Year 8 Science Assessment and Progression Grid

	Biology	Chemistry	Physics	How Science Works
Excelling	<u>Organisms:</u> Describe and explain the role of the respiratory system in gas exchange Describe the impact of exercise, asthma and smoking on the respiratory system and the circulatory system Explain the role of the circulatory system and the associated vessels including how they are adapted for function <u>Genes:</u> Explain the role of DNA, genes and chromosomes in heredity Discuss the roles of scientists in the development of the DNA model. Explain the purpose of gene banks in maintaining biodiversity Explain that variation allows species to compete more successfully, and this may result in extinction Explain how variation and environmental pressures can drive natural selection and lead to evolution <u>Ecosystems:</u> Describe photosynthesis and identify limiting factors Summarise photosynthesis in a word and symbol equation (balancing not required) Describe how plants are adapted to maximise the rate of photosynthesis Distinguish between photosynthesis and respiration in plants.	<u>Matter:</u> Explain the difference between elements, mixtures and compounds using symbols ad formulae, diagrams and other representations. Explain the arrangement of the periodic table in terms of metals and non-metals and solids, liquids and gases and properties of the elements included and some patterns of reactivity (Group 1 and Group 7). <u>Reactions:</u> Explain how atoms are rearranged in chemical reactions in order for reactants to become products and represent these in both word and balanced symbol equations. Relate properties of materials to their behaviour during chemical reactions. Relate the properties of metal to their behaviour during reactions to explain the reactivity series of metals. <u>Earth:</u> Explain the impact of human activities on the use of resources on the planet and what can be done to improve sustainability.	<u>Energy:</u> Explain confidently, mechanisms of energy transfer Describe the electromagnetic spectrum in detail explaining about the wavelength and frequency of its waves <u>Electromagnetism:</u> Describe and explain electric current and potential difference in series and parallel circuit Explain what electrostatic force is giving examples and applications of its use Investigate the effect of current and potential difference on resistance <u>Forces:</u> Investigate the effects of force and perpendicular distance to the pivot on moments Investigate force and area on pressure Rearrange moments/pressure/density equations Interpret distance-time graphs to describe changes in motion and calculate speed <u>Waves:</u> Describe and explain the nature and behaviour of light	Use scientific knowledge to decide how ideas and questions can be tested. Make predictions of possible outcomes. Identify and control the key factors that are relevant to a particular situation. Select and use appropriate equipment Use repeat measurements to reduce error and check reliability Present and interpret data through the routine use of tables, bar charts and line graphs Describe and explain results when drawing conclusions and relate these to scientific knowledge and understanding Evaluate the strength of evidence
Secure	<u>Organisms:</u> Explain the role of the respiratory system in gas exchange Describe the impact of exercise, asthma and smoking on the respiratory system and the circulatory system Explain the role of the circulatory system and the associated vessels <u>Genes:</u> Describe the role of DNA, genes and chromosomes in heredity Explain what biodiversity is and why it is important Explain why variation is important. <u>Ecosystems:</u> Summarise photosynthesis in a word and symbol equation (balancing not required) List factors that affect photosynthesis Recognise that all living things respire including plants.	<u>Matter:</u> Explain the difference between elements, mixtures and compounds using symbols ad formulae, diagrams and other representations. Explain the arrangement of the periodic table Identify patterns of reactivity in group 1 and 7 Describe the involvement of Mendeleev in the construction of the periodic table <u>Reactions:</u> Describe how atoms are rearranged in chemical reactions and represent these in both word and symbol equations. Describe some types of chemical reactions and relate this to properties of materials Describe the reactivity series of metal and relate this to their properties <u>Earth:</u> Describe the impact of human activities on the use of resources on the planet	<u>Energy:</u> Explain confidently, mechanisms of energy transfer Describe the electromagnetic spectrum giving information about wavelength and frequency of its waves <u>Electromagnetism:</u> Explain electric current and potential difference in series and parallel circuit Describe the relationship between electrostatic force and the induction of charge Describe the relationship between potential difference, current and resistance <u>Forces:</u> Rearrange equations to calculate moment, pressure, density and speed Interpret distance-time graphs to describe changes in motion Use calculations of density to predict whether an object will float or sink <u>Waves:</u> Describe the law of reflection and how images are formed in the eye and pinhole camera Describe how light behaves when passing through different media	Identify the appropriate approach when trying to answer a question. Make predictions of possible outcomes Identify and control the key factors that are relevant to a particular situation. Make a series of measurements with appropriate precision Use repeat measurements and offer explanations for differences in results.. Present and interpret data through the routine use of tables, bar charts and line graphs. Identify patterns within results and use these when drawing conclusions. Relate conclusions to scientific knowledge and understanding Identify limitations of the experiment and suggest ways to improve

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Developing	**Organisms:** Label the respiratory system and describe gas exchange Recognise the impact of exercise, asthma and smoking on the respiratory system and the circulatory system Label the circulatory system and name the associated vessels, describe their roles in the movement of substances around the body **Genes:** Distinguish between genes, DNA and chromosomes Define biodiversity Explain the difference between genetic and environmental variation **Ecosystems:** Summarise photosynthesis in a word equation Suggest factors that affect photosynthesis Recognise that photosynthesis is a chemical reaction	**Matter:** Describe the difference between elements, mixtures and compounds Recognise that different materials have different properties and are more reactive than others Describe how the period table is groups according to properties of materials List the properties of metals and non-metals Identify some patterns of reactivity in group 1/7 **Reactions:** Summarise chemical reactions in word equations, use symbol equations with help Recognise that the way chemicals react is related to their properties Describe the reactivity series of metals **Earth:** List human activities that impact the planet Suggest ways that carbon dioxide levels could be reduced Recognise that recycling could reduce the harmful effects of human activities	**Energy:** Describe how energy transfer happens by convection, conduction and radiation Describe the electromagnetic spectrum using details about wavelength and frequency **Electromagnetism:** Describe electric current and potential difference in series and parallel circuits including how to measure them Use ideas about electrostatic force to explain why objects can attract or repel each other Define the term resistance and provide a simple explanation **Forces:** Calculate moments, pressure, density and average speed Describe the connection between density and floating and sinking Recognise ways of increasing/reducing friction Describe relative changes in motion **Waves:** Recognise that light waves are transverse Give examples of when light rays are absorbed, reflected or refracted Interpret ray diagrams	Use scientific knowledge to decide how ideas and questions can be tested. Make predictions where appropriate . Identify and key factors that are relevant to a particular situation and suggest how to make it fair Measure quantities using a range of simple equipment Present data in bar charts and tables, begin to plot points for simple graphs Explain observations and simple patterns and begin to relate conclusions to these patterns Suggest improvements
Emerging	**Organisms:** Label the respiratory system and define gas exchange as breathing List some effects of exercise, asthma and smoking on the respiratory system and the circulatory system Label the circulatory system and name the different type of blood vessels **Genes:** Explain that genes code for characteristics and we inherit these from our parents Recognise that inheritance brings about variation **Ecosystems:** Identify what a plant needs to photosynthesis Identify what a plant makes in photosynthesis	**Matter:** Recognise elements when compared to mixtures or compounds Recognise some symbols in the periodic table and simple formula such as: water, carbon dioxide and oxygen. Point out where metals and non-metals are on the periodic table. **Reactions:** Recognise that atoms are rearranged in chemical reactions Recognise some different type of chemical reactions List some metals in order of reactivity **Earth:** Give examples of how humans impact the environment Describe what recycling is	**Energy:** Recognise that energy transfer happens by convection, conduction and radiation and explain the difference between heat and temperature Name the waves on the electromagnetic spectrum **Electromagnetism:** Identify and construct series and parallel circuits Give examples of static electricity State whether it is hard or easy for current to flow through some materials **Forces:** State that a turning force is called a moment Calculate moments, density, pressure and speed with guidance Describe simple changes in motion and read values from distance-time graphs **Waves:** State that light can travel in straight line including through a vacuum List the colours of light in order of the spectrum	Simple suggestion for how to find things out Make a simple prediction….I think this will happen… With help, suggest the use of equipment Take some measurements when instructed how to do so Draw a simple bar chart Describe what happened and whether it was what they expected.