

Year 8 Autumn Term

Department: Science

Unit of Work: 8Kand I Energy Transfers and Fluids

| <p align="center">Projection Grades (end of year 11) 1-3</p> | <p align="center">Projection Grades (end of year 11) 4-6</p> | <p align="center">Projection Grades (end of year 11) 7-9</p> |
|--|--|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Recall some units for measuring temperature. <input type="checkbox"/> Explain how internal energy and temperature are different. <input type="checkbox"/> Describe the factors that determine the temperature of an object. <input type="checkbox"/> Recall and describe that energy can be transferred by heating in conduction, radiation and convection. <input type="checkbox"/> Recall examples of common thermal conductors and insulators. <input type="checkbox"/> Explain why particular materials are used for given purposes. <input type="checkbox"/> Use the particle model of matter to explain energy transfers by conduction and convection. <input type="checkbox"/> Apply the idea of different colours being good or poor emitters or absorbers. <input type="checkbox"/> Match Sankey diagrams to simple situations. <input type="checkbox"/> State the meaning of efficiency and recall some advantages of efficient appliances and identify useful and wasted energies. <input type="checkbox"/> Describe what power means, and the relationship between watts and joules/second. <input type="checkbox"/> Recall some advantages of low-energy appliances. <input type="checkbox"/> State what is meant by diffusion, contraction and expansion. <input type="checkbox"/> State what is meant by density and recall its units and recall that ice is less dense than water. <input type="checkbox"/> Describe the ways in which the volume and density changes during the water-ice transition are different from other materials. <input type="checkbox"/> Explain how chemical changes are different from physical changes and recall some examples of each type. <input type="checkbox"/> Recall that a change of state of a pure substance takes place at a constant temperature. <input type="checkbox"/> State what is meant by gas pressure and recall some of its effects. <input type="checkbox"/> Recall that pressure in a fluid changes with depth. <input type="checkbox"/> State what is meant by upthrust. <input type="checkbox"/> Explain why an object floats and recall the factors that affect the amount of upthrust on an object. <input type="checkbox"/> Recall the different types of resistive forces and describe how they affect movement. <input type="checkbox"/> Describe how drag changes with speed. <input type="checkbox"/> Explain the effects of balanced forces in simple situations. | <ul style="list-style-type: none"> <input type="checkbox"/> Describe the factors that affect the rate of transfer of energy by heating. <input type="checkbox"/> Use the particle model of matter to explain energy transfer by evaporation from a surface. <input type="checkbox"/> Compare conduction, convection, radiation and evaporation. <input type="checkbox"/> Evaluate ways of increasing or decreasing energy transfer by conduction, convection, radiation and evaporation. <input type="checkbox"/> Compare the effects of different rates of conduction in different materials. <input type="checkbox"/> Use Sankey diagrams to compare appliances or processes. <input type="checkbox"/> Calculate energy efficiencies. <input type="checkbox"/> Explain why the efficiency can never be greater than 100%. <input type="checkbox"/> Use data to consider cost efficiency by calculating payback times <input type="checkbox"/> Evaluate different ways of keeping something warm. <input type="checkbox"/> Describe the three states of matter in terms of shape, volume and compressibility. <input type="checkbox"/> State what is meant by diffusion, contraction and expansion. <input type="checkbox"/> Use the particle model of matter to explain the properties of solids, liquids and gases, and how their movement changes with temperature. <input type="checkbox"/> Use the particle model of matter to explain expansion and contraction at different temperatures. <input type="checkbox"/> State what is meant by density and recall its units and the factors that affect it. <input type="checkbox"/> Explain what happens to particles and temperature during changes of state, in terms of energy and forces. <input type="checkbox"/> Explain some effects caused by air or water pressure using ideas about forces. <input type="checkbox"/> Explain why pressure in a fluid increases with depth. <input type="checkbox"/> Work out if something will float. <input type="checkbox"/> Describe the ways in which the size of drag forces can be changed. <input type="checkbox"/> Describe the causes of air and water resistance. <input type="checkbox"/> Explain why a vehicle needs a force from the engine to keep moving at a constant speed. | <ul style="list-style-type: none"> <input type="checkbox"/> Convert between the Kelvin and Celsius scales. <input type="checkbox"/> Describe how the average kinetic energy of the particles in a gas relates to its Kelvin temperature. <input type="checkbox"/> Explain the causes and effects of wind chill. <input type="checkbox"/> Apply the idea of thermal mass to homes. <input type="checkbox"/> Use the formula relating power, energy and time (in W, J and s). <input type="checkbox"/> Use data to evaluate methods of reducing carbon emissions. <input type="checkbox"/> Use quantitative information on expansion and contraction. <input type="checkbox"/> Compare densities of materials and link them to the mass of the particles and how closely they pack together. <input type="checkbox"/> Explain why ice is less dense than water. <input type="checkbox"/> Use the idea of latent heats when discussing changes of state. <input type="checkbox"/> Apply ideas about pressure to barometers and altimeters. <input type="checkbox"/> Use the equation relating pressure to the depth and density of a liquid. <input type="checkbox"/> Explain that the upthrust depends on the weight of fluid displaced. <input type="checkbox"/> Use ideas about displacement to explain phenomena connected with floating and sinking. <input type="checkbox"/> Use and interpret the equation linking drag, density, speed and frontal area. |

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Year 8 Autumn Term 1

Department: Science

Unit of Work: The Periodic Table

| <p align="center">Projection Grades (end of year 11) 1-3</p> | <p align="center">Projection Grades (end of year 11) 4-6</p> | <p align="center">Projection Grades (end of year 11) 7-9</p> |
|---|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Recall that different elements have different physical properties <input type="checkbox"/> Identify the chemical symbols for some common elements and record two-letter symbols correctly <input type="checkbox"/> Describe Dalton's ideas about atoms. <input type="checkbox"/> Use a simple (Dalton's) atomic model to describe an element. <input type="checkbox"/> Explain how chemical reactions are different from physical changes. <input type="checkbox"/> Explain the difference between physical and chemical properties of a substance. <input type="checkbox"/> Use observations to decide whether a chemical reaction has taken place. <input type="checkbox"/> Model simple chemical reactions using word equations. <input type="checkbox"/> Use a simple (Dalton's) atomic model to describe a compound. <input type="checkbox"/> Use the periodic table to look up symbols. <input type="checkbox"/> Identify the alkali metals, halogens, (transition metals) and noble gases in the periodic table. <input type="checkbox"/> State what elements in the same group of the periodic table share. <input type="checkbox"/> Recall that the noble gases are chemically inert compared with other elements. <input type="checkbox"/> State what happens at a material's melting, freezing and boiling points. <input type="checkbox"/> Use knowledge of melting/freezing and boiling point to predict the state of a substance at a given temperature. <input type="checkbox"/> Identify metals and non-metals by their physical properties. <input type="checkbox"/> Use ideas about the periodic table to identify the positions of metal and non-metal elements. <input type="checkbox"/> Describe the reactions of metals with oxygen. 2. L5 Describe the reactions of non-metals with oxygen. <input type="checkbox"/> Describe the reactions of metals with water. <input type="checkbox"/> Use the reactions of some alkali metals with water to predict the reactions of other alkali metals with water (in terms of what happens, not reactivity). | <ul style="list-style-type: none"> <input type="checkbox"/> Use the idea of atoms to explain why different elements have different physical properties. <input type="checkbox"/> Model complex chemical reactions using word equations. <input type="checkbox"/> Describe how atoms are rearranged in chemical reactions. <input type="checkbox"/> Write simple chemical formulae from information on structure. <input type="checkbox"/> Interpret formulae to identify the types of and ratio of atoms in a compound <input type="checkbox"/> Recall the typical properties of alkali metals. <input type="checkbox"/> Recall the typical properties of halogens. <input type="checkbox"/> Explain how Mendeleev made predictions using his table. <input type="checkbox"/> Describe how the periodic table is arranged (in terms of elements in groups of similar properties). <input type="checkbox"/> Recall there is usually a regular gradation in physical properties as you go down a group. <input type="checkbox"/> Use data to identify trends in physical properties within a group. <input type="checkbox"/> Compare the physical and chemical properties of metal and non-metal oxides. <input type="checkbox"/> Recall there is usually a regular gradation in chemical properties as you go down a group <input type="checkbox"/> Use data to identify trends in chemical properties within a group. <input type="checkbox"/> Identify a pattern of reactivity in the reaction between some alkali metals and water and use this to predict the reactivity of other <input type="checkbox"/> alkali metals | <ul style="list-style-type: none"> <input type="checkbox"/> Use information about reaction ratios to calculate atomic masses <input type="checkbox"/> Give a simple description of the valency of an element and use this to deduce the formula of compounds (containing two main group elements). <input type="checkbox"/> Explain how Mendeleev originally arranged the periodic table by placing the elements in order of atomic weight. <input type="checkbox"/> Recall suitable units to measure particle diameters. <input type="checkbox"/> Compare particle sizes to the sizes of common objects. <input type="checkbox"/> Describe how the sizes of atoms change in the groups and periods of the periodic table. <input type="checkbox"/> State that atoms can be joined up to make molecules or giant lattice structures <input type="checkbox"/> Describe the difference between molecules and giant lattice structures. |