

3.3 Variation

Biology NC link:

- differences between species.

Working Scientifically NC link:

- interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.



Band	Outcome	Checkpoint	
		Question	Activity
Developing	State what is meant by the term variation (Level 4).	A, 1	Main, Plenary 2
	State that variation is caused by the environment or inheritance (Level 4).	C, D, 1	Starter 1, Starter 2, Main, Plenary 1
	Record observations of variations between different species of gull (Level 3).		Main
Secure	Describe how variation in species occurs (Level 5).	1, 3	Starter 1, Starter 2, Main, Plenary 2, Homework
	Describe the difference between environmental and inherited variation (Level 5).	1-4	Starter 1, Starter 2, Main, Plenary 1, Homework
	Record and categorise observations of variations between different species of gull (Level 5).		Main
Extending	Explain how variation gives rise to different species (Level 8).		Main, Plenary 2, Homework
	Explain that some variation is affected by both environmental and inherited factors (Level 7).	2-4	Starter 1, Starter 2, Main, Plenary 1
	Record and categorise observations of variations between different species of gull to suggest species boundaries (Level 7).	1	Main

Literacy

Students test their spelling of key words used in the student-book activity. They will then use scientific terminology to describe and suggest reasons for the variation in different species of seagulls.



APP

Students make observations to find variation between different types of seagulls (AF4).

Key Words

variation, species, inherited variation, environmental variation

Answers from the student book

In-text questions	<p>A Differences in characteristics within a species.</p> <p>B A group of organisms which share very similar characteristics (and are able to produce fertile offspring).</p> <p>C Variation between organisms in a species due to the characteristics inherited from their parents.</p> <p>D Variation caused by a person's surroundings and lifestyle.</p>
Activity	<p>Spelling key terms</p> <p>Students should test their spelling of the following words with a partner: species, variation, adaptation, inherited, environmental.</p>

Summary Questions

- 1 species, characteristics, offspring, variation, environmental, inherited (6 marks)
- 2 Environmental: tattoo, scar. Inherited: blood group, eye colour. Both: body mass, intelligence (6 marks)
- 3 Identical twins have the same inherited characteristics. Any differences must therefore be caused by environmental factors. (2 marks)
- 4 6 mark question. Example answers:

Variation is the difference in characteristics within a species. Inherited variation depends on characteristics inherited from parents. For example, lobed or lobe-less ears, eye colour, and blood type. Environmental variation depends on changes in a person's surroundings and/or lifestyle. For example, dyed hair, tattoos, and scars. Many characteristics are affected by both inherited and environmental variation. For example, height. Some characteristics are not affected by environmental factors at all. For example, eye colour, blood group.



Starter	Support/Extension	Resources
<p>What is variation? (10 min) Students work in pairs to discuss what the word variation means, and give a possible definition with examples.</p> <p>Give an example of inherited variation (e.g., dog breeds), environmental variation (e.g., colours of flamingos), and variation affected by both (e.g., height). Students suggest a reason for the variation of each type.</p> <p>Causes of variation (5 min) Students read a short passage of text provided on the interactive resource about a day at the zoo, and select types of variation dependent on inherited factors, environmental factors, or both.</p>	<p>Extension: Students suggest other factors for each category of variation.</p> <p>Extension: Students suggest a definition for inherited and environmental variation.</p>	<p>Interactive: Causes of variation</p>
Main	Support/Extension	Resources
<p>Variation (40 min) Formally introduce the key words for this lesson: variation, inherited variation, environmental variation, and species. Discuss possible variation in humans due to the three types of factors (inheritance, environmental, or both) before moving on to the activity. In the activity students study images of different species of seagulls and record variations within the different species, then answer the questions. It is important to go through differences within a species (e.g., dog breeds) and differences between species (e.g., kangaroos and wallabies) before issuing this activity.</p>	<p>Support: A support sheet is available where students are given a list of possible variations within the gulls to choose from.</p>	<p>Activity: Variation</p>
Plenary	Support/Extension	Resources
<p>Variation in humans (10 min) Working in small groups students list human variations, and categorise them as inherited, environmental, or variations affected by both. Discuss their lists as a class.</p> <p>Variation definitions (5 min) Students give the definitions of variation, inherited variation, and environmental variation.</p>	<p>Extension: Students suggest the point at which variation is significant enough for organisms to become different species, using examples.</p>	
Homework	Support/Extension	Resources
<p>Provide students with a list of four pet animals. For example, two different dogs (e.g., a Labrador and a Yorkshire terrier), a rabbit, and a goldfish. Ask students to list as many variations between the animals as possible, classify the variations, and suggest possible causes.</p>	<p>Extension: Students use their list to explain why the dogs are the same species but dogs, rabbits, and goldfish are different species.</p>	