Attainment Band	**Genes & Reproduction** **Knowledge and Understanding**
Yellow/Yellow +	• Explain how the similarities and differences between organisms can be used to classify them. • Evaluate the importance of variation in organisms by assessing the advantages and disadvantages of variation to a species' survival. • Evaluate the relative importance of genetic and environmental variation, and conclude that genetic variation is essential for long-term survival and environmental variation can affect short-term survival. • Evaluate the importance of selective breeding in producing sufficient food for the world's population; explore the ethical issues involved in selective breeding – including the impact on biodiversity and the dangers of inbreeding. • Evaluate the strengths and weaknesses of the male reproductive system. • Explain how the male and female reproductive structures are designed for fertilisation; describe methods of combating infertility. • Explain how and why some problems with menstruation occur. • Choose scales to produce a line graph to show how a foetus grows during gestation; explain how a pregnant uterus is different from a normal uterus. • Explain the effect of different substances on the health and development of the foetus; explain whether given data are reliable and valid and suggest how to improve the quality of the data. • Predict and research how identical twins occur and analyse evidence about their features. • Analyse the role of different scientists in the discovery of the structure of DNA. • Explore the ethics and evaluate the use of extracted DNA. • Explain the impact of slight 'changes' to the DNA passed on from the parents. • Evaluate the importance of Darwin's work in explaining how life has evolved.
Blue	• Explain the importance of biodiversity and present the key points. • Identify variation within a species by gathering and presenting data about individuals within a species; explain the difference between variation within species and across species. • Explain that offspring from the same parents may be very different because they have unique, random combinations of their parents' hereditary information. • Explain how farmers use the process of selective breeding – for example breeding dairy cows that produce large quantities of milk. • Describe the structure and function of the main parts of the male reproductive system. • Describe the structures and functions of the main parts of the female reproductive system; describe some problems of male and female reproductive structures that lead to infertility. • Describe how the menstrual cycle works. • Describe the difference between a foetus and an embryo; describe the structures and functions of different parts of a pregnant uterus. • Describe the effects of different substances on the development of the foetus; describe whether there is enough evidence to draw conclusions. • Explain how inherited differences arise in members of the same family. • Explain and model the structure of DNA; explain the link between chromosomes, genes and DNA. • Explain why it is important for scientists to extract DNA from organisms. • Explain that the fusion of male and female sex-cell nuclei (in both animals and plants) produces a new individual that is genetically unique. • Explain how the theories of Darwin and Wallace were similar (focusing on natural selection), and how Lamarck's theory was different (focusing on acquired characteristics).

Green	• Recall differences between different species and describe how we use variation to classify organisms. • Explain the difference between continuous variation and discontinuous variation by looking at the differences in features between individuals of the same species. • Recognise that features such as height, eye colour, freckles etc. are inherited, whereas scars, tooth loss, tattoos etc. are gained from the environment. • Describe how we breed animals with features that we want in order to produce more organisms with the feature. • Name the main parts of the male and female reproductive systems; recognise sperm as the male sex cell. And the egg as the female sex cell. Describe fertilisation as being a fusion of a male nucleus and a female nucleus. • Name some changes that occur during puberty. • Describe growth as reproduction of cells. • Name certain substances that will affect the development of the foetus. • Identify inherited differences between members of the same family. • Identify that cells have nuclei containing chromosomes that carry genetic information, DNA. • Recall that during fertilisation one chromosome in each pair comes from each of the parents. • Describe how differences between individuals (e.g. neck length of giraffes) causes competition for food, and describe how only those organisms that can get food will survive.
White	• Some of the above elements have been achieved.