and causes of variation?
5. What are the stages of selective breeding?
6. What are the advantages of genetic engineering?
7. How are organisms classified in biology?

Answers

Revision Card on Electrolysis

1. What are the different methods of extracting metals?
2. What is electrolysis?
3. Why do some metals need to be extracted by electrolysis?
4. What are the names for the positive and negative ions in electrolysis?
5. What are the names for the positive and negative electrodes in electrolysis?
6. What are the rules for determining the products during electrolysis of aqueous solutions?
7. What is an electrolyte?

Answers