

Science KS4: Blended Learning Booklet

B8 Ecology in action

Name:

Form:

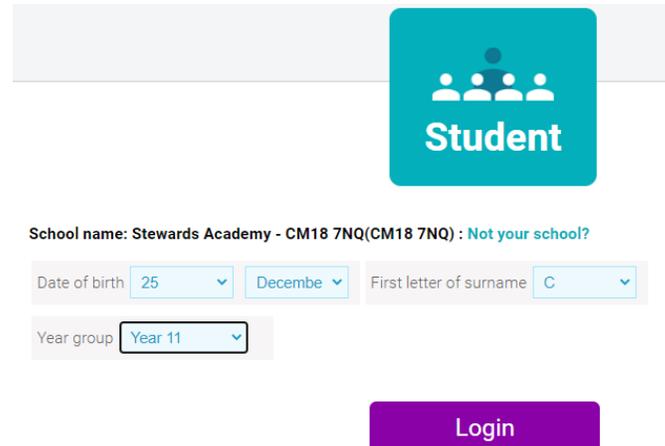
Aim to complete four lessons each week. Watch the videos and follow the four part lesson plan

All video clips are online using the ClassCharts link. Upload all work onto ClassCharts for feedback.

The online textbook has all the key information and vocabulary to help you with this unit

To log on to the online textbook:

- <https://connect.collins.co.uk/school/portal.aspx>
- Type in “stewards” and select Stewards Academy
- Login using your date of birth, initial of your surname and your academic year

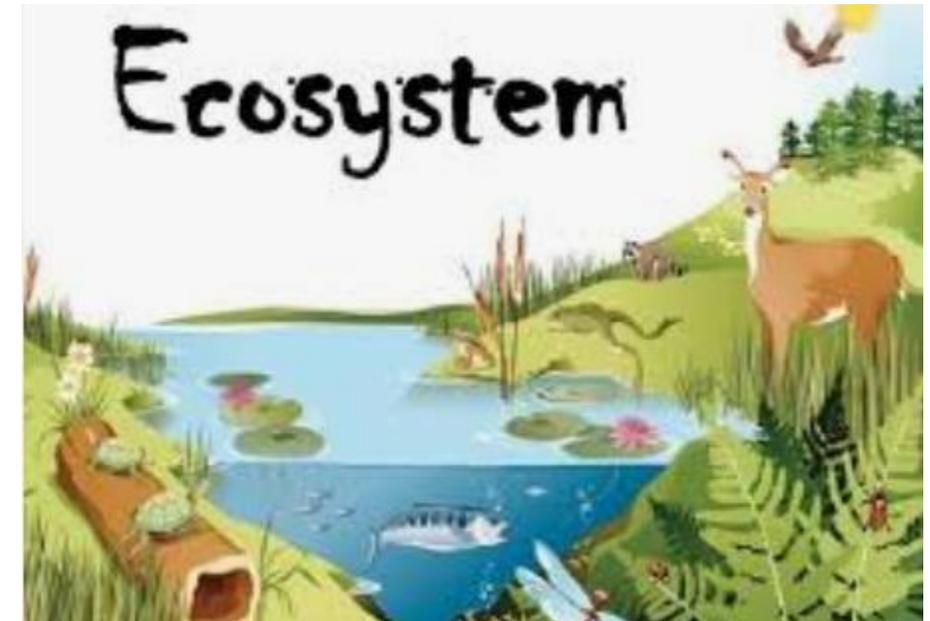


School name: Stewards Academy - CM18 7NQ(CM18 7NQ) : [Not your school?](#)

Date of birth First letter of surname

Year group

Login



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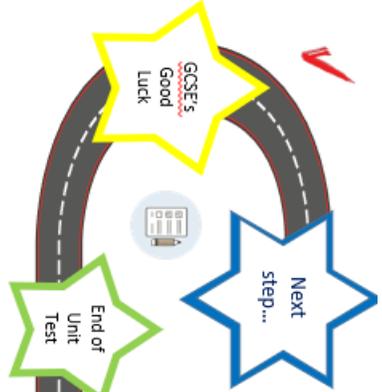
Knowledge organiser

SAL

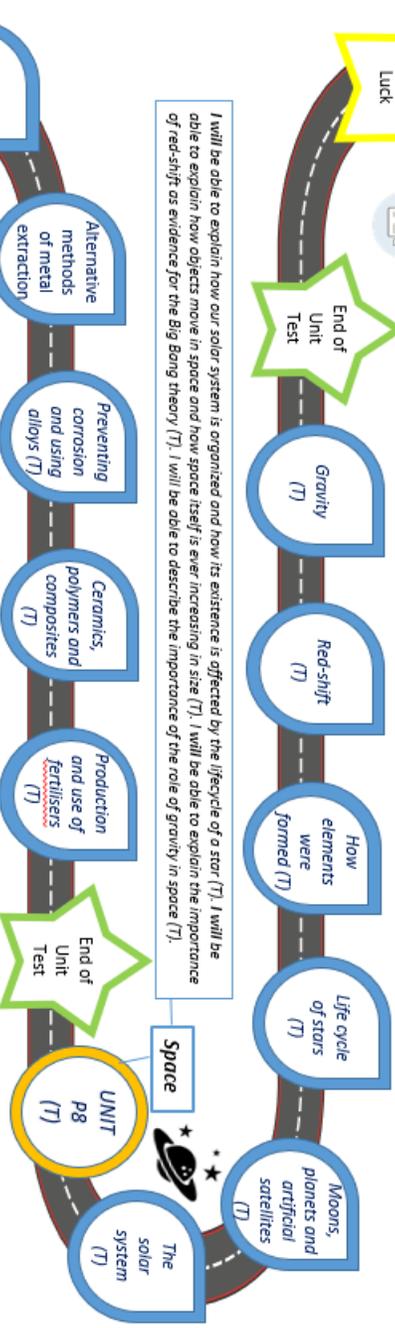
(T) = Triple scientists only



Big Picture – Year 11 Overview Science



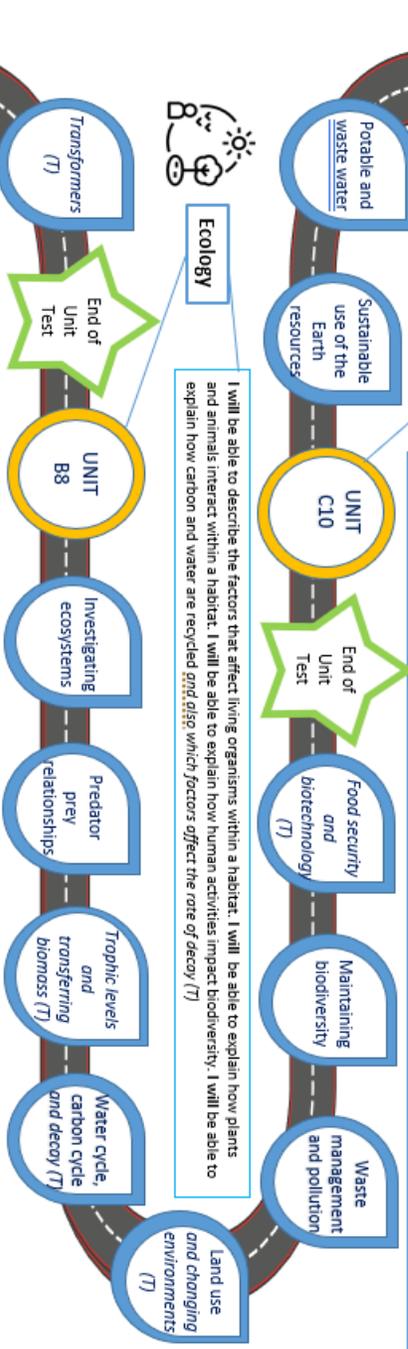
I will be able to explain how our solar system is organized and how its existence is affected by the lifecycle of a star (T). I will be able to explain how objects move in space and how space itself is ever increasing in size (T). I will be able to explain the importance of red-shift as evidence for the Big Bang theory (T). I will be able to describe the importance of the role of gravity in space (T).



Space

I will be able to describe the processes required to make water potable and also process required to treat sewage and waste water. I will be able to describe methods for reducing resource waste and lessening the environmental impact of removing resources from the Earth. I will be able to describe alternative methods of extracting metals. Finally, I will be able to describe the importance of fertilisers in maintaining food security (T)

Sustainability



Ecology

I will be able to describe the factors that affect living organisms within a habitat. I will be able to explain how plants and animals interact within a habitat. I will be able to explain how human activities impact biodiversity. I will be able to explain how carbon and water are recycled and how factors affect the rate of decay (T)

I will be able to describe the shape of the magnetic field that surrounds a magnet. I will be able to explain how an electric current can be used to generate a magnetic field and give some example of the uses of electromagnets (T). I will be able to explain how a motor works. I will be able to explain how a transformer works and how this links to supplying electrical energy efficiently.

Electromagnetism

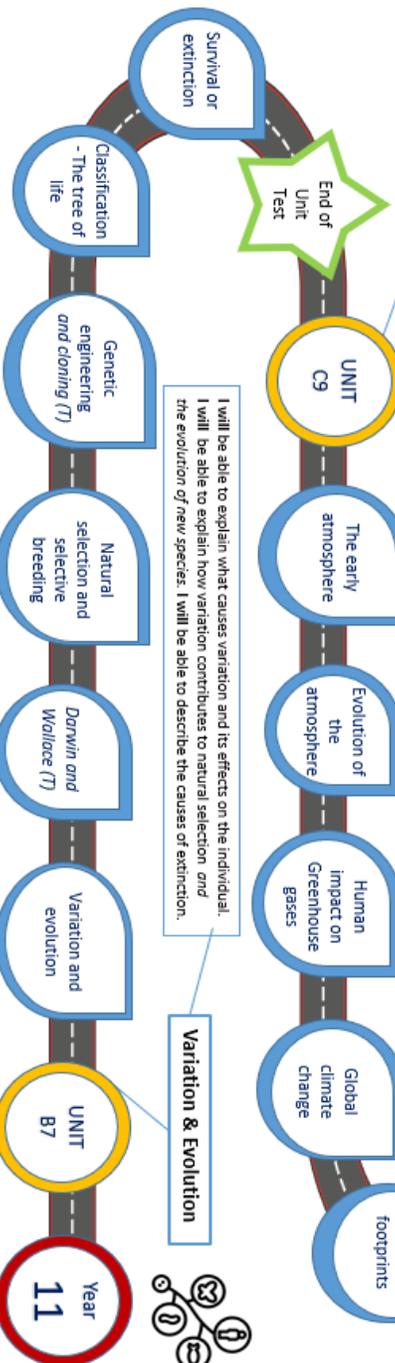


The Atmosphere

I will be able to describe what the early atmosphere was like and how and why it changed. I will be able to explain the consequences of the green house effect, how humans add to the impact of the green house effect and what we can do to reduce this. I will be able to describe how various atmospheric pollutants are formed and the effects that they have on the environment.

I will be able to explain what causes variation and its effects on the individual. I will be able to explain how variation contributes to natural selection and the evolution of new species. I will be able to describe the causes of extinction.

Variation & Evolution



ZOOM IN... MY LEARNING JOURNEY:

Subject: Ecology in action Year: 11 Unit: B8

UP NEXT
Revision for GCSE

CAREERS

- Ecologist
- Wildlife officer
- Farmer
- Surveyor
- Sustainability manager



AIMS
In this unit students will learn about ecosystems and biodiversity. They will investigate the effects of abiotic factors on the ecosystem and predator-prey relationships, find out about energy flow through trophic levels and how to construct pyramids of biomass. Students will investigate competition between organisms and how animals and plants are adapted for survival. They will investigate the population of a species in a selected habitat and find out about cycling materials, such as water and carbon. Students will investigate how temperature affects the rate of decay and the impact humans are having on the environment. Finally, students will learn about maintaining a food supply for humans and how biotechnology can be used to produce food.

DEVELOPING COURAGE
C Humans can take measures to preserve the Earth and it's resources
O To learn about how humans are currently affecting the Earth
U Work together to conserve the Earth's resources
R Carry out an investigation to estimate a population size in a habitat
A The importance of food chains
G Play our part in preserving the worlds resources
E Seeing how all organisms are interconnected

PREVIOUS LEARNING

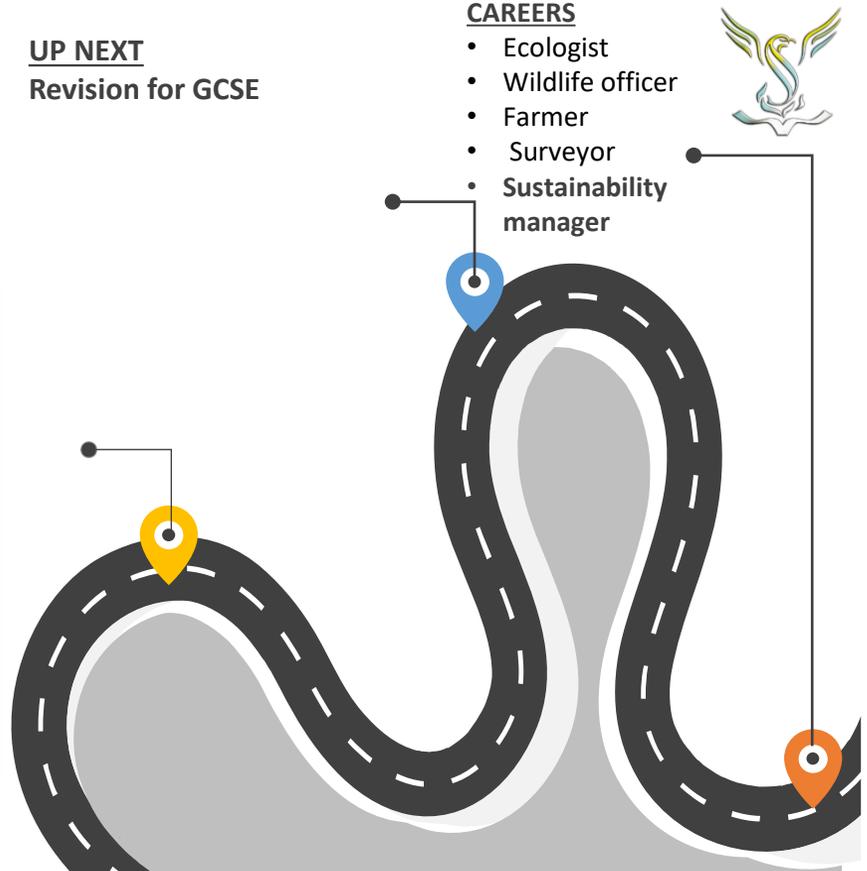
Students will have an idea of interconnecting food chains/webs, how changes in the environment can affect the survival of all organisms in a food web. They will know that some human activities produce carbon dioxide and link this to global warming. They will be able to describe some examples where organisms take what they need from the Earth and its atmosphere to sustain life.

WHAT WE KNOW/ REMEMBER

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RECOMMENDED READING
1. What Is Climate Change? (What Was?) by Gail Herman.
2. Biodiversity and Climate Change: Transforming the Biosphere by Thomas E. Lovejoy, Lee Hannah, Edward O. Wilson.
3. Do We Need Pandas? The Uncomfortable Truth About Biodiversity by Ken Thompson.

PERSONAL OBJECTIVES
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Connection

Have a look at the topic overview and the B8 zoom in.

Populate what you know and your personal objectives.

Lesson 1: B8.1 - Variation

Activation

LI: Describe what a self supporting ecosystem is and why biodiversity is important

<https://www.youtube.com/watch?v=KkMilRb-Kz4>

1. Make a note of the title and the LI
2. Read pages 324-325
3. List key words – define those you don't know
4. Make a list of the key words and define those you don't know

Consolidation

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

Extension

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

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 B8.1 Key concept - Learning about ecosystem.

Connection

Demonstration

1 NA

1 The interaction of a community (of living organisms) with the non-living parts of their environment.

2 NA

3 NA

2 Large fish, small fish, coral, sea plants

3 a A habitat is where an organism lives but an ecosystem is the interaction of a community with the non-living parts of their environment.

b A population is the total number of one organism in an ecosystem but a community is all the different species of plants and animals in an ecosystem

4 Sea water, dissolved oxygen cold, large and small fish, coral, sea plants etc.

High altitude mountainous terrain with low oxygen levels little plant life and water running through etc.

Deciduous forest with trees and bluebells atmospheric water/oxygen etc.

Freshwater pond, water plants, stones dissolved oxygen etc

5 i) Plants get energy from the sun - use carbon dioxide to grow and produce food (and oxygen) for animals (by photosynthesis).

ii) Some animals eat plants and other animals. Animals use oxygen and produce carbon dioxide.

iii) Dead animals are broken down by fungi, bacteria etc to provide nutrients for plants etc

6 All animals depend on plants for oxygen and food. Plants depend on animals for carbon dioxide, pollination and seed dispersal, nutrients from decay.

7 Areas of high biodiversity are important because they; Allow a wide variation of food sources to support a species survive. Provide us with food and other products such as timber and medicines. Play a role in maintaining the atmosphere and water cycle.

1. Connection

Q1. What is the difference between an ecosystem and a habitat?

Q2. What is the difference between a population and a community?

Q3. How is an ecosystem self-supporting

Lesson 2: B8.2 – Changing abiotic factors

2. Activation

LI: Identify factors that affect ecosystems

<https://www.youtube.com/watch?v=x73bsC7WIsE>

1. Make a note of the title and the LI
2. Read pages 326-327
3. List key words – define those you don't know
4. Make a list of Abiotic factors
5. Make a list of biotic factors

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 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 2: B8.2 – Changing abiotic factors

Connection

Q1. A habitat is where an organism lives but an ecosystem is the interaction of a community with the non-living parts of their environment.

Q2. A population is the total number of one organism in an ecosystem but a community is all the different species of plants and animals in an ecosystem

Q3. An environment is self supporting when all organisms in it have the required resources to support themselves.

Demonstration.

1 For example: Abiotic – light intensity – no photosynthesis so plants would not grow and animals would have less food and oxygen

Biotic – new predator will kill many of one species of animal, this could result in plants not being used for food and growing more

2 Use more of the water and nutrients in the soil, take up more space etc

3 Amount of sea water, temperature, light availability, changes with the tides etc
Some sea weeds may not like being submerged, need more light for photosynthesis etc.

4 Limpits can withstand not being submerged in water because of their shell, more food available etc.

5 a stable community is: where the biotic and abiotic factors are in balance so that population sizes remain fairly constant.

6 Little grazing allows a few plants to out-compete others. As grazing increases more plant species grow because dominant plants are controlled by the animals, allowing weaker species to grow more light and nutrients to the weaker plants. Only specially adapted plants can resist the effect of intensive grazing and survive.

Lesson 3: B8.3 – Investigating predator prey relationships

1. Connection

Q1. List 3 abiotic factors

Q2. List 3 biotic factors

Q3. What is a stable community?

2. Activation

LI: Explain why the predator prey relationship is interdependent

<https://www.youtube.com/watch?v=dRFQ8rZCK6Q>

https://www.youtube.com/watch?v=kjZyC_fry9s

<https://www.youtube.com/watch?v=4j6jikayKZA>

1. Make a note of the title and the LI
2. Read pages 328-329
3. List key words – define those you don't know
4. Draw figure 8.6
5. Give 2x examples of mutualism and 2x of paracitism
6. Draw figure 8.8

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 1-3 & 5-6.

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 3: B8.3 – Investigating predator prey relationships

Connection

Q1. Temperature

Light intensity

Oxygen levels

Carbon dioxide levels

Moisture level

Soil pH & mineral content

Wind intensity & direction

Q2. Food availability

New pathogens

New predators

Competition between species

Q3. When the biotic and abiotic factors are balanced and the populations sizes remain constant.

Demonstration

1 Humans eat producers (fruit and vegetables) and other consumers (meat)

2 a Grow and reproduce more

b Grow and reproduce less, may die from starvation and population decreases or dies out

3 Tapeworms feed on food digested by humans and the person suffers from malnutrition

4 In parasitism one organism benefits but the other is harmed by the relationship. If parasites kill their host, they die too.

5 Large predator population causes number of prey to fall as less available to reproduce, or may cause them to die out. Small predator population causes prey numbers to increase as more can reproduce.

6 Prey numbers have to increase so more food is available to sustain a larger population of predators before predator numbers can increase ORA.

Lesson 4: B8.4 – Looking at trophic levels (Triple)

1. Connection

Q1. Define mutualism and give an example.

Q2. Define parasitism and give an example.

Q3. What does the term out of phase mean regarding predator prey cycles?

2. Activation

LI: Contract pyramids of biomass and explain trophic levels

<https://www.youtube.com/watch?v=sgh1OWm0oTQ>

Make a note of the title and the LI

1. Read pages 330-331
2. List key words – define those you don't know
3. List the trophic levels and give examples (green bullet points)
4. Draw fig 8.10 and 8.11
5. List why pyramids of biomass can be difficult (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 1-6.

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 4: B8.4 – Looking at trophic levels (Triple)

Connection

Q1. Organisms that have a mutually beneficial relationship.
eg clown fish/anemone or cleaner fish/shark

Q2. An organism that benefits of another whilst causing the other organism harm.
Tape worms, headlice, fleas

Q3. The predator numbers increase just after the prey numbers increase.

Demonstration

1 Feeding positions in food chains

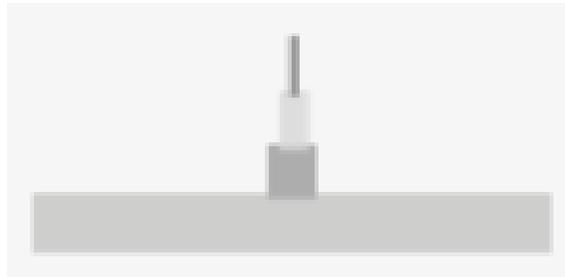
2 a Mackerel – level 4

b Zooplankton – level 2

c Producer – level 1

3 Wet mass can vary

4



5 Trout – bar with 10 squares

Frogs – bar with 25 squares

Insects – bar with 50 squares

Pondweed – 2500 squares

6 Would have to kill and dry krill, whales and humans

Lesson 5: B8.5 – Transferring biomass (Triple)

1. Connection

Q1. What does a pyramid of biomass start and end with?

Q2. Why is dry mass used in the creating pyramids of biomass?

Q3. What are the issues with getting an accurate measurement of biomass?

2. Activation

LI: Identify how biomass is lost and calculate the efficiency of energy transfers

<https://www.youtube.com/watch?v=JZ5kN2Jiz50>

Make a note of the title and the LI

1. Read pages 332-333
2. List key words – define those you don't know
3. List the reasons biomass is lost (green bullet points)
4. Draw fig 8.12 and 8.14 – calculate X
5. Copy the efficiency equation and write a sentence to explain why food chains are rarely longer than 5 trophic levels



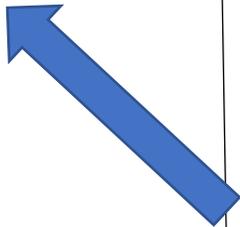
4. Consolidation

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 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 5: B8.5 – Transferring biomass (Triple)

Connection

Q1. producer / apex or top predator

Q2. wet mass can vary based on how hydrated the organism is

Q3. Organisms need to be caught and killed to measure dry mass
Biomass can vary with the seasons
Some species feed at more than one level (omnivores)

Demonstration

1 photosynthesis

2 some plant material, which cannot be digested, leaves the body as faeces some animal material cannot be digested, e.g. bone, horn, hooves, claws and teeth biomass eaten by animals is also used in respiration to release energy and leaves the animal as carbon dioxide and water.

3 There is much more indigestible food in plant material than meat

4 Some is used for respiration, movement, growth and some is waste (urine, faeces and methane)

5 need to eat lots of plant material to convert sufficient amounts into new biomass and much plant material is indigestible

6a 4%

6b Not as much energy is used to keep warm and move around so more can be used for growth

Lesson 6: B8.6 – Competing for resources

1. Connection Triple

Q1. What does a pyramid of biomass start and end with?

Q2. Why is dry mass used in the creating pyramids of biomass?

Q3. What are the issues with getting an accurate measurement of biomass?

Answers Lesson 6: B8.6 – Competing for resources

Connection Triple

Q1. producer / apex or top predator

Q2. wet mass can vary based on how hydrated the organism is

Q3. Organisms need to be caught and killed to measure dry mass

Biomass can vary with the seasons

Some species feed at more than one level (omnivores)

Lesson 6: B8.6 – Competing for resources

1. Connection

Q1. Define mutualism and give an example.

Q2. Define parasitism and give an example.

Q3. What does the term out of phase mean regarding predator prey cycles?

2. Activation

LI: Explain why animals in the same habitat are in competition and how this affects their populations

<https://www.youtube.com/watch?v=ePsjdKoSA9g>

Make a note of the title and the LI

1. Read pages 334-335
2. List key words – define those you don't know
3. List the reasons plants and animals compete (green bullet points)
4. List what might happen to organisms unable to compete (blue bullet points)
5. Define inter and intra specific competition

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 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 6: B8.6 – Competing for resources

Connection

Q1. Temperature

Light intensity

Oxygen levels

Carbon dioxide levels

Moisture level

Soil pH & mineral
content

Wind intensity &
direction

Q2. Food availability

New pathogens

New predators

Competition between
species

Q3. When the biotic
and abiotic factors are
balanced and the
populations sizes
remain constant.

Demonstration

1 Animals and plants that get more of the resources are more successful than those that get less. Successful organisms are more likely to survive and reproduce so the size of their population is more likely to increase. Animals will travel to where food is available.

2 For a mate; For water, nutrients and sunlight; For food.

3 If they are not matched, one will become more successful than the other.

4 Resources in any habitat are limited

5 Any correct examples e.g. seals competing for a mate is intraspecific, desert plants competing for water is interspecific.

6 Animals try to avoid competition with other species if they can but need to compete with members of their population for food and to reproduce.

Lesson 7: B8.7 – Practical – Measure the population size in a habitat

1. Connection

Q1. List 3 factors that organisms can compete for.

Q2. What happens when an organism is unable to compete?

Q3. Give an example inter and intra specific competition

2. Activation

LI: Use a quadrat to estimate population

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

Make a note of the title and the LI

1. Read pages 336-337
2. List key words – define those you don't know
3. Complete practical

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 7: B8.7 – Practical – Measure the population size in a habitat

Connection

Q1. light, space, water, mineral ions, food, mates, territory

Q2. goes extinct, develops new survival strategies, moves to a new area

Q3. between members of the same species
Between members of different species

Demonstration

1a Reduces aeration (amount of air) and irrigation (amount of water) soil is able to hold.

1b More difficult for roots to penetrate, less water in soil, as well as physical damages of trampling.

2 Meristems – daisies unable to grow

Leaves – daisies unable to photosynthesize

Flowers – daisies unable to reproduce

3 Daisies may dehydrate as lack of surrounding grass to protect them. Excessive water loss, even death.

4 The areas that are un-trampled will have less daisies due to competition with other plants for resources. Trampled areas will have more daisies because they are tougher than the other plants.

5 Make a transect line across each of the investigation areas with the tape, one at a time and place the quadrant every 5m along the line, starting at 0m. In each placement of the quadrat, count the number of whole daisy plants completely within the quadrant. Count the number of daisy plants partially in the quadrant along 2 adjacent sides only. Add these numbers together and record them in a table.

6 The plant may not be in flower; the flower may be in the quadrat, but not the whole plant; to get a more accurate record of plants growing, not just those in flower. 12 (accept 11)

7 By adding all the daisy plants they found altogether and divide by the number of quadrats – gives a plant density per m²

8 The other student may have carried out a similar investigation, using a different transect. Pooling the results will make them more valid, and minimise the effect of any anomalies.

9 There are more daisies in the trampled area (converse: there are less daisies in the untrampled area). The daisies in both areas were approximately equally spread along the transect/in the area

10 Other plants (grass) out-competed the daisies for resources in the un-trampled areas. Trampling had more effect on the other plants, but daisies are tougher – leaves not delicate, tough cuticle to withstand extreme temperatures and long fibrous roots (compacted soil less impact than for plants with shallow roots, able to reach deeper water reserves). When other plants died off due to trampling, daisies had more resources available, and so there were more of them.

11 Proved/upheld