

**Biology**

|          | <b>STRAND 1</b><br>Fundamental biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>STRAND 2</b><br>Gas exchange and respiration                                                                                                                                                                                                                                                                                                                                                                     | <b>STRAND 3</b><br>Body systems                                                                                                                                                                                                                                                                                                                             | <b>STRAND 4</b><br>Ecology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>STRAND 5</b><br>Inheritance                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>STRAND 6</b><br>Working scientifically                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>9</b> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• evaluate the methods of sexual versus asexual reproduction.</li> <li>• describe the function of mitochondria and ribosomes.</li> <li>• explain the difference between sexual and asexual reproduction.</li> <li>• suggest what factors affect the rate of diffusion and explain these.</li> </ul>                                                                                                                                                                                                                       | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• analyse graphs of breathing and heart rate before, during and after exercise.</li> <li>• define oxygen debt (extra oxygen needed after exercise).</li> <li>• outline the pros and cons of aerobic and anaerobic respiration for organisms.</li> </ul>                                                                        | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• explain why maintaining body temperature is essential for enzyme function.</li> <li>• suggest the impacts that having artificial parts of the skeletal system may have on an individual.</li> </ul>                                                                  | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• write a balanced symbol equation for photosynthesis.</li> <li>• evaluate organic versus inorganic farming methods.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• outline the process of genetic engineering.</li> <li>• describe the purpose and advantages of genetic engineering using examples.</li> </ul>                                                                                                                                                                                                                                | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• explain and use the terms accuracy, precision, repeatability, reproducibility, range, interval and bias correctly and in any context.</li> <li>• use data to support or refute an argument or stated position.</li> </ul>                                                                                                                                                                                                                                                                                                                                      |
| <b>8</b> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• describe some methods used to treat infertility and evaluate these methods; considering moral, ethical and economic issues.</li> <li>• explain how the menstrual cycle is involved in fertilisation and how infertility can be affected by changes to the menstrual cycle.</li> </ul>                                                                                                                                                                                                                                   | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• compare and contrast aerobic and anaerobic respiration.</li> </ul>                                                                                                                                                                                                                                                           | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• calculate the energy requirements of different groups of people (teenagers, the elderly, males and females).</li> <li>• describe how bacteria can aid human digestion.</li> </ul>                                                                                    | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• explain how leaves are adapted for efficient photosynthesis.</li> <li>• explain the importance of photosynthesis in maintaining levels of oxygen and carbon dioxide in the atmosphere.</li> <li>• evaluate the importance of insect pollinators within the ecosystem with reference to human food supply.</li> <li>• explain what is meant by bioaccumulation (the build-up of substances in a food chain) and suggest the effects of bioaccumulation (the build-up of substances in a food chain) on the ecosystem.</li> </ul> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• discuss the roles of Watson, Crick, Wilkins and Franklin in the discovery of DNA.</li> <li>• explain the process of natural selection and how this leads to evolution; with reference to variation and adaptation.</li> <li>• explain the use of gene banks to maintain biodiversity.</li> </ul>                                                                            | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• give reasoned explanations that link data to predictions and hypotheses (testable explanations).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>7</b> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• compare and contrast plant cells to animal cells.</li> <li>• investigate methods of seed dispersal mechanisms.</li> <li>• evaluate the effects of recreational drugs on the human body, health as well as social aspects.</li> </ul>                                                                                                                                                                                                                                                                                    | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• explain how pressure changes during ventilation</li> <li>• analyse data to assess the impact of exercise, asthma and smoking on the human gas exchange system.</li> <li>• recall the word equations for aerobic and anaerobic respiration.</li> </ul>                                                                        | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• state and explain which muscles in the body may need to be stronger than others.</li> <li>• explain how the skeletal and muscular systems work together to form the musculoskeletal system.</li> <li>• explain the function of antagonistic muscle pairs.</li> </ul> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• write the word equation for photosynthesis; identifying the reactants and products.</li> <li>• explain the importance of photosynthesis for life on Earth, with reference to food chains.</li> </ul>                                                                                                                                                                                                                                                                                                                            | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• describe what is meant by continuous and discontinuous variation; giving examples of each.</li> <li>• describe the function of DNA, genes and chromosomes and explain how they are related to one another.</li> <li>• describe how gene banks may be used to maintain biodiversity.</li> <li>• describe how competition can lead to extinction.</li> </ul>                  | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• use IUPAC chemical names correctly.</li> <li>• identify further questions arising from the results of an investigation.</li> <li>• apply sampling techniques.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>6</b> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• label parts of cells from a diagram.</li> <li>• describe the functions of the main parts of animal and plant cells.</li> <li>• define the terms; tissue, organ and organ system.</li> <li>• explain how gametes are involved in fertilisation.</li> <li>• describe the menstrual cycle.</li> <li>• outline some methods of seed and fruit dispersal.</li> <li>• explain some effects of recreational drugs on the human body and health.</li> </ul>                                                                     | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• explain how the lungs and trachea are adapted for efficient gas exchange.</li> <li>• describe how lung volume changes during breathing.</li> <li>• describe how exercise, asthma and smoking affects the human gas exchange system.</li> <li>• describe the commercial uses of aerobic and anaerobic respiration.</li> </ul> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• explain how an unbalanced diet may affect the human body; with examples.</li> <li>• explain the process of digestion, including the role of enzymes.</li> </ul>                                                                                                      | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• state the function of the stomata in plant leaves.</li> <li>• state the reactants and products of photosynthesis.</li> <li>• explain how organisms may be affected by changes in their environment.</li> <li>• draw and interpret food webs.</li> <li>• explain how a change in the numbers of one organism may affect another, referring to competition and predation.</li> </ul>                                                                                                                                              | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• describe what is meant by inherited variation and environmental variation.</li> <li>• state that genetic information is inherited.</li> <li>• state that due to variation, some individuals within a species will be better adapted for competition.</li> <li>• define biodiversity.</li> <li>• state that gene banks are important in maintaining biodiversity.</li> </ul> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• evaluate data and explain how random and systematic errors may affect the results.</li> <li>• analyse data using simple statistical techniques.</li> <li>• recognise anomalous results (results that do not fit the pattern) in data.</li> <li>• calculate mean data while recognising the need to exclude anomalous results (results that do not fit the pattern) from mean calculations.</li> </ul>                                                                                                                                                          |
| <b>5</b> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• describe the process of diffusion.</li> <li>• give some examples of tissues and organs.</li> <li>• list the main parts of animal and plant cells.</li> <li>• state the structural adaptations of some unicellular organisms, such as flagella.</li> <li>• describe how some animal and plant cells are adapted for their function.</li> <li>• describe the functions of some reproductive tissues and organs in plants.</li> <li>• describe some effects of recreational drugs on the human body and health.</li> </ul> | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• state what happens to the air, ribs and diaphragm during inhalation and exhalation.</li> <li>• define the term ‘respiration’</li> <li>• state the difference between aerobic and anaerobic respiration.</li> </ul>                                                                                                           | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• describe what is meant by a balanced, healthy diet; including the roles of the different nutrients.</li> <li>• carry out an investigation to measure the force of a muscle.</li> </ul>                                                                               | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• state that plants use their leaves and the process of photosynthesis to make carbohydrates.</li> <li>• describe how organisms may be affected by changes in their environment.</li> </ul>                                                                                                                                                                                                                                                                                                                                       | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• state that all organisms show variation, including within the same species and between members of different species.</li> </ul>                                                                                                                                                                                                                                             | <b>All the steps below, and I can also...</b> <ul style="list-style-type: none"> <li>• make and record observations and measurements using a range of methods for different investigations.</li> <li>• comment on the reliability of methods.</li> <li>• suggest possible improvements to an investigative technique</li> <li>• work out appropriate axes and scales for graphs.</li> <li>• draw best-fit lines for appropriate data.</li> <li>• know that scientific theories develop as earlier explanations are modified to take into account new evidence.</li> <li>• understand the importance of publishing results and peer review.</li> </ul> |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• can state that the cells are the ‘building blocks’ of living organisms.</li><li>• can list some equipment that may be used to observe cells.</li><li>• can define ‘diffusion’.</li><li>• can describe how cells, tissues, organs and organ systems and linked in multicellular organisms.</li><li>• can give examples of tissues and organs in the human reproductive systems.</li><li>• can describe the functions of some human reproductive tissues and organs.</li><li>• can describe what happens during pregnancy and birth.</li><li>• can discuss how to have a healthy pregnancy.</li><li>• can name some plant reproductive tissues and organs.</li><li>• can list some effects of recreational drugs on the human body and health.</li></ul> | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• can name some human gas exchange tissues and organs.</li><li>• can describe the functions of some human gas exchange tissues and organs.</li></ul> | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• can identify from a diagram; bones, muscles, cartilage, tendons and ligaments.</li><li>• can describe the functions of bones, muscles, cartilage, ligaments and tendons.</li><li>• can list the different types of joint and give an example of each joint type.</li></ul> | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• can describe how a change in the numbers of one organism may affect another.</li><li>• can draw and interpret simple food chains.</li><li>• can state the function of plant roots.</li><li>• can state that all organisms in an ecosystem may affect each other and are affected by changes in their environment.</li></ul> | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• can identify how animals and plants are adapted to suit their environments and that adaption may lead to evolution.</li></ul> | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• can use simple equations to carry out calculations from results and interpret observations to identify simple patterns.</li><li>• can ask questions based on observations and make simple predictions.</li><li>• can plan a simple investigation and identify independent, dependent and control variables</li><li>• can recognise some potential sources of error.</li></ul> |
| 3 | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• recognise how different types of diet, exercise, drugs and lifestyle can affect the body.</li><li>• describe what is meant by reproduction in plants and animals.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• explore and compare the differences between things that are living, dead or never been alive.</li></ul>                                            | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• name some tissues and organs in the human digestive system.</li><li>• describe the functions of some tissues and organs in the human digestive system.</li></ul>                                                                                                           | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• describe how living things are classified into broad groups based on observable similarities or differences.</li><li>• give reasons for classifying plants and animals based on characteristics.</li></ul>                                                                                                                  | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• recognise that living things produce offspring of the same kind.</li></ul>                                                    | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• name and use some SI units.</li><li>• name some common chemicals such as water, hydrochloric acid and sodium chloride.</li><li>• identify hazards and carry out a simple risk assessment.</li><li>• identify simple patterns or trends from data presented in graphs.</li></ul>                                                                                               |
| 2 | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• recognise and describe the functions of the roots, stem, leaves and flowers.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• describe the importance of exercise for humans.</li></ul>                                                                                          | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• identify the main organs of the human circulatory system.</li><li>• outline the functions of the heart, blood vessels and blood.</li><li>• identify that humans and some other animals have skeletons and muscles for support.</li></ul>                                   | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• observe and describe how seeds and bulbs grow into mature plants.</li><li>• recognize that environments can change and that this can sometimes pose dangers to living things.</li></ul>                                                                                                                                     | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• recognise that normally offspring vary and are not identical to their parents.</li></ul>                                      | <p><b>All the steps below, and I can also...</b></p> <ul style="list-style-type: none"><li>• present findings and draw simple conclusions from experimental data.</li><li>• present observations and data using simple tables and graphs where axes and scales are provided.</li></ul>                                                                                                                                                                                     |
| 1 | <p><b>I can...</b></p> <ul style="list-style-type: none"><li>• name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</li><li>• identify and name some common carnivores, herbivores and omnivores.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>I can...</b></p> <ul style="list-style-type: none"><li>• describe the basic need for air in humans.</li></ul>                                                                                                                             | <p><b>I can...</b></p> <ul style="list-style-type: none"><li>• identify, draw, name and label the basic parts of the human body.</li><li>• say which part of the body is associated with each sense.</li></ul>                                                                                                                                                          | <p><b>I can...</b></p> <ul style="list-style-type: none"><li>• identify and name a variety of common wild and garden plants, including evergreen trees and deciduous trees.</li><li>• identify the basic structure of a variety of common flowering plants.</li></ul>                                                                                                                                                    | <p><b>I can...</b></p> <ul style="list-style-type: none"><li>• notice that animals, including humans, have offspring which grow into adults.</li></ul>                                                                     | <p><b>I can...</b></p> <ul style="list-style-type: none"><li>• take measurements, including repeat readings using a range of scientific equipment.</li><li>• draw simple, correctly labelled scientific diagrams.</li><li>• follow instructions safely.</li></ul>                                                                                                                                                                                                          |