Year 9 Science Assessment and Progression Grid

	Biology	Chemistry	Physics	How Science Works
Excelling	Biology 1 Explain the organisation of living things. Explain how the main subcellular structures are related to functions. Explain how specialised cells and plant tissues are related to their functions. Describe photosynthesis as an endothermic reaction and explain the effects of different factors on the rate. Recognise why factors can be described as limiting. Compare and contrast asexual and sexual reproduction. Explain how variation is caused by the genome and its interaction with the environment. Describe the structure of DNA and distinguish between genes, chromosomes and DNA. Define the term genome and explain the importance of studying it. Interpret the outcomes of genetics crosses that explain the inheritance of characteristics and sex. Biology 2 Explain the lock and key theory of enzymes action and use this to explain the process of digestion in humans. Explain the roles of the respiratory and circulatory systems including how they are adapted to function. Compare and contrast aerobic and anaerobic respiration. Describe the symptoms of salmonella and gonorrhoea, methods of transmission and how to stop transmission. Describe the role of the immune system in the defences against disease (specific and non-specific defence)	Chemistry 1 Represent the three states of matter using the particle model and explain the arrangement of atoms and the energy required to change state is dependent on the forces between particles. Confidently use the periodic table to use the names and symbols of the first 20 elements, name compounds of these elements from given formulae or symbol equations. Describe, explain and given examples of the specified processes of separation of mixtures Calculate numbers of protons, neutrons and electrons in an atom or ion, give the atomic number and mass number. Use the periodic table to draw and describe the electronic structure of the first 20 elements. Explain how the position of an element in the periodic table is related to the arrangement of electrons in its atoms Calculate relative formulae mass. Describe the properties of hydrocarbons and relate this to the size of their molecules. Summarise combustion in a word and balanced symbol equation. Describe the tests for oxygen, carbon dioxide, hydrogen and chlorine. Explain the differences between metals and non-metals, explain how their atomic structure relates to their position in the periodic table and how reactions they are involved in relate to the arrangement of electrons in their atoms. Chemistry 2 Confidently use the pH scale and describe the use of indicators to measure pH. Explain characteristics of strong and weak acids. Use the collision theory to explain how fall actors affect the rate of a chemical reaction. Identify greenhouse gases. Explain how oxygen increased in the early atmosphere and how carbon dioxide decreased. Describe and explain the properties of metals and alloys. Explain how the reactivity series can be used to extract metals from their ores.	Physics 1 Describe the interaction between pairs of objects which produce a force on each object. Apply Newtons First Law to explain the motion of objects where the speed and direction changes Calculate the resultant forces that act in a straight line Recall typical values of a person in different forms of motion and make measurements of distance/time and calculate speed and average speed for non-uniform motion. Describe the difference between weight and mass and calculate weight. Rearrange the equation to calculate mass and gravitational field strength. Explain differences in density between the different states of matter. Calculate density and rearrange the equation to calculate mass and volume. Describe the difference between permanent and induced magnets. Describe the attraction and repulsion of permanent magnets. Describe and draw the magnetic field pattern of a bar magnet, a wire carrying current and a solenoid, showing how strength and direction change form one point to another. Describe how the magnetic effect of current can be demonstrated. Describe the electromagnetic spectrum, give examples and illustrate the transfer of energy by electromagnetic waves. Physics 2 Draw and interpret circuit diagrams, construct and check series and parallel circuits to include a variety of components Explain features of mains electricity and the difference between direct and alternating current. Rearrange the equation to calculate charge, current and time Rearrange the equation to calculate potential difference, current and resistance Describe the difference between current and potential difference in series and parallel circuits Rearrange the equation to power, potential difference and current Rearrange the equation to energy transfer, power and time Rearrange the equation to efficiency, total input and useful output Describe renewable and non-renewable energy resources and consider advantages, disadvantages and the environmental implications of their use	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

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	Biology	Chemistry	Physics	How Science Works
Secure	**Biology 1:** Describe the organisation of living things including the organelles found in eukaryotic plant and animal cells. Explain how specialised cells and plant tissues are related to their functions. Summarise photosynthesis in a word and balanced symbol equation and describe how limiting factors affect its rate. Describe similarities and differences between asexual and sexual reproduction. Explain how variation is caused by the genome and its interaction with the environment. Distinguish between genes, chromosomes and DNA. Define the term genome and explain the importance of studying it. Interpret the outcomes of genetics crosses that explain the inheritance of characteristics and sex. **Biology 2:** Explain the process of digestion in humans. Explain the roles of the respiratory and circulatory systems including how they are adapted to function. Describe and explain aerobic and anaerobic respiration. Describe the symptoms of bacterial diseases, methods of transmission and how to stop transmission. Describe the role of the immune system in the defences against disease.	**Chemistry 1:** Explain the arrangement of atoms in SLG and the energy required to change state is dependent on the forces between particles. Use the names and symbols of the first 20 elements, name compounds of these elements from given formulae or symbol equations. Describe specified processes of separation of mixtures Calculate numbers of protons, neutrons and electrons in an atom or ion, give the atomic number and mass number. Use the periodic table to draw and describe the electronic structure of the first 20 elements with some assistance. Explain how the position of an element in the periodic table is related to its properties. Calculate relative formulae mass. Describe the properties of hydrocarbons and summarise combustion in a word and symbol equation. Describe the tests for most gases. Explain how the properties of metals is related to their structure. **Chemistry 2:** Describe the use of indicators to measure pH. Explain characteristics of strong and weak acids. Use the collision theory to explain some factors affect the rate of a chemical reaction. Identify greenhouse gases. Explain changes in gases in the early atmosphere. Describe the reactivity series of metals and the application of this.	**Physics 1:** Describe the interaction between pairs of objects which produce a force on each object. Apply Newtons First Law to explain the motion of objects and calculate resultant force. Recall typical values of a person in motion and calculate speed and average speed for non-uniform motion. Describe the difference between weight and mass. Rearrange the equation to calculate mass and gravitational field strength. Explain differences in density between the different states of matter. Calculate density and rearrange the equation to calculate mass and volume. Describe the attraction and repulsion of permanent magnets. Describe and draw the magnetic field pattern of a bar magnet and a solenoid, showing how strength and direction change form one point to another. Describe the electromagnetic spectrum and give examples. **Physics 2:** Draw and interpret circuit diagrams, construct and check series and parallel circuits to include a variety of components Explain features of mains electricity and the difference between direct and alternating current. Calculate charge, power, energy transfer and efficiency. Describe renewable and non-renewable energy resources and consider some implications of their use.	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

Year 9 Science Assessment and Progression Grid

	Biology	Chemistry	Physics	How Science Works
Developing	Biology 1: Draw and label the organelles found in eukaryotic plant and animal cells. Explain how specialised cells and plant tissues are related to their functions. Summarise photosynthesis in a word and symbol equation and list factors affecting rate. Describe asexual and sexual reproduction. Describe genetic and environmental variation. Distinguish between genes, chromosomes and DNA. Describe what the human genomes is. Predict outcomes of genetics crosses that describe the inheritance of characteristics and sex. Biology 2: Label the digestive system and describe the process of digestion in humans. Explain the roles of the respiratory and circulatory systems. Describe aerobic and anaerobic respiration. Describe the symptoms of bacterial diseases, methods of transmission and how to stop transmission. Describe the role of the immune system in the defences against disease.	**Chemistry 1:** Describe the arrangement of atoms in SLG and the energy required to change state Use the names and symbols of the first 20 elements, name compounds of these elements from given formulae or symbol equations. Describe how mixtures can be separated Calculate numbers of protons, neutrons and electrons in an atom or ion, give the atomic number and mass number with assistance. Use the periodic table to draw and describe the electronic structure of the first 20 elements with some assistance. Explain how the position of an element in the periodic table is related to its properties. Calculate relative formulae mass. List properties of hydrocarbons and summarise combustion in a word. Describe the tests for most gases. Explain how the properties of metals is related to their structure. **Chemistry 2:** Describe the use of indicators to measure pH. Explain characteristics of strong and weak acids. Describe how some factors affect the rate of a chemical reaction. Identify greenhouse gases and suggest how the early atmosphere was formed. Describe the reactivity series of metals.	**Physics 1:** Describe the interaction between pairs of objects Apply Newtons First Law to explain the motion of objects Recall typical values of a person in motion Describe the difference between weight and mass. Calculate density. Describe the attraction and repulsion of permanent magnets. Describe and draw the magnetic field pattern of a bar magnet. Describe how to make an electromagnet stronger. Describe the electromagnetic spectrum and give examples. **Physics 2:** Draw and interpret circuit diagrams. Distinguish between series and parallel circuits. Explain features of mains electricity and the difference between direct and alternating current. Calculate charge, power, energy transfer and efficiency. Describe renewable and non-renewable energy resources and suggest some advantages and disadvantages of each.	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 Suggest limitations of an experiment.

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	Biology	Chemistry	Physics	How Science Works
Emerging	Biology 1: Draw and label eukaryotic cells and explain how specialised are adapted to their function Summarise photosynthesis in a word equation and list the limiting factors that affect it Describe asexual and sexual reproduction. List examples of genetic and environmental variation. Put gene, DNA, chromosomes, and genome in order of size. Describe how some characteristics are inherited. Biology 2: Label the digestive system and describe digestion Label the respiratory system ad describe gas exchange Describe aerobic respiration as 'with oxygen' and anaerobic respiration as 'without oxygen'. Describe the symptoms of bacterial diseases and describe how they are spread. Give some examples of how the body fights disease.	Chemistry 1: Describe the difference between elements, mixtures and compounds Describe how the period table is grouped according to properties of materials List the properties of metals and non-metals Give examples of how mixtures can be separated Calculate numbers of protons, neutrons and electrons in an atom or ion, give the atomic number and mass number with assistance. Calculate relative formulae mass. Define the term hydrocarbon and summarise combustion in a word equation Describe the tests for some gases. Chemistry 2: 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	Physics 1: 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 Describe the difference between weight and mass and calculate weight. Describe the attraction and repulsion of permanent magnets and draw the magnetic field pattern of a bar magnet. Give examples of waves on the electromagnetic spectrum Physics 2: Draw and interpret circuit diagrams, construct and check series and parallel circuits to include a variety of components Recognise the difference between direct and alternating current. Calculate efficiency and energy transfer with help. List renewable and non-renewable energy resources	Suggest how some 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