

## Lesson 8: B8.8 – Adapting for survival in animals

### 1. Connection

Q1. what was used to sample plants in the environment?

Q2. How is a sampling using a transect different to random sampling?

Q3. Why are less plants found under a tree?

### 2. Activation

**LI: Explain why animals have adaptations and give some examples**

<https://www.youtube.com/watch?v=KvK7EJimAH8>

Make a note of the title and the LI

1. Read pages 338-339
2. List key words – define those you don't know
3. Explain why camouflage is important
4. List Behavioural adaptation for hot and cold conditions
5. Give some structural and functional adaptations for hot and cold conditions

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-6.

In 10 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 8: B8.8 – Adapting for survival in animals

### Connection

**Q1.** quadrat

**Q2.** transect – quadrat used along a line through the area being sampled. Random- sampled at random (by pulling sampling areas out of a hat)

**Q3.** tree causes shade, lack of light prevents plants being able to photosynthesis to produce glucose for growth. So less plants can grow under the tree. Also uses water and soil nutrients

### Demonstration

- 1 They allow them to survive and be successful in their habitat.
- 2 Correct description of any 3 adaptations, e.g. • Folded skin to increase the surface area for heat loss in elephants. Thick fur and blubber to reduce heat loss in polar bears etc.
- 3 Stay under rocks or go underground during hot days and cold nights, where temperatures are more stable.
- 4 Stay in burrows during hot days and cold nights to try and maintain constant temperature, brown colouring for camouflage, eyes on side of head to look for predators etc.
- 5 having a large surface area to volume ratio maximises heat loss through the skin; a small surface area to volume ratio reduces heat loss through the skin.
- 6 structural adaptations form part of the body whereas functional adaptations refer to how the body functions or operates as an adaptation to the environment.

## Lesson 9: B8.9 – Adapting for survival in plants

### 1. Connection

Q1. Why is camouflage important?

Q2. Give 2 behavioural adaptations

Q3. List key features for survive cold and hot climates?

### 2. Activation

**LI: Identify adaptations in plants and bacteria and explain their importance**

[https://www.youtube.com/watch?v=ca99WW\\_v0bA](https://www.youtube.com/watch?v=ca99WW_v0bA)

<https://www.youtube.com/watch?v=uADGupgofkU>

Make a note of the title and the LI

1. Read pages 340-341
2. List key words – define those you don't know
3. List adaptations for plants in hot and cold conditions (green paragraph)
4. Draw and label a cacti to show its adaptations (blue paragraph)
5. What are extremophiles and where might they be found?
6. What is an epiphyte and how is it adapted to survive?

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file



### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-7

In 10 mins answer as many questions as you can.

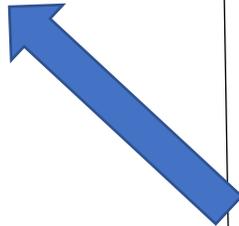
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Green questions to GCSE Level 3

Blue questions to GCSE Level 6

Purple questions to GCSE Level 9



## Answers Lesson 9: B8.9 – Adapting for survival in plants

### **Connection**

**Q1.** allows prey to avoid predators and predators to sneak up on prey.

**Q2.** -stay in burrows when it is hot come out when it is cool  
-hibernate when food is limited  
-migrate to warmer climates with more food

### **Q3. Cold**

Blubber & small SA:V ratio

### **Hot**

minimal fat, don't sweat, large SA:V ratio

### **Demonstration**

**1** Decomposers that break down carbon include worms, bacteria and fungi.

**2** Decomposers release carbon (and other nutrients) in dead plants and animals.

**3** Precipitation: water droplets in clouds get bigger and heavier. They fall as rain, snow or sleet. Evaporation: water evaporates as it is heated by the Sun's energy. Water vapour is carried upwards in convection currents. Transpiration: water vapour is released into the air through stomata in leaves. Condensation: water vapour rises, cools and condenses back into water droplets that form clouds.

**4 a** When it is water vapour

**b** When it falls as snow or hail

**5** break down the smaller pieces of dead material. Decomposers release waste carbon dioxide, water, heat and nutrients (that plants use).

**6** Maintains a supply of freshwater for plants and animals

## Lesson 10: B8.10 – Cycling materials

### 1. Connection

Q1. how are plants adapted to survive hot and cold conditions

Q2. In what conditions do extremophiles thrive?

Q3. List key features of a cactus that enable it to survive

### 2. Activation

**LI: Describe the water cycle and explain why recycling systems are so important**

<https://www.youtube.com/watch?v=al-do-HGulk>

Make a note of the title and the LI

1. Read pages 342-343
2. List key words – define those you don't know
3. Draw figure 8.29 use bullet points from blue section to help label it.

<https://www.youtube.com/watch?v=6utMftGxual>

4. Explain the process of decay and list the factors required

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-6

In 10 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 10: B8.10 – Cycling materials

### Connection

#### Q1. Cold

Grow close to ground – avoid wind damage, small leaves  
conserve water

#### Hot

Reduced surface area to reduce water loss, store water in their tissues

Q2. survive extreme environments

High/low temperatures  
High salt concentrations  
High pressure or pH

Q3. Spines – reduce water loss and prevent plant being eaten

Fleshy stem – store water  
Extensive shallow roots – to absorb surface water  
Thick waterproof layer – reduce water loss  
Round compact shape reduces SA:V ratio (water loss)

### Demonstration

1 Decomposers that break down carbon include worms, bacteria and fungi.

2 Decomposers release carbon (and other nutrients) in dead plants and animals.

3 Precipitation: water droplets in clouds get bigger and heavier. They fall as rain, snow or sleet.  
Evaporation: water evaporates as it is heated by the Sun's energy. Water vapour is carried upwards in convection currents. Transpiration: water vapour is released into the air through stomata in leaves. Condensation: water vapour rises, cools and condenses back into water droplets that form clouds.

4 a When it is water vapour  
b When it falls as snow or hail

5 break down the smaller pieces of dead material. Decomposers release waste carbon dioxide, water, heat and nutrients (that plants use).

6 Maintains a supply of freshwater for plants and animals

## Lesson 11: B8.11 – Cycling carbon

### 1. Connection

Q1. What are the stages of the water cycle?

Q2. Why is water so important?

Q3. List the factors required to speed up decay

### 2. Activation

**LI: Describe the carbon cycle and explain why it is important**

<https://www.youtube.com/watch?v=cWj3u8voDSg>

Make a note of the title and the LI

1. Read pages 344-345
2. List key words – define those you don't know
3. Draw figure 8.32 use bullet points from blue section to help label it.
4. List where CO<sub>2</sub> is:
  - Taken in from the atmosphere
  - Returned to the atmosphere
  - Stored in a carbon sink

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-6

In 10 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Green questions to GCSE Level 3

Blue questions to GCSE Level 6

Purple questions to GCSE Level 9

## Answers Lesson 11: B8.11 – Cycling carbon

### Connection

**Q1.** Precipitation, Evaporation, Transpiration & condensation

**Q2.**

- Maintains habitats
- Maintains internal fluids and transport systems
- Needed for chemical reactions
- Is a reactant in photosynthesis

**Q3.**

- Plenty of microbes
- Warmth
- Plenty of oxygen
- Some moisture

### Demonstration

**1** Producers use carbon dioxide to photosynthesise. The carbon is used to make carbohydrates, proteins, fats and DNA that form new biomass, which is eaten by consumers. All organisms respire to release energy for cellular processes. They release waste carbon dioxide back into the environment, which is then used by plants.

**2** Because most of the carbon dioxide is combined with other elements, such as in coal and other fossils fuels or in carbonate rocks. Only carbon dioxide in the air can be used by plants for photosynthesis.

**3** Respiration and combustion

**4** To include: animals eat plants and absorb carbon from them. Carbon passes along food chains. Energy is transferred along the food chain and to the environment at each trophic level. Carbon dioxide is returned to the atmosphere by:

- Plants, animals and decomposers respiring:
- $\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water}$
- burning (combustion) of fossil fuels and wood:
- $\text{fossil fuel/wood} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water}$

**5** Plants need supplies of carbon dioxide to photosynthesise and carbon is built into glucose which is needed for respiration to release the energy living cells need for chemical reactions.

**6** Processes involved in the carbon cycle

- Respiration – reacting oxygen and glucose (containing carbon) to release energy.
- Photosynthesis – reacting carbon dioxide with water to produce glucose needed for respiration.
- Combustion – burning wood and fossil fuels which releases carbon dioxide
- Feeding – digestion of food containing carbon
- Egestion – waste food eliminated from the body
- Death – dead plants and animals are broken down by decomposers releasing carbon (and other nutrients)
- Dead plants and animals may also form fossil fuels over millions of years

## Lesson 12: B8.12 – Investigating decay

### 1. Connection

Q1. How is carbon dioxide removed from the environment?

Q2. How is carbon returned to the environment?

Q3. List 3 carbon stores/sinks.

### 2. Activation

**LI: Describe the process of decay and explain why it is important**

<https://www.youtube.com/watch?v=6utMftGxual>

Make a note of the title and the LI

1. Read pages 346-347
2. List key words – define those you don't know
3. List the bullet points in the green section

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-7

In 10 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 12: B8.12 – Investigating decay

### Connection

Q1. photosynthesis

Q2. respiration and combustion also acid rain releases CO<sub>2</sub> from Limestone decay releases CO<sub>2</sub> from dead organisms and volcanic eruptions from rocks in the Earth

Q3.

- Shells of marine animals
- Calcium carbonate/Limestone – rock formed from dead sea shelled organisms
- Absorbed by oceans

### Demonstration

1 Warmth, oxygen and water (and microorganisms)

2 Compost is made by placing the compost bin in the sun (warmth), mixing the contents to let oxygen in and adding moisture.

3 generators hold rotting organic material (dung, farm and garden waste) which is broken down by anaerobic bacteria.

4 As temperature increases biogas production increases

5 Aerobic bacteria cause most decay in compost heaps. They respire using oxygen to release energy for growth and reproduction. The more oxygen present, the more decay happens. Bacteria feed on the waste using extracellular digestion.

6 The hotter it is the quicker the biogas is produced until it reaches 40°C because the enzymes have more energy. At 40°C the enzymes are denatured and the process slows down quickly and stops. The more oxygen is available, the faster the rate of respiration. This releases more heat for the enzymes.

7 If decomposers did not exist, decomposition would not occur so the remains of dead plants and animals and all their waste products (there would be a lot of excrement lying around!). A lack of decomposers would also affect the recycling of materials such as the carbon cycle.

## Lesson 13: B8.13 – Practical - Investigating the effect of temperature on the rate of decay

### 1. Connection

- Q1. List 4x factors affecting decay
- Q2. How is biogas produced and how is it useful?
- Q3. How does temperature affect the decay process?

### 2. Activation

**LI: Describe the experimental process to investigate the effect of temperature on decay**

<https://www.youtube.com/watch?v=zSx83-D-LYE>

Make a note of the title and the LI

1. Read pages 348-349
2. List key words – define those you don't know
3. Draw and label figure 8.37 and figure 8.38

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-11

In 15 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 13: B8.13 – Practical - Investigating the effect of temperature on the rate of decay

### Connection

Q1. More microorganisms  
More oxygen  
Warmer temperature  
Some moisture

Q2. Produced in a biogas generator by anaerobic respiration of bacteria. Useful for cooking, heating, producing electricity and fuel for vehicles

Q3.  
Temperature increases decay up to an optimal point due to increased enzyme activity. Exceeding the optimum temperature destroys the microorganisms by denaturing their enzymes

### Demonstration

- 1 10cm<sup>3</sup> measuring cylinder or a 10cm<sup>3</sup> calibrated dropping pipette.
- 2 The water baths give the more accurate measurements, because you are able to keep the temperature constant. Warm water in a beaker will quickly cool down, possibly slowing/affecting/changing the reaction rate.
- 3 A pH probe connected to a data logger will give more accurate results, as you will have readings of the exact pH. The phenolphthalein indicator tells you more approximately the pH, depending on comparing the colour in the test tube against a colour card, it is more subjective.
- 4 Care in measuring and transferring the chemical; wear safety goggles; clean up any spillages appropriately
- 5 So that he could work out the best intervals for his variable (minutes) – not too long, not too short, around the time when the indicator changed colour
- 6 Time, in minutes
- 7 The alkalinity of the solution/ colour change, pH
- 8 Values starting in the left hand column from 1– 5
  - 1st column – independent variable values
  - 2nd column - test 1 results
  - 3rd column – test 2 results
  - 4th column – test 3 results
  - 5th column – average for the result of each independent variable value.
- 9 At 0oC the reaction only happened very, very slowly and the pH dropped only very slightly. At 20oC the reaction started after about 2 mins and the pH steadily and quite slowly dropped, eventually reaching to about pH 8.6 At 37oC (human body temperature) the pH initially went up fractionally (anomalous/ inaccuracy of indicator) after 3 minutes, but then dropped quickly and steadily to reach pH just above 8 (8.08). At 80oC the reaction had finished after little more than 2 minutes, the pH reached after 4 minutes did not dip any lower, about pH 8 (8.04) Zak's hypothesis was mainly upheld – the warmer the solutions, the faster the pH fell, although the investigation carried out at 37oC reached a final pH similar to the investigation at 80oC
- 10 Use a water bath rather than a beaker of warm water and use a pH data logger rather than phenolphthalein indicator
- 11 To measure the change in pH caused by the production of fatty acids. This gives a more accurate measurement of changes in pH than using chemical indicators.

## Lesson 14: B8.14 – Changing the environment

### 1. Connection

Q1. List 4x factors affecting decay

Q2. How is biogas produced and how is it useful?

Q3. How does temperature affect the decay process?

### 2. Activation

**LI: Recall the causes of environmental change and explain their impact**

<https://www.youtube.com/watch?v=fZxw0QiaSN4>

Make a note of the title and the LI

1. Read pages 350-351
2. List key words – define those you don't know
3. Make a note of the bullet points (blue section)

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-5

In 10 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 14: B8.14 – Changing the environment

### **Connection**

**Q1.** More microorganisms  
More oxygen  
Warmer temperature  
Some moisture

**Q2.** Produced in a biogas generator by anaerobic respiration of bacteria. Useful for cooking, heating, producing electricity and fuel for vehicles

**Q3.** Temperature increases decay up to an optimal point due to increased enzyme activity. Exceeding the optimum temperature destroys the microorganisms by denaturing their enzymes

### **Demonstration**

- 1** Natural changes e.g seasonal changes, geographic location etc Changes caused by humans.
- 2** Their numbers and distribution may change e.g. they may migrate, stay dormant (seeds)
- 3** global warming the seas are becoming more acidic (and warmer), which means that the shells of calcareous organisms (such as bivalve molluscs) are dissolving and becoming thinner. Erosion by rivers and tides may gradually destroy habitats. Volcanic eruptions/tsunamis destroying environments etc.
- 4** Pollution e.g. pesticides entering waterways and building up in food chains etc. Dredging sea beds for building projects increasing sand in the water so less sunlight can reach marine plants for photosynthesis.
- 5** Very small rises in sea temperature can have a massive effect on biodiversity e.g. coral reefs, with 20% being destroyed in just 50 years. If this continues, 200 years all coral reefs will have disappeared, but if sea temperatures continue to rise they will disappear even faster, so it is really important that we act quickly to try and stop the rise.

## Lesson 15: B8.15 – Learning about land use

### 1. Connection (Triple)

Q1. List 3x factors that change the environment

Q2. How do geographic changes affect the environment?

Q3. Describe the impact of an increasing sea temperature

### 2. Activation

### 4. Consolidation

### 5. Extension

### 3. Demonstration

## Answers Lesson 15: B8.15 – Learning about land use

### **Connection (Triple)**

**Q1.** Seasonal changes,  
Geographic changes, Human  
induced changes

### **Q2.**

- loss of land-bridges (stop movement of animals)
- global warming making cold areas more temperate and increasing competition
- & seas becoming warmer and more acidic affecting shell creatures (dissolves shells), erosion by rivers and tides destroys habitats.

### **Q3.**

- Bleaching of corals, also affects algae that live on them – further affect on food chains
- Some marine species are unable to adapt to the warmer seas

## Lesson 15: B8.15 – Learning about land use

### 1. Connection

Q1. How is carbon dioxide removed from the environment?

Q2. How is carbon returned to the environment?

Q3. List 3 carbon stores/sinks.

### 2. Activation

**LI: Identify why land use has changes and describe the effects**

<https://www.youtube.com/watch?v=SROoINlp4VY>

Make a note of the title and the LI

1. Read pages 352-353
2. List key words – define those you don't know
3. Make a note of green and blue bullet points

<https://www.youtube.com/watch?v=mLbDbmmV6Qc>

4. Describe Eutrophication

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-7

In 15 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 15: B8.15 – Learning about land use

### Connection

Q1. photosynthesis

Q2. respiration and combustion also acid rain releases CO<sub>2</sub> from Limestone decay releases CO<sub>2</sub> from dead organisms and volcanic eruptions from rocks in the Earth

Q3.

- Shells of marine animals
- Calcium carbonate/Limestone – rock formed from dead sea shelled organisms
- Absorbed by oceans

### Demonstration

1 Land use: farming, building, quarrying, dumping waste.

2 To produce as much crop as possible as quickly as possible and in a smaller space

3 Biodiversity will be reduced further. More land is needed for homes, shops, factories and roads. Building sites destroy habitats. Roads divide habitats making it harder for organisms to find food and mates.

4 Land use changes:

- New quarries are mined to provide stone, slate and metal ores for building materials. Habitats are destroyed.
- More farmland is needed and fertilisers are used. Many farms grow one crop over huge areas. This affects food availability for insect pollinators. There are fewer available nesting sites for birds.
- More waste is sent to landfill, and more sewage and industrial waste are produced. This can pollute the land.

5 Eutrophication will happen: nitrates and phosphates in the water increase and so then algal growth increases. Algae cover the water surface and prevent light from reaching water plants. The plants and algae die. Bacteria respire as they break down dead plants and use up oxygen in the water. The other living organisms in the water die.

6 e.g. grassland can be changed into landfill sites. Waste is sent to landfill, chemicals can leak into the soil and pollute it. There is very little biodiversity as few organisms can live there. However, when the sites are full, they are redeveloped into parks etc. and biodiversity increases again.

7 We are dependent on a rich biodiversity to provide the resources that we need (food, natural materials for building, textiles etc. ) and for our survival.

## Lesson 16: B8.16 – Changing the landscape

### 1. Connection

Q1. List 4 ways humans are changing the use of land

Q2. How do these changes in land use affect the environment?

Q3. 6 words to explain eutrophication

### 2. Activation

**LI: Identify the reasons for deforestation and describe the impact of**  
<https://www.youtube.com/watch?v=nYlnoxgqEWO>

Make a note of the title and the LI

1. Read pages 354-355
2. List key words – define those you don't know
3. Make a note of green and blue bullet points
4. Make a note of the purple bullet points

### 4. Consolidation

Complete and self assess the relevant past paper question for this topic -  
From the B8 DIP file

### 5. Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

### 3. Demonstration

Attempt questions 1-5

In 10 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

- Green questions to GCSE Level 3
- Blue questions to GCSE Level 6
- Purple questions to GCSE Level 9

## Answers Lesson 15: B8.15 – Learning about land use

### Connection

**Q1.** farming, quarrying, building, dumping waste

**Q2.** Loss of habitat (all) disruption of food chains/eutrophication (farming) pollution (quarrying and waste disposal)

### Q3.

- XS nutrients (fertilisers)
- Run off
- Algal/plant bloom
- Plant death (Run out of nutrients)
- Decay (microorganisms use up oxygen/ respiration)
- Other aquatic life dies

### Demonstration

**1** provide land for cattle and rice fields to produce more food and to grow crops.

**2** Peat is plant material that is not completely broken down because of acidic conditions with little oxygen. It is used as a fuel and compost

### 3

- increases the release of carbon dioxide into the atmosphere
- reduces the rate that carbon dioxide is removed from the atmosphere (by photosynthesis)
- reduces biodiversity;
- Increases methane in the atmosphere

**4** Plant trees to replace those cut down

**5** Peat is a really useful fuel and compost but peatlands are also very unique ecosystems with a large biodiversity. Destroying the peatlands can result in many species becoming extinct as well as the loss of an important carbon source. Other fuels are available that could replace the use of peat and compost can be made by other means. The use of peat needs to be controlled to ensure the survival of the ecosystem.