KS3 ASSESSMENT

[Science - Chemistry]

BRAMHALL HIGH SCHOOL

	Acquiring	Developing	Secure	Mastered
	Is beginning to acquire the necessary knowledge for the topic(s)	Is developing the knowledge necessary to understand the topic	Understands the topic and is able to make links using the knowledge	Fully understands the topic and is able to confidently link knowledge.
Term 1a Topic(s) Title **7E Mixtures and separation** - Mixture - Solutions - Evaporation	Able to demonstrate a basic knowledge of mixture, solutions, and evaporation including: Identify examples of [solids, liquids, gases]. State the meaning of: mixture. State the meaning of: soluble, solution, solvent, solute. State what happens at a material's [melting, freezing, boiling] point.	Able to demonstrate a growing knowledge of mixture, solutions, and evaporation including: Describe what the three states of matter are like. Describe how insoluble solids can be separated from a liquid. Identify the [solvent, solute] in a solution. Identify the [solvent, solute] in a solution. Describe how soluble solids can be separated from a liquid.	Able to demonstrate and begin to apply an excellent knowledge of mixture, solutions, and evaporation including: Group materials using their states of matter as justification. Use a knowledge of [solutions, suspensions, dissolving] to decide how mixtures should be separated. Use a knowledge of dissolving to decide how a solution should be separated. Use a knowledge of dissolving to decide how mixtures should be separated.	Able to demonstrate and apply an extensive knowledge of mixture, solutions, and evaporation including: Identify materials that are difficult to identify as [solids, liquids, gases]. Justify the decision to separate a mixture in a certain way. Justify the decision to separate a solution in a certain way. Evaluate how well the [melting point, boiling point] of a substance provides evidence for identification.

Term 1b Topic(s) Title **7E Mixtures and separation** - Chromatography – distillation **7F Acids and alkalis** - Indicators	State examples of where chromatography is used. Describe how distillation can be used to separate mixtures. Give examples of everyday substances that are [acids, bases, alkalis]. Name an indicator. State that indicators can be made from plant materials.	Explain how chromatography works. Explain how distillation works. Choose a plant material from which to make an indicator. Explain whether a substance is an acid or an alkali from the reaction with indicators.	Interpret a chromatogram. Identify factors that could affect distillation. Apply ideas about neutralisation to distinguish between alkalis and bases. Apply knowledge to explain why litmus is purple in neutral solutions.	Evaluate the information provided by paper chromatograms. Evaluate the success to which a given separation technique does its job. Analyse chemical formulas to deduce the factor that is common to acids and alkalis. Compare the effectiveness of a number of different indicators.
Term 2a Topic(s) Title - Acidity and alkalinity - Neutralization - Neutralization in daily life	Give examples of everyday substances that are [acids, bases, alkalis]. State the meaning of: acid, alkali. Name an indicator. Describe the main features of the pH scale. Use universal indicator to identify acids and alkalis. State the meaning of: neutralisation, base, alkali.	Choose a plant material from which to make an indicator. Explain whether a substance is an acid or an alkali from the reaction with indicators. Describe the pH scale in detail and use it to classify solutions as strong or weak acids or alkalis. Use universal indicator to measure the pH of a solution. Explain how [indigestion remedies] work. Explain how soils can be neutralised.	Use solutions of known acidity to deduce a colour chart for an indicator. Apply ideas about the pH scale to explain the changes that take place on neutralisation and dilution. Model simple reactions using word equations. Apply knowledge to explain how a soda-acid fire extinguisher works.	Plot and interpret graphs of pH against volume of acid or alkali added in a neutralisation reaction. Discuss the basis of the pH scale using ideas about concentration of solutions. Model more complex reactions using word equations. Suggest word equations that might apply in novel or unfamiliar situations. Explain the formation of natural limestone features.

Term 2b Topic(s) Title **7G The particle model** - Particles - Brownian motion - Diffusion - Air pressure	Describe the three states of matter in terms of [shape, volume, compressibility]. State what is meant by: diffusion. Recall some effects of diffusion. State what is meant by gas pressure. Recall some effects of gas pressure. State the meaning of: vacuum, particle.	Identify a [solid, liquid or gas] from the arrangement of particles. Use the kinetic theory to explain diffusion in liquids and gases. Explain why diffusion is a physical change. Describe how the pressure of gases in containers can be [increased, decreased].	Draw the arrangement of particles in a [solid, liquid and gas]. Explain how Brownian motion supports the kinetic theory. Use the kinetic theory to explain why gas pressure [increases, decreases] with [temperature, number of particles, volume]. Use the particle model of matter to explain the [squashiness/ compressibility, ability to flow, ability to change shape] of [solids, liquids, gases].	Evaluate how well the particle model works to explain the properties of mixtures. Use the kinetic theory to explain why diffusion is faster in some materials than in others. Evaluate how well kinetic theory explains diffusion. Identify correlations by analysis of graphs of [pressure, volume, temperature].
Term 3a Topic(s) Title **7H atoms, elements and compounds** - The air we breathe - Metals and non-metals	[Identify, name] some everyday materials. State what is meant by: element, atom and a molecule. List some typical properties of metals and nonmetals. Identify the metal and non-metal elements on the periodic table.	Explain the difference between an atom and a molecule. Explain why a substance is a compound and not a mixture. Name the compound formed by a reaction between two elements. Describe the evidence needed to decide whether an element is a metal or non-metal.	Group together items made from the same material. Interpret diagrams to identify mixtures of elements and pure elements. Classify unfamiliar elements as metals or nonmetals. Use knowledge about the properties of similar elements to suggest uses for unfamiliar elements.	Compare the uses of different everyday materials. Debate the meaning of ‘chemically combined’ in contexts such as dissolving. Consider whether elements near the boundary line (e.g. carbon (graphite) and silicon) should be classified as metals or nonmetals.

				Discuss whether the classification of elements into metals and non-metals is sufficient and/ or devise criteria for classifying elements in other ways.
Term 3b Topic(s) Title Metals and non-metals - Making compounds - Chemical reactions	Recall examples of energy being used to start a chemical reaction. Recall that temperature changes occur during many chemical reactions. Identify the products and reactants using a word equation. State the meaning of thermal decomposition.	Explain what temperature changes indicate. Explain why energy input may be needed to start some reactions. Supply missing reactants or products to complete a word equation. Explain how chemical [changes, reactions] are different from physical changes.	Link temperature changes of the reactants to those of the surroundings. Apply the knowledge of naming of compounds to less familiar situations (e.g. nitrides and carbonates). Link temperature changes of the reactants to those of the surroundings. Use observations to decide whether a chemical or physical change has taken place.	Compare reactions that need a continuous supply of heat with those that need only an initial energy input. Evaluate the use of catalysts. Use observations to decide whether a chemical reaction has taken place. Evaluate results critically to decide whether or not a reaction has taken place.

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Term 1a Topic(s) Title: Combustion	State the meaning of fuel, combustion. Name the three sides of the fire triangle. Describe the combustion of hydrocarbons (in terms of reactants and products). State the meaning of hydrocarbon. Identify the products and reactants using a word & symbol equation. State the meaning of oxidation. Name the three sides of the fire triangle. Describe with examples what is meant by exothermic changes. State the names of some non-metal oxide pollutants. Recall examples of pollution caused by burning .	Explain the products formed by the complete combustion of Hydrocarbons. Use the idea of the fire triangle to explain how to extinguish a fire. Classify changes as exothermic or endothermic from temperature changes. Explain how carbon monoxide, sulfur dioxide& nitrogen oxides are produced in some combustion reactions.	Explain why different types of fire need to be put out in different ways. Model simple reactions using word & symbol equations. Explain the problems caused by incomplete combustion. Explain why different types of fire need to be put out in different ways. Explain the effects of acid rain on organisms & bodies of water.	Explain the problems caused by incomplete combustion. Model more complex reactions using word equations Suggest word & symbol equations that might apply in novel or unfamiliar situations.

Term 1b Topic(s) Title: Combustion The periodic table	Describe the reactions of non-metals with oxygen. Recall reasons why the temperature on the Earth varies over time. State the meaning of: global warming, climate change. Recall some effects of global warming & climate Change. Recall that different elements have different physical properties. Identify the chemical symbols for some common elements. State what is meant by element, atom, molecule.	Explain how sulfur dioxide, & nitrogen oxides are produced in some combustion reactions. Explain how human activity affects the levels of carbon dioxide in the atmosphere. Relate the uses of different elements to their physical & chemical properties. Use the periodic table to look up symbols.	Explain how methods of controlling the levels of carbon dioxide work. Use knowledge about the properties of similar elements to suggest uses for unfamiliar elements. Explain why symbols for some elements do not reflect their English names.	Evaluate ways in which pollution from non-metal oxides can be reduced. Decide how responsibility for cutting emissions should be shared. Evaluate the use of one and two letter codes for element symbols.
Term 2a Topic(s) Title The periodic table	Recognise a chemical formula. Recall some observations that indicate a chemical reaction. Describe how atoms are rearranged in a chemical reaction. State what happens to mass in a chemical reaction. Identify some common metals, & non-metals. Describe the pattern of reactivity of lithium, sodium and potassium with water. State the meanings of oxidation & corrosion.	Explain how chemical reactions are different from physical changes. Explain the difference between an element and a compound in terms of atoms. Interpret formulae to identify the types of and numbers of atoms in a compound. Identify metals and non-metals by their physical properties. Use data to identify trends in properties within a group. Use the reactions of some alkali metals with water to predict	Interpret diagrams to identify mixtures of elements and pure elements. Write simple chemical formulae. Evaluate results critically to decide whether a reaction has taken place. Use ideas about the periodic table to identify the positions of metal and non-metal elements. Link the reactivity of metals to their resistance to oxidation.	Use observations to decide whether a chemical or physical change has taken place. Compare atoms, molecules of elements and simple compounds using a model. Use valencies to deduce the formula of simple two-element compounds including transition metals. Justify the position of the line dividing metals from non-metals in the periodic table.

	Describe the reactions of metals with water.	the reactions of other alkali metals with water.		
Term 2b Topic(s) Title: The periodic table Metals and their uses	State what happens at a material's melting, freezing & boiling point. State the meaning of alloy. State that a pure material has a fixed melting point and boiling point.	Explain why a substance is a compound and not a mixture. Describe how elements can combine to form compounds. Classify unfamiliar substances as elements, mixtures or compounds. Write simple chemical formulae. Describe the evidence needed to decide whether an element is a metal or not. Identify, the products formed by the oxidation of metals.	Name compounds that contain two elements plus oxygen. Consider whether elements near the boundary line (e.g. graphite and silicon) should be classified as metals or nonmetals. Describe how temperature, concentration, surface area & catalysts affect the speed of a reaction.	Analyse a formula to name a compound. Model more complex reactions using word equations (e.g. reactions in which the reactants are compounds). Suggest word equations that might apply in novel or unfamiliar situations. Identify the word equation for rusting of iron.

Term 3a Topic(s) Title: Metals and their uses	Describe how a mixture and a pure substance are different. Describe how chemical compounds can be represented by formulae. Recall the uses of some elements. State the meaning of catalyst. State the meanings of oxidation, corrosion. State the meaning of rusting. Use information on the reactions of metals with acids to place them in an order of reactivity.	Describe the tests for hydrogen, carbon dioxide, & oxygen. Recall which salts are produced by which acids.	Link the reactivity of metals to their resistance to oxidation. Interpret secondary data on the reactions of acids and metals. Use knowledge of melting & boiling points to predict the state of a substance at a given temperature. Use models to explain why converting pure metals into alloys often increases the strength of the product.	Evaluate how well the melting & boiling poin] of a substance provides evidence for identification. Plot and interpret graphs of melting point or boiling point for mixtures of varying compositions.
Term 3b Topic(s) Title: Rocks	Recall some examples of rocks made from interlocking grains or rounded grains. State the meaning of texture, mineral, grain, crystal. Recall the most important gases found in the Earth's atmosphere and their relative amounts. Describe the effect of physical & biological weathering on rocks. State the meaning of lava & magma. Describe the properties of sedimentary rocks.	Explain why certain rocks are [porous, usually permeable]. Explain why air is classified as a mixture. Describe how [physical, biological] weathering can break up rocks. Explain how the size of crystals is evidence for the speed of cooling. Describe how sedimentary rocks are formed.	Use grain structure to classify rocks. Explain how air is a mixture of elements, compounds, atoms and molecules. Apply knowledge of particles, expansion & contraction to explain how rocks are broken up by freeze–thaw action & onionskin weathering. Use crystal size to classify igneous rocks as intrusive and extrusive. Explain the variation in crystal size in an igneous intrusion in terms of cooling rate. Explain why sedimentary rocks may contain fossils & are susceptible to erosion.	Extract relevant information about sedimentary rocks from geological maps, diagrams or graphs. Interpret diagrams to identify the different types of particle in air. Relate features of a landscape to the type of rock, how it was formed & how it has weathered. Explain how fossils and layer order can be used to give relative dates for rocks.

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Term 1a Topic(s) Title **9E Making Materials** -Ceramics -Polymers -Composite materials -Problems with materials -Recycling	Recall some examples of common ceramics (e.g., pottery, glass). State the meaning of ceramic. Recall what happens when monomers of [ethene, propene, chloroethene, tetrafluoroethene] polymerise. State the meaning of polymer and monomer. Recall some examples of common composites State the meaning of composite. Recall some problems with the disposal of [artificial, synthetic] polymers. State the meaning of: [biodegradable, non-biodegradable]. Recall that metals can be recycled.	Explain how the properties of ceramics make them useful. Describe how [ceramics, glass] can be recycled. Link the properties of different polymers to their uses. Explain how the properties of composites make them useful. Describe how [composites, concrete, paper] can be recycled. Explain how some of the problems of artificial polymers can be overcome. Explain what a landfill site is and some of the problems they cause.	Justify the use of a ceramic material for a given application. Evaluate the efficacy of recycling [ceramics, different sorts of materials]. From a given monomer be able to model the formation of a polymer. Justify the use of a composite material for a given application. Evaluate the efficacy of recycling [composites, different sorts of materials]. Evaluate the continued use of non-biodegradable polymers. Explain the advantages of recycling metals.	Explain why modifications in [a certain ceramic or glass] manufacture can change its properties (e.g., lead crystal). Combine data from different properties to suggest the structure and bonding in a substance. Be able to model the formation of a range of polymers and identify monomers from polymers. Be able to select the most appropriate polymer for a use and evaluate its effectiveness. Explain why modifications in manufacture of [a certain composite, e.g., paper, concrete] can change its properties. Evaluate the continued use of non-biodegradable polymers and evaluate alternative materials.

				Evaluate the efficacy of recycling of metals.
Term 1b Topic(s) Title **9F Reactivity** -Explosions -Reactivity -Energy and reactions -Displacement	Recall some examples of physical changes and of chemical changes. Recall examples of changes that can be reversed and those that cannot. Know the order of elements in the reactivity series. Define the terms endothermic and exothermic. State the meaning of reactivity series, displacement reaction.	Explain how chemical [changes, reactions] are different from physical changes. Explain the difference between physical and chemical properties of a substance. Be able to explain how we know the order of reactivity by the reactions of metals with air, water, acids and with other metals. Describe examples of endothermic and exothermic reactions. Describe what happens when a given displacement reaction occurs.	Use observations to decide whether a chemical or physical change has taken place Formulate the equations to show the reactions of metals with oxygen, water and acids. Interpret experimental data and describe the reaction as endothermic or exothermic. Explain why a displacement reaction may or may not occur. Use evidence to decide whether a displacement reaction has or has not occurred	Link Particle theory to gas pressure and explosions. Be able to link reactivity with rusting. Be able to describe why some reactions are endothermic and some are exothermic. Use results from displacement reactions to produce an order of reactivity. Write equations for displacement reactions.

Term 2a Topic(s) Title **C1a Atomic Structure and the Periodic Table** -Structure of an Atom -Atomic mass -The periodic table	To know how the Dalton model of an atom has changed. Recall that most of the mass of an atom is concentrated in its nucleus Describe isotopes as different atoms of the same element containing the same number of protons but different numbers of neutrons in their nuclei. Recall the chemical symbols of some common elements.	Describe the structure of an atom as a nucleus containing protons and neutrons, surrounded by electrons in shells. Recall the meaning of the term 'mass number' of an atom Describe atoms of a given element as having the same number of protons in the nucleus and that this number is unique to that element. Describe how Mendeleev arranged elements into a periodic table.	Recall the relative charge and relative mass of: (a) a proton (b) a neutron (c) an electron. Explain how the existence of isotopes results in some relative atomic masses of some elements not being whole numbers. Describe how Mendeleev predicted the existence and properties of some elements yet to be discovered.	Explain why atoms contain equal numbers of protons and electrons. Describe the nucleus of an atom as very small compared to the overall size of the atom. Calculate the numbers of protons, neutrons and electrons in atoms given the atomic number and the mass number Calculate the relative atomic mass of an element from the relative masses and abundances of its isotopes. Explain how Mendeleev's early ideas were supported by later evidence.
Term 2b Topic(s) Title **C1a Atomic Structure and the Periodic Table** -Atomic number -History of the periodic table -Electron configuration	Explain the meaning of the term 'atomic number' Know that metals are on the left and non-metals are on the right of the periodic table.	Describe how the elements are arranged in the modern periodic table. Recall the positions of metals and non-metals in the periodic table.	Describe and explain how the elements are arranged in the modern periodic table. Show electronic configurations in the form 2.8.1 and as diagrams.	Explain some problems Mendeleev had when ordering the elements. Predict the electronic configurations of the elements hydrogen to calcium. Explain the links between an element's position in the periodic table and its electronic configuration.

Term 3a Topic(s) Title **C2 Methods of Separating and purifying substances** -States of Matter -Mixtures -Filtration & crystallisation	Name the three states of matter, and the physical changes that occur between them. Describe the differences between a pure substance and a mixture. State some mixtures that can be separated by filtration. State some mixtures that can be separated by crystallisation.	Describe the arrangements and movement of particles in the different states of matter. Use melting point information to decide whether a substance is pure or is a mixture. Explain ways of reducing risk when separating mixtures by filtration and crystallisation.	Describe the relative energies of particles in the different states of matter. Describe what happens to atoms at a pure substance's melting point. Interpret a heating curve to identify a melting point. Explain how mixtures are separated by filtration.	Explain why the movement and arrangement of particles change during changes of state. Explain why the energy of particles changes during changes of state. Explain why the temperature does not change as a pure substance melts. Draw and interpret diagrams showing how filtration and crystallisation are done. Explain the formation of crystals during crystallisation.
Term 3b Topic(s) Title **C2 Methods of Separating and purifying substances** -Chromatography -Distillation -Drinking water	Identify substances that are identical on chromatograms. Describe how to carry out, and explain what happens in, simple distillation. Describe how fresh water can be produced from seawater	Identify pure substances and mixtures on chromatograms. Explain what precautions are needed to reduce risk in a distillation experiment. Describe the steps needed to make fresh water suitable for drinking.	Draw and interpret diagrams showing how chromatography is done. Describe how some mixtures can be separated by chromatography. Distinguish between simple distillation and fractional distillation. Identify when fractional distillation should be used to separate a mixture.	Calculate Rf values and use them to identify substances. Explain how substances can be separated by chromatography. Explain how the products of fractional distillation are linked to the boiling points of the components. Explain why water used in chemical analysis must not contain dissolved salts.

			Describe how to carry out fractional distillation. Suggest how to purify water when you know what it contains.	Evaluate the hazards and control the risks present when purifying water.