Glenthorne High School
Achievement for all

Year 8 Topic Checklists

Matter - Periodic Table and Types of Reactions

Key Knowledge	I have completed	I have understood	I need to revise
The periodic table shows all the elements alongside their chemical symbol and was created by Mendeleev.			
The periodic table is organized in terms of columns (groups) and rows (periods) which have similarities between them			
The periodic table is divided into metals and non-metals, with metals on the left and non-metals on the right hand side.			
Everything is made of atoms which are tiny particles that are made of mostly empty space. They have a nucleus in the middle containing positively charged protons and neutral neutrons. They also have electrons which are negatively charged and found in shells, orbiting the nucleus.			
The mass number on the periodic table tells you the number of protons + neutrons and element contains			
The atomic number on the periodic table tells you how many protons an element contains which = the number of electrons. Therefore an atom has no overall charge.			
Electrons are arranged in a specific way in an atom. The inner shell is filled first and can hold up to 2 electrons, the outer shells are then filled which can each hold a maximum of 8 electrons. This is called an electronic configuration.			
Elements in the same group have the same number of electrons in their outer shell.			
Elements in the same period have the same number of shells.			
The elements in group 1 of the periodic table are called the alkali metals. They all have one electron in their outer shell which gives them similar properties.			
When an alkali metal reacts with water a metal hydroxide and hydrogen forms.			
The observations when a metal reacts with water are fizzing, the piece of metal shrinks in size, the metal floats on the surface of the water, there is a purple flame with potassium.			
The reactivity increases are you move down group 1.			

Alkali metals are different from other metals as they can be cut, are very reactive (have to be stored in oil) and form alkaline solutions.			
The elements in group 7 of the periodic table are called the halogens. They have 7 electrons in their outer shell which gives them similar properties.			
The halogens become darker in colour as you move down the group. Their boiling point also increases are you move down the group. Their reactivity decreases.			
Halogens are all diatomic (they come in pairs)			
When halogens react with metals they form halide salts.			
A displacement reaction is one where a more reactive halogen replaces the less reactive halogen in a compound.			
The elements in group 8/0 of the periodic table are called the noble gases.. They have a full outer shell which gives them similar properties.			
The noble gases exist as single atoms and are largely unreactive due to their full outer shell.			
The difference between a chemical and physical change is that chemical changes are typically irreversible whereas physical changes are reversible.			
There a 5 signs of a chemical reaction: temperature change, colour change, change in smell, gas produced, new substance forms.			
In a chemical reaction atoms and molecules in reactants rearrange to make the products.			
In a chemical reaction mass is conserved as atoms cannot be created or destroyed.			
In some chemical reactions the mass appears to change if the product or reactant is a gas.			
Chemical reactions can be represented by word equations with the reactants before the arrow and products after the arrow.			
Chemical reactions can be represented by symbol equations which must be balanced in order to show that mass is conserved.			
Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.			
There are two types of combustion – complete and incomplete. These form different products.			
Different fuels provide different amounts of energy when combusted. They also have different effects on the environment.			

You can test for carbon dioxide using limewater (turns cloudy) and you can test for water using cobalt chloride paper.			
Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating.			
To define the term polymer, monomer and polymerisation			
To state uses of polymers			

Chemical Reactions – Metals & Non-Metals

Key Knowledge	I have completed	I have understood	I need to revise
I can identify an unknown element from its physical and chemical properties			
I can compare the properties of metals and non-metals			
I can interpret a word equation to label reactants and products			
I can compare the reactions of different metals with dilute acids			
I can decide which metals react more vigorously from practical observations			
I can link a metals reaction with its place in the reactivity series			
I can plan a practical to compare the reactivity of three metals, including identifying control variables and how to control them			
I can explain predictions about displacement reactions			
I can use the reactivity series to explain displacement reactions			
I can use word equations and particle diagrams to represent displacement reactions.			
I can define an exothermic reaction as one that releases energy into the environment			
I can define an endothermic reaction as one that takes energy from the environment			
I can recall that an exothermic reactions shows an increase in temperature in the surroundings and an endothermic reaction shows a decrease in temperature of the surroundings			
I can carry out a calorimetry experiment to determine whether a reaction is endothermic or exothermic using the relevant equipment			

I can explain that the activation energy is the minimum amount of energy required for a reaction to start.			
I can recall that in an exothermic reaction, the reactants have more energy than the products.			
I can recall that in an endothermic reaction, the reactants have less energy than the products.			
I can draw reaction profile diagrams for exothermic and endothermic reactions			
I can state that a catalyst is a substance that speeds up the rate of chemical reaction without being used up.			

Earth – Earth's Climate and Resources

Key Knowledge	I have completed	I have understood	I need to revise
I can state that global warming is the gradual increase in surface temperature of the Earth.			
I can state the names and percentages of the gases that make up the Earth's atmosphere and name two greenhouse gases.			
I can interpret graphs that show trends over time.			
I can explain why the concentration of carbon dioxide in the atmosphere did not change for many years.			
I can explain changes in the levels of carbon dioxide using stages of the carbon cycle.			
I can use equations to explain processes that exchange carbon dioxide into and out of the atmosphere.			
I can describe how human activities affect the carbon cycle.			
I can evaluate the implications of a proposal to reduce carbon emissions.			
I can describe how global warming can impact on climate and local weather patterns.			
I can define the terms fossil fuel, carbon sink, global warming and greenhouse effect.			
I can state that most metals are found combined with other elements, as a compound, in ores.			
I can name two processes used to extract metals from their compounds.			
I can define the terms; ore, extraction, mineral, electrolysis and recycling.			
I can recall the names and chemical components of malachite, bauxite and haematite.			
I can explain how displacement with carbon can be used for metal extraction using the reactivity series.			

I can use equations to explain displacement with carbon.			
I can predict the method used for extracting a metal from it's ore based it's position in the reactivity series.			
I can evaluate the disadvantages associated with using electrolysis for metal extraction.			
I can explain the importance of recycling, and ways of recycling glass and metals.			
I can explain how changes in behaviour and use of alternative materials may limit the consumption of natural resources.			
I can evaluate the advantages and disadvantages of recycling and to consider how scrap steel can be recycled.			

Waves – Wave Properties and Effects

Key Knowledge	I have completed	I have understood	I need to revise
Compare and contrast longitudinal and transverse waves			
Describe the strengths and limitations of some wave models			
Describe interference			
Define Ultrasound			
Describe some uses of ultrasound (eg. echolocation, sonar, imaging, cleaning)			
Apply the speed/distance/time equation to echolocation			
List the electromagnetic waves			
List some uses of the different EM waves			
List some dangers of EM waves			
Describe ionisation and explain why it is damaging to cells			

Forces – Force of Gravity and Pressure

Key Knowledge	I have completed	I have understood	I need to revise
Definition and meaning of gravity			

Explain why gravity is an attractive force			
Comparing gravity with other forces			
Provide information on how theories about gravity developed over time			
Differentiate between mass and weight			
Explain how gravitational force varies with mass and distance			
Using the equation: Weight = Mass x GFS			
Explain GFS on different planets and moons			
Calculating GFS on Earth using a newtonmeter			
I can recall the equation for pressure and re-arrange it to calculate unknown values.			
I can explain how to maximise/minimise pressure where necessary in a variety of situations.			
I can explain how a gas exerts a pressure using appropriate scientific language.			
I can describe and explain the effects of changing temperature and volume of ==n the pressure exerted by a gas.			
I can explain the effects of air pressure differences in a number of scenarios, e.g. breathing, decompression in a plane cabin.			
I can describe and explain how pressure experienced in a liquid varies with depth.			
I can explain how and why pressure is transmitted through a fluid.			
I can calculate forces or areas using the principle of hydraulics.			

Energy – Energy Resources and Heating & Cooling

Key Knowledge	I have completed	I have understood	I need to revise
Define what is meant by renewable and non-renewable sources of energy and identify examples of each.			
Understand how the energy stores in specific resources are harnessed usefully in certain situations, e.g. to generate electricity in power stations, heat homes, fuel transport etc.			
Describe the advantages and disadvantages of using fossil fuels.			

Describe the advantages and disadvantages of using renewable resources.			
Describe the energy transfers in electrical devices.			
Calculate the cost of electricity using the kilowatt hour (referencing the earlier power equation in the unit of work).			
Evaluate the social, economic and environmental consequences of using a resource to generate electricity, from data.			
Suggest actions a government or communities could take in response to rising energy demand.			
Suggest ways to reduce costs, by examining data on a home energy bill.			
Describe the particle arrangement and motion in solids liquids and gases			
Describe the effects of heating on the temperature and state of matter of a substance (with reference to a heating curve).			
Describe the direction of heat flow in a number of situations and explain that heat will always dissipate.			
Describe the processes of conduction in solids and convection in fluids.			
Explain that a surface will emit thermal radiation due to its temperature.			
Describe the factors that will affect the rate of emission of thermal radiation.			
Describe the factors that will affect the rate of absorption of thermal radiation.			
Apply ideas about conduction, convection and radiation to explain how devices either to prevent heat escaping, encourage heating or encourage cooling.			

Electromagnets – Magnets and Electromagnets

Key Knowledge	I have completed	I have understood	I need to revise
I can recall what the basic magnetic materials are.			
I can draw the shape of a magnetic field around a permanent magnet and the field between 2 poles (like and opposite)			
I can describe a method of how to plot the magnetic field around a magnet using a compass.			

I can explain why magnetic materials are attracted to magnets (induced magnetism) and other magnets are attracted or repelled.			
Skills: I can describe the trend of demonstrated by graph in detail including how the trend changes.			
Skills: I can explain the meaning of the following terms: precision, reproducibility, repeatability with reference to data form an experiment.			
I can describe the magnetic field surrounding a current-carrying wire.			
I can draw the field surrounding a solenoid.			
I can recall how to increase the strength of an electromagnet.			
I can explain why iron is an ideal material to use with electromagnets.			
I can describe an experiment to show how an electromagnet's strength varies with certain factors: current, turns of the coil, material.			
I can explain how a device uses the principles of electromagnetism can be used in a variety of useful devices, e.g. an electric bell, a relay etc.			

Organisms – Breathing and Digestion

Key Knowledge	I have completed	I have understood	I need to revise
The main parts of the respiratory system – Trachea, Bronchi, Bronchioles, Alveoli, Ribs and Diaphragm.			
The mechanisms of inhalation and exhalation.			
Breathing is necessary to provide cells with oxygen for respiration.			
Rate of breathing increases during exercise to provide cells with more oxygen for respiration.			
The waste products of respiration are carbon dioxide and water which are exhaled or excreted.			
The alveoli are adapted for gas exchange by having a large surface area and short diffusion pathway.			
The effect of smoking on the respiratory system.			

Common diseases that affect the respiratory system and treatments.			
The organs of the digestive system.			
The roles each organ plays within the digestion of food.			
Adaptations of the digestive organs for food absorption.			
Describe the possible health effects of unbalanced diets.			
Explain how enzymes work and recall examples.			
Recall common deficiency diseases.			
Explain how temperature affects enzyme action.			
Describe the role of bacteria in digestion.			

Ecosystems – Photosynthesis and Respiration

Key Knowledge	I have completed	I have understood	I need to revise
Respiration is a chemical reaction to release energy for life processes.			
Explain how limewater can be used to prove respiration is taking place.			
State the purpose of respiration			
Write the word equation for aerobic respiration			
Write the word equation for anaerobic respiration.			
Anaerobic respiration is used within brewing and baking.			
Respiration takes place within the mitochondria of cells.			
EC: Write the balanced symbol equation for aerobic respiration.			
Describe how the body responds when energy levels are reduced.			
Recall how plants and algae make food using light.			

Recall the word equation for photosynthesis			
Recall the balanced symbol question for photosynthesis.			
Describe how plants use glucose, including the role of starch.			
Describe the role of leaves and roots in aiding in photosynthesis.			
Describe how leaves are adapted for photosynthesis; including the key words – chloroplasts, epidermis, palisade cells, mesophyll cells, stomata, guard cells.			
Describe how light intensity, temperature and carbon dioxide concentration can affect the rate of photosynthesis.			

Genes – Inheritance and Evolution

Key Knowledge	I have completed	I have understood	I need to revise
Describe how characteristics are inherited			
Describe the relationship between chromosomes, DNA and genes.			
Describe the main differences between mitosis and meiosis cell divisions and state their functions in the body.			
Describe the structure of DNA.			
Describe what mutation is and give examples of mutagens.			
Describe a method for extracting DNA from the nucleus of a plant cell.			
Define allele, recessive, dominant, genotype, phenotype, homozygous, heterozygous.			
Use a punnet square to show what happens during a genetic cross.			
Use ratios, fractions and percentages and calculate simple probability to express the outcomes of a genetic cross.			
Describe what selective breeding is and why it is used.			
Describe the steps of genetic engineering and why it is used.			
Discuss the advantages and disadvantages of genetic engineering.			

Describe the process of natural selection and explain how natural selection leads to evolution.			
Explain specific examples of natural selection such as peppered moth.			
Describe and explain how Darwin used the evidence from finches to develop his theory of natural selection and evolution.			
Describe and explain some factors that may lead to extinction.			
State what is meant by biodiversity and explain how a lack of biodiversity can affect an ecosystem.			
Name different ways to protect endangered species.			
Explain how different techniques are used to prevent extinction and maintain biodiversity.			