**Science - Biology Target Related Expectation (TReE) Year 8**

| | Pathway 1 (Target Grade 1-3) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8.3.1 Gas exchange | 8.3.2 Breathing | 8.3.3 Drugs | 8.3.4 Alcohol | 8.3.5 Smoking | 8.4.1 Nutrients | 8.4.2 Food tests | 8.4.3 Unhealthy diet | 8.4.4 Digestive system | 8.4.5 Bacteria and enzymes in digestion |
| 8 Organisms | • Explain how lungs work and the difference in composition between inhaled and exhaled air | • State what happens to the ribcage and diaphragm during inhaling and exhaling using a bell jar model | • Name some recreational and medicinal drugs and state one effect of a drug on health or behaviour | • Name one effect of alcohol on health or behaviour and how alcohol affects pregnancy | • Name an effect of tobacco smoke on health and how tobacco smoke affects the development of a foetus | • Name the nutrients required by the human body | • Use appropriate techniques to carry out a food tests for starch, lipids and proteins safely | • State one potential problem for someone with an unhealthy diet | • Identify the main structures in the digestive system on a model | • Name some enzymes used in digestion |
| | 9.3.1 Aerobic respiration | 9.3.2 Anaerobic respiration | 9.3.3 Biotechnology | 9.4.1 Photosynthesis | 9.4.2 Leaves | 9.4.3 Investigating photosynthesis | 9.4.4 Plant minerals | | | |
| 9 Ecosystems | • State the requirements for aerobic respiration | • State the differences between aerobic and anaerobic respiration | • State what is meant by fermentation and name the organism used to make bread, beer, and wine | • State where photosynthesis occurs in a plant and the products of photosynthesis | • State the function of the chloroplasts in a leaf | • Carry out an experiment to test for the presence of starch in a leaf | • State that nitrates are essential for plant growth | | | |
| | 10.3.1 Natural selection | 10.3.2 Charles Darwin | 10.3.3 Extinction | 10.3.4 Preserving biodiversity | 10.4.1 Inheritance | 10.4.2 DNA | 10.4.3 Genetics | 10.4.4 Genetic modification | | |
| 10 Genes | • State that organisms have changed over time, giving examples | • Name the process by which organisms evolve | • State what is meant by the term extinction and biodiversity using dinosaurs as an example | • State what is meant by an endangered species and name a way of protecting that species | • State what is meant by DNA chromosomesans genes | • Build a model of the DNA molecule | • Complete a Punnett square to state how many offspring will have a particular characteristic | • State what is meant by genetic modification | | |

| | Pathway 2 (Target Grade 4-6) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8.3.1 Gas exchange | 8.3.2 Breathing | 8.3.3 Drugs | 8.3.4 Alcohol | 8.3.5 Smoking | 8.4.1 Nutrients | 8.4.2 Food tests | 8.4.3 Unhealthy diet | 8.4.4 Digestive system | 8.4.5 Bacteria and enzymes in digestion |
| 8 Organisms | • Describe how the parts of the gas exchange system are adapted to their function | • Describe the processes of inhaling and exhaling and describe how a bell jar can be used to model what happens during breathing | • Describe the effects of drugs on health and behaviour | • Describe the effect of alcohol on health, behaviour and effect alcohol has on conception and pregnancy | • Describe the effects of tobacco smoke on health and the effects of tobacco smoke on pregnancy | • Explain the role of each nutrient in the body | • Describe how to test foods for starch, lipids, sugar, and protein | • Describe some health issues caused by an unhealthy diet<br>• Calculate the energy requirements of different people | • Describe the structure and function of the main parts of the digestive system | • Describe the role of enzymes and bacteria in digestion |
| | 9.3.1 Aerobic respiration | 9.3.2 Anaerobic respiration | 9.3.3 Biotechnology | 9.4.1 Photosynthesis | 9.4.2 Leaves | 9.4.3 Investigating photosynthesis | 9.4.4 Plant minerals | | | |
| 9 Ecosystems | • Plan an investigation to measure the effect of exercise on breathing rates | • State the word equation for anaerobic respiration and describe the differences between aerobic and anaerobic respiration | • Write the word equation for fermentation and describe how bread, beer, and wine are made | • Describe the process of photosynthesis<br>• State the word equation for photosynthesis<br>• Carry out an experiment to prove that oxygen is produced during photosynthesis | • Describe the structure and function of the main components of a leaf | • State the relationship between temperature, light intensity, and availability of carbon dioxide on the rate of photosynthesis | • Describe how a plant uses minerals for healthy growth and explain the role of nitrates in plant growth | | | |
| | 10.3.1 Natural selection | 10.3.2 Charles Darwin | 10.3.3 Extinction | 10.3.4 Preserving biodiversity | 10.4.1 Inheritance | 10.4.2 DNA | 10.4.3 Genetics | 10.4.4 Genetic modification | | |
| 10 Genes | • Describe the process of natural selection and how organisms evolve over time | • Describe the evidence that Darwin used to develop his theory of natural selection | • Use examples to describe the difference between an area of high biodiversity and area of low biodiversity | • Describe what is meant by captive breeding and describe some techniques used to prevent extinction | • Describe the relationship between DNA, genes, and chromosomes | • Describe the structure of DNA and how scientists worked together to discover the structure of DNA | • Trace characteristics through a family tree using Punnett squares, giving answers as percentages and ratios | • Describe some advantages of producing products through genetic modification | | |

| | Pathway 3 (Target Grade 7-8) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8.3.1 Gas exchange | 8.3.2 Breathing | 8.3.3 Drugs | 8.3.4 Alcohol | 8.3.5 Smoking | 8.4.1 Nutrients | 8.4.2 Food tests | 8.4.3 Unhealthy diet | 8.4.4 Digestive system | 8.4.5 Bacteria and enzymes in digestion |
| 8 Organisms | • Explain how the adaptations of the parts of the gas exchange system help them perform their function | • Explain how the actions of the ribcage and diaphragm lead to inhaling and exhaling | • Explain why people take different medicinal and recreational drugs. How recreational drugs can have a negative effect on people's lifestyles | • Explain in detail how alcohol affects health and behaviour, detailing its effect on life processes and the importance of providing information about drinking to the general public, not just pregnant women | • Explain how smoking causes disease and explain which chemicals in tobacco smoke affect the development of a foetus | • Explain what makes a food a healthy option and how each nutrient contributes to a healthy, balanced diet | • Explain why testing food for starch, lipids, sugar, and protein is important and explain the meaning of positive or negative results in terms of the food tests | • Explain how an unhealthy diet causes health issues and describe how different people require different amounts of energy, using energy calculations and data to support explanations | • Give a detailed explanation of digestion in sequence | • Explain how enzymes affect the rate of digestion and how some bacteria improve health |
| | 9.3.1 Aerobic respiration | 9.3.2 Anaerobic respiration | 9.3.3 Biotechnology | 9.4.1 Photosynthesis | 9.4.2 Leaves | 9.4.3 Investigating photosynthesis | 9.4.4 Plant minerals | | | |
| 9 Ecosystems | • Explain how the reactants for respiration get into the cell and the process of aerobic respiration | • Explain the uses of the products from anaerobic respiration and explain the differences between the two types of respiration | • Explain how the process of fermentation works in relation to the word equation and why temperature is important in the making of bread, beer, and wine | • Explain the importance of photosynthesis in the food chain and how the plant obtains the reactants for photosynthesis | • Explain how the structures of the leaf make it well adapted for photosynthesis | • Describe why low temperature, shortage of carbon dioxide, and shortage of light limit the rate of photosynthesis | • Explain nutrient deficiency symptoms in plants and how proteins are made for plant growth | | | |
| | 10.3.1 Natural selection | 10.3.2 Charles Darwin | 10.3.3 Extinction | 10.3.4 Preserving biodiversity | 10.4.1 Inheritance | 10.4.2 DNA | 10.4.3 Genetics | 10.4.4 Genetic modification | | |
| 10 Genes | • Explain how natural selection leads to evolution and how scientists know that organisms have changed over time | • Explain the importance of peer review to scientists and how Darwin used the evidence from finches to develop his theory of natural selection and evolution | • Explain some factors that may have led to extinction and how a lack of biodiversity can affect an ecosystem | • Explain some of the advantages and disadvantages of captive breeding and the techniques used to prevent extinction work | • Explain how a change in DNA may affect an organism and how a change in DNA may affect the future offspring of an organism | • Explain why it is important for scientists to work together | • Explain how dominant or recessive alleles can be expressed as external features and how to use a Punnett square to predict the outcome of a genetic cross | •Describe how an organism can be genetically modified to display a desired characteristic | | |