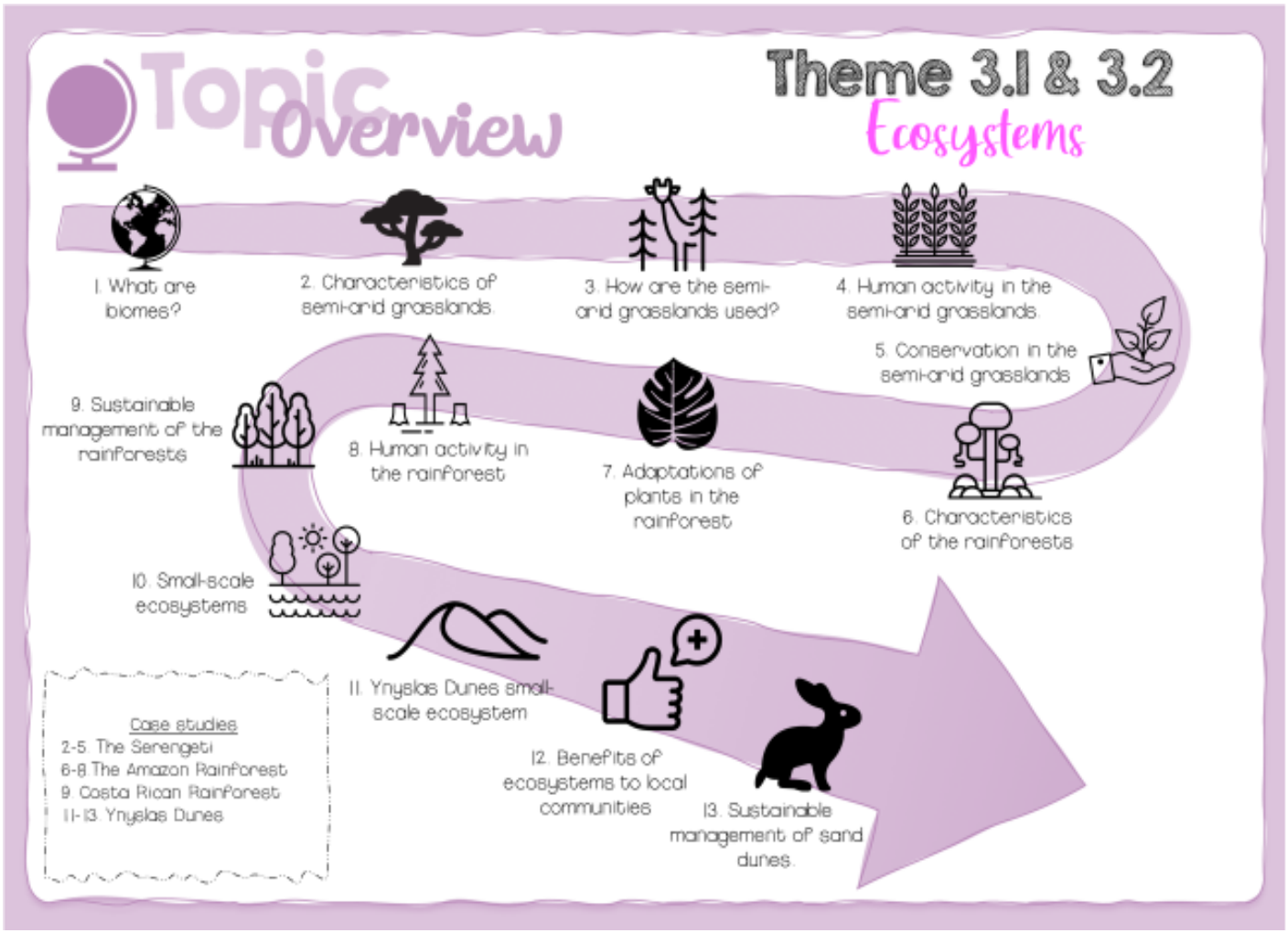
How ecosystems function.

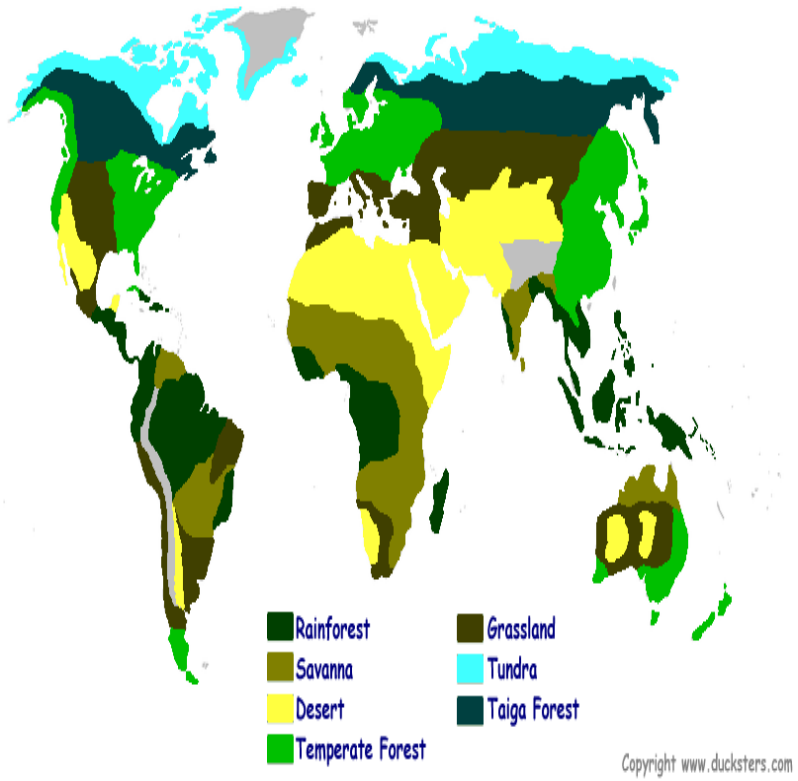
Ecosystems under threat.

Name _____ Group _____



Lesson One Date:

Do Now: What does this map show? What do all of the categories have in common?



Title: What are biomes?
LO: To explain the relationship between climate and biomes at a global scale.

Match the key word with the definition

Ecosystem		Very large ecosystems e.g. tropical rainforest.
Biome		The non-living parts of an ecosystem e.g. sunlight.
Abiotic		The average conditions (rainfall and temperature) throughout the year.
Biotic		Location on earth measured in degrees away from the equator (which is 0°C).
Latitude		A community of plants and animals and the environment in which they live.
Climate		The living parts of an ecosystem e.g. plants and animals.

What are biomes?
Using the information sheets complete the table below. Include as much detail as you can, but don't just copy from the sheets!

Biome	Distribution/location – continents, countries, latitude BE SPECIFIC!	Description of the biome. What animals and plants live there?	Description of the climate.
Taiga			
Tropical Rainforest			

Hot Semi-Arid Grassland			
Tundra			
Desert			
Temperate Deciduous Forest			

Progress Check

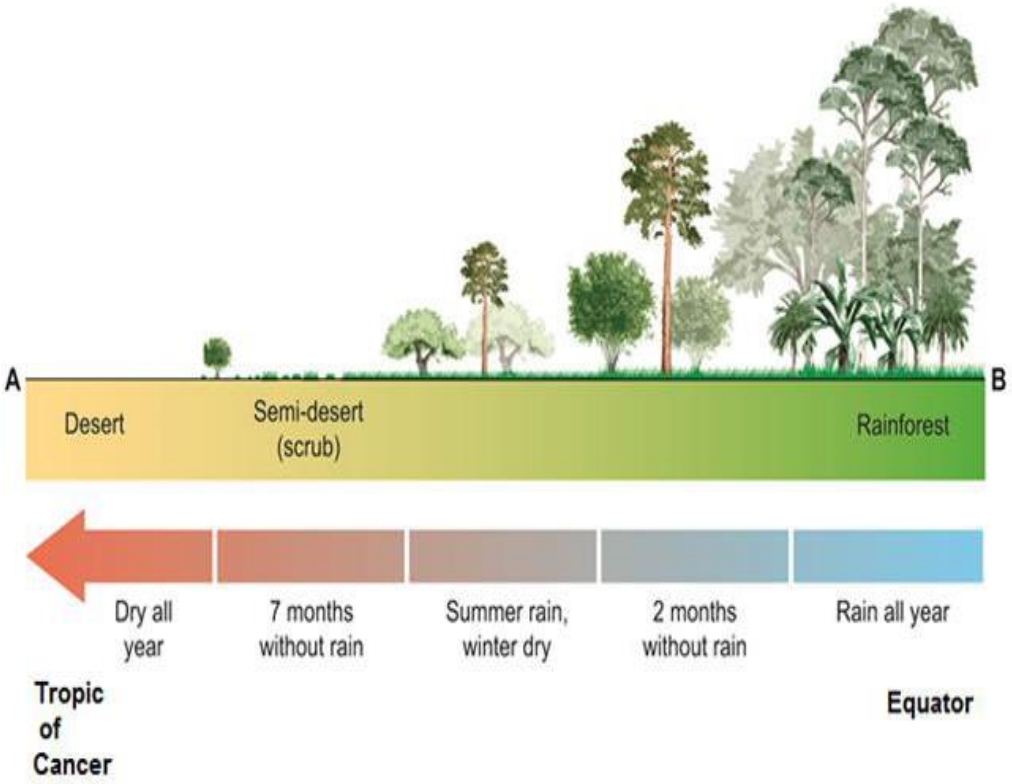
Name one ecosystem that has very low temperatures:

Name ecosystem that receives very little precipitation:

Name one ecosystem that can be found in North America:

Name one ecosystem that is found at high latitudes:

What is the link between climate and biome?



Use the sentence starters and the diagram to help you to identify the key links between vegetation, latitude and climate.

1. There is more rain at the equator, as a consequence there is…

2. Conversely, towards the tropics it is dry all year, the impact of this is…

3. Overall, the latitude affects the climate, as a result this can impact each biome due to…

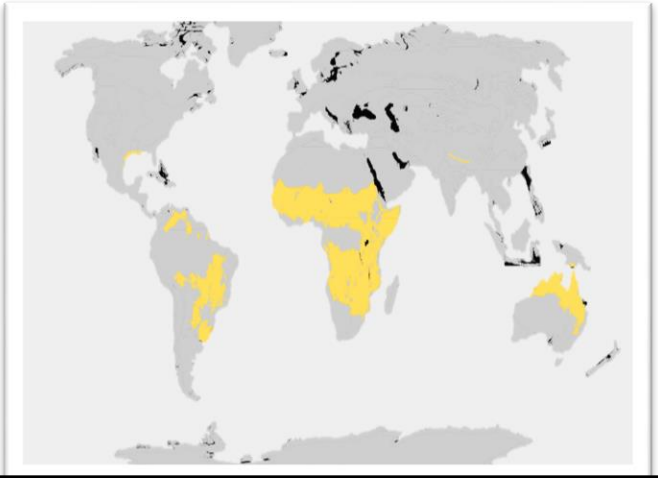
True or False?
If you think the answer is false, rewrite it so it becomes true.

Question	True/False	Re-write if false to make it true
1. Biotic factors are non-living things.		
2. Soil is classed as abiotic.		
3. Rainforests are found around the tropics.		
4. As you move outwards from the equator, rainfall increases.		
5. A lion is a biotic factor		
6. The tundra is only found in Antarctica.		
7. There are 6 main biomes.		
8. The desert is an example of an ecosystem.		

Lesson 2 Date:

Do Now: Describe the environment that the Lion King lives in. What is the name of this biome?

Title: What are the characteristics of the semi-arid grassland?
LO: To be able to describe the biotic and abiotic features of the semi-arid grasslands.



Describe the location of the semi-arid grasslands. Remember to use C.L.O.C.C

(continent, latitude/longitude, oceans/seas, countries nearby, compass rose)

Where are the semi-arid grasslands located? What else is it known as?

Video clip challenge: Answer the 10 questions whilst watching the clip
https://www.youtube.com/watch?v=q_t15sZh0-s

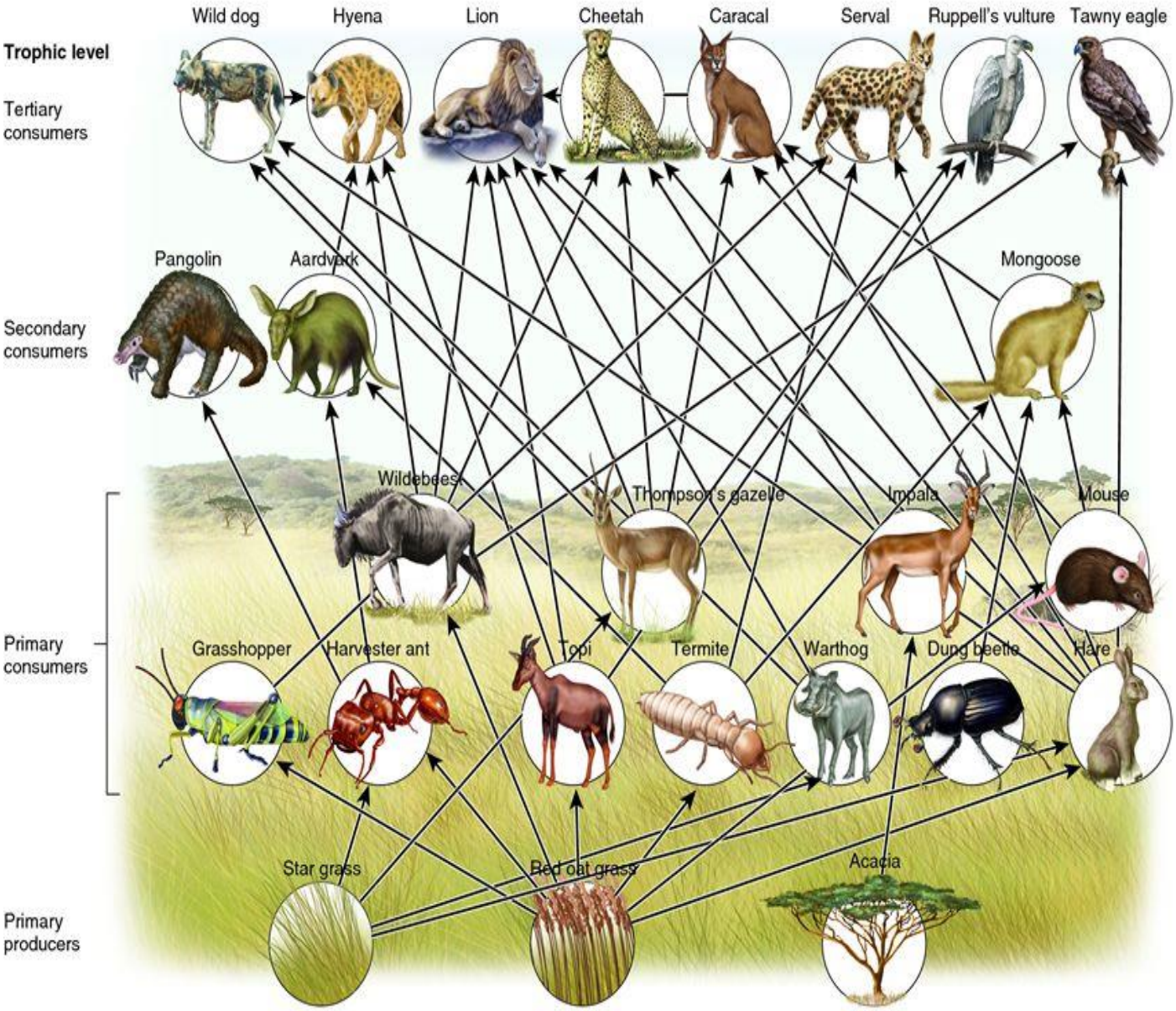
Question	Your answer
Name 3 locations where Savannah can be found	
What factor can affect rainfall?	
What is the temperature range when near the deserts?	
What is the soil called?	
What colour is the soil and why?	
Name a tree that is found in the Savannah	
What does xerophytic mean?	
Name two types of animal that live in the Savannah	
What is desertification?	
What could crop failure lead to?	

What is a food web? Can you give an example?

Match the key word with the definition

Producers		Usually eat animal material – they are carnivores. For example: cats and dogs.
Primary consumers		An animal which feeds on dead organic material, especially plant detritus.
Secondary consumers		Usually eat plant material – they are herbivores. For example: rabbits, caterpillars, cows and sheep.
Tertiary consumers		Green plants – they make food by photosynthesis.
Detritivores		Animals that kill for food, they are carnivorous and are at the top of the food chain.

The semi-arid grassland food web

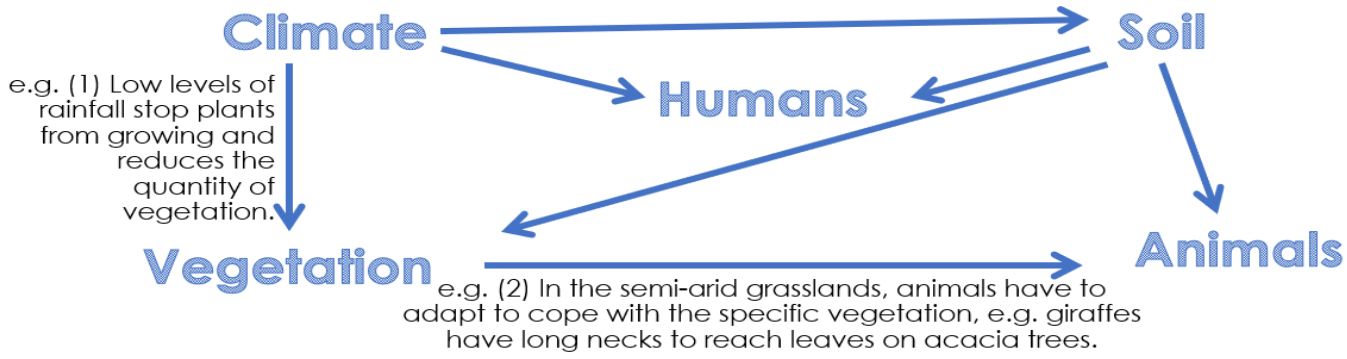


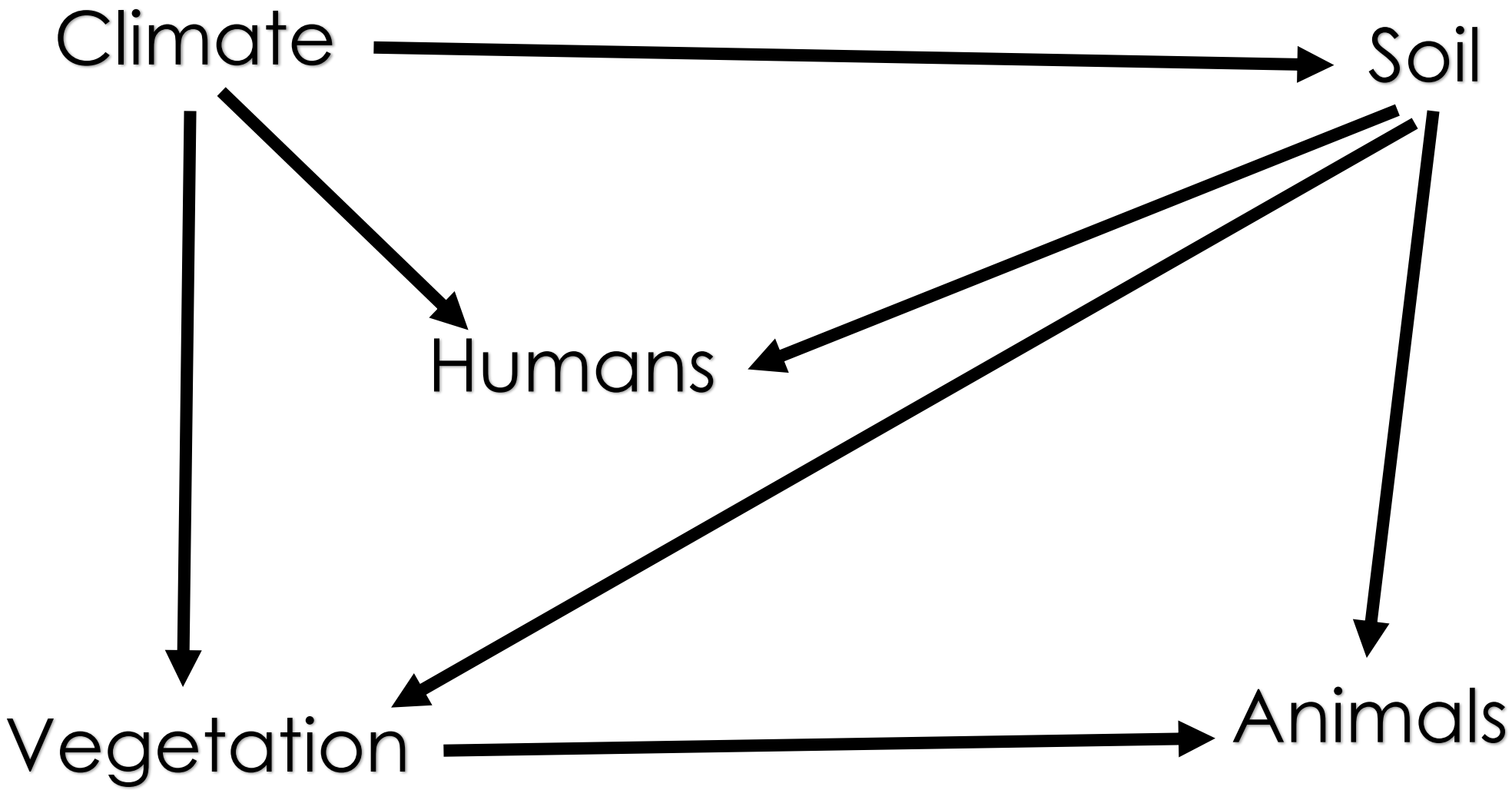
Use the food web to help you to answer the questions in the table.

Name 2 tertiary consumers	
Name 2 secondary consumers	
Name 2 primary consumers	
Name 2 primary producers	
What primary producers does the mouse eat?	
What is the food chain for the Hyena?	
What would happen if the Thompson's Gazelle became extinct?	
Give two examples of herbivores	
Give two examples of carnivores	
Where does the Cheetah get its energy from?	

Draw 3-4 examples of food chains from the food web.

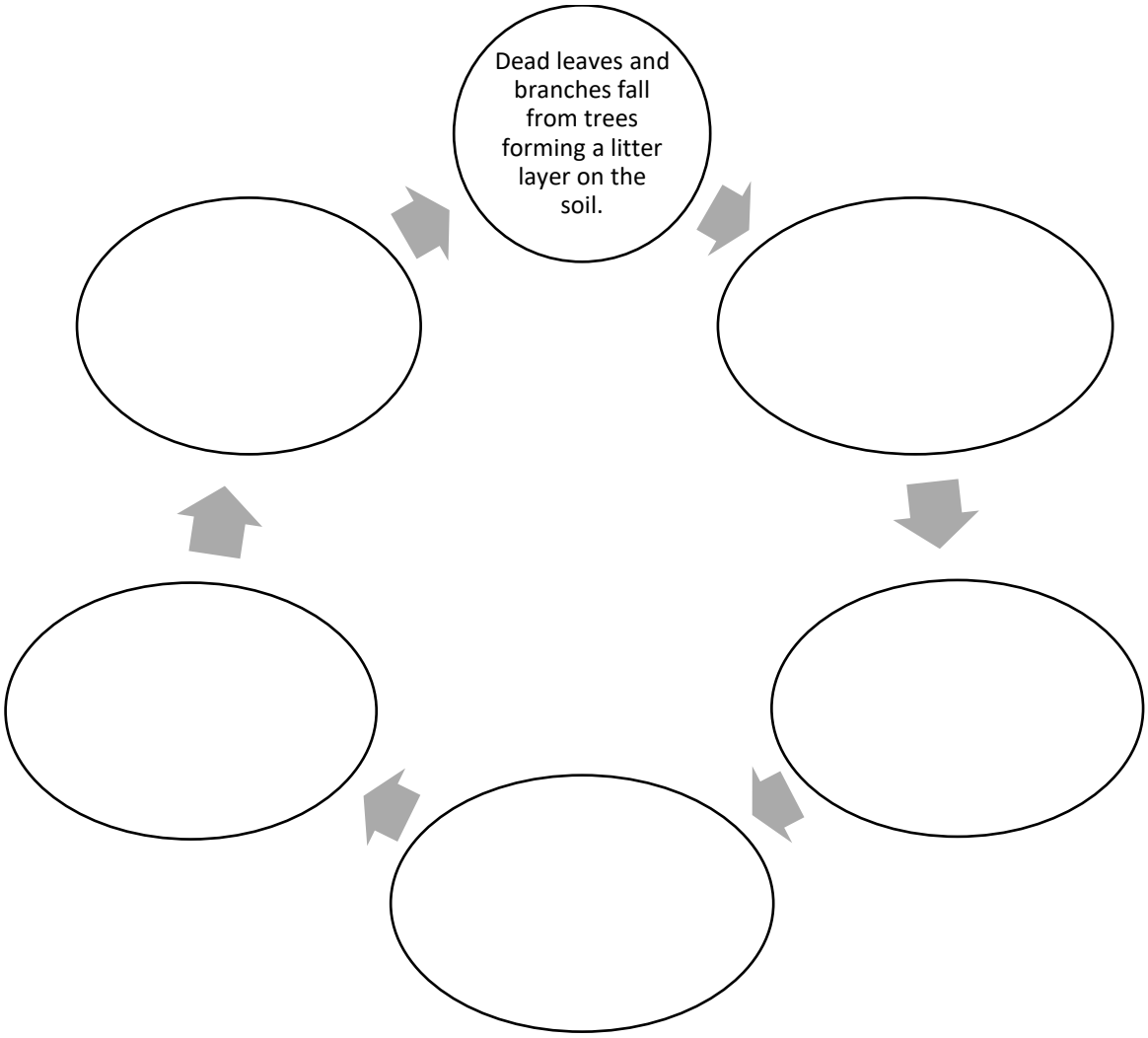
What are the links between these 5 items in the diagram below? How are they dependent on each other? Use the examples to help you. Complete the mind map on the next page aiming for at least 4 links. Add specific details related to the semi-arid grasslands.




Climate
Soil
Humans
Vegetation
Animals

Nutrient Cycling in the Semi-Arid Grasslands

Complete the cycle diagram using the statements. Read them carefully to ensure that you have put them in the right order.

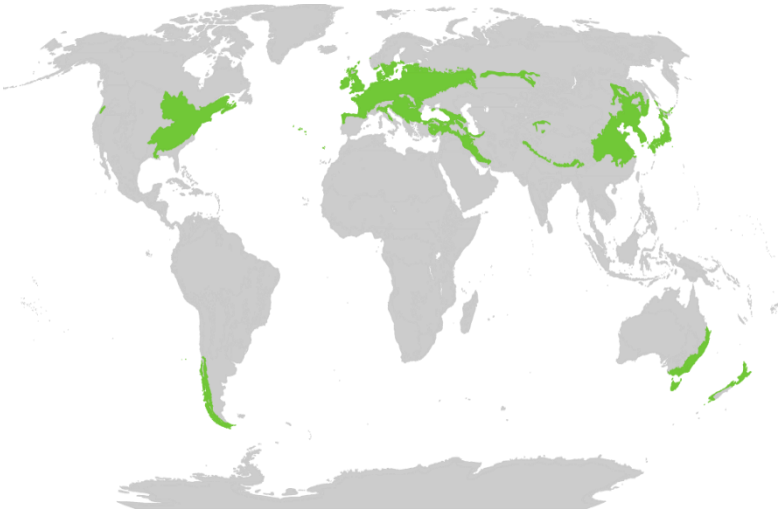


1. Leaf litter breaks down into the soil.
2. Plants use nutrients from the soil to help growth.
3. Decomposers such as beetles and fungi grow in the litter.
4. As plants grow leaves begin to die ready for new growth.
5. Nutrients from leaf litter return to the soil.

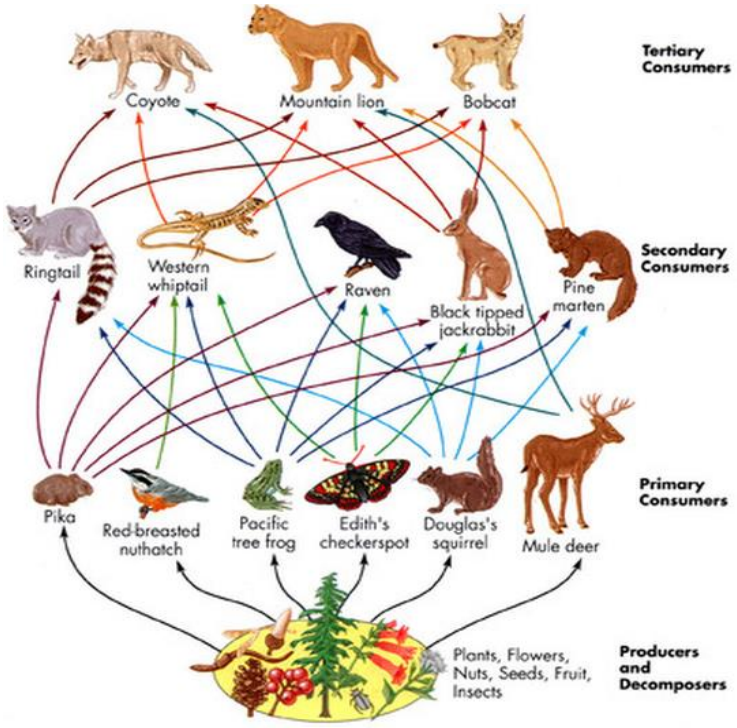
Explain the importance of nutrient cycling for ecosystems.

Meanwhile, Elsewhere...

We have been learning about the food web for the semi-arid grasslands. How is this biome different to the temperate deciduous biome? Complete the activities below.



Describe where the temperate deciduous biome is located. Remember C.L.O.C.C



Answer the questions below about the food web in the temperate deciduous biome.

1. Describe the food chain for the bobcat.

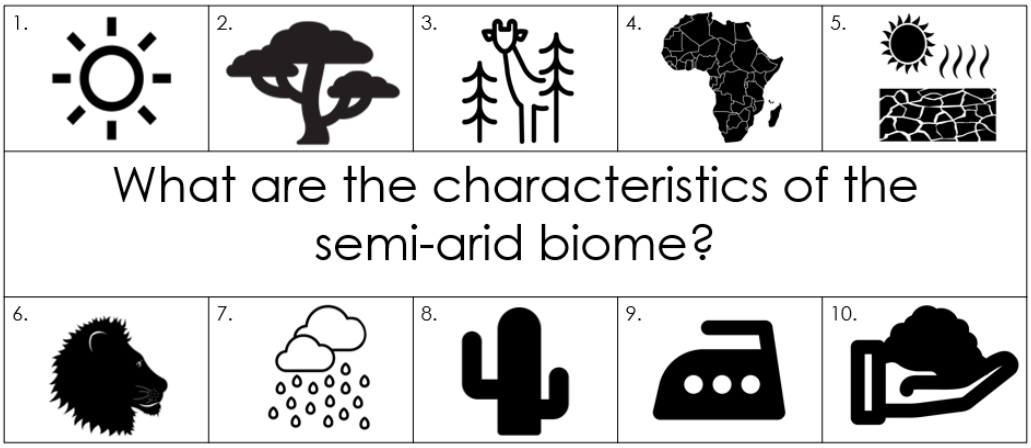
2. What would happen to the food web if a disease wiped out the Pacific Tree Frog?

3. What would happen to the food web if there was an increase in bobcats?

Describe the climate in the temperate deciduous biome. How does it change throughout the year?

Lesson 3
Do Now!

Date:



Title: How is the semi-arid grassland biome used?
LO: To understand where the Serengeti us and how humans use the semi-arid grassland.

What is the semi-arid grassland biome?

Video notes: https://www.bbc.co.uk/bitesize/guides/zx3hqty/video

Where is the Serengeti?

What is the Serengeti?

Look at the images on the board. How is the semi-arid grassland used?

Human uses of the Serengeti

Who are the Maasai?

How do the Maasai use the land?

Why is collecting firewood a problem?

Why do tourists visit the Serengeti?

What problems do tourists cause?

New Vocabulary

What is poaching? Why is it a problem?

Why has an increased population led to poaching?

Which animal species has dramatically decreased?

How could the Maasai's activities lead to desertification?

What is the difference between commercial farming and subsistence farming?

How is farming leading to desertification?

Exit Ticket:

Exit Ticket

Where is the Serengeti?

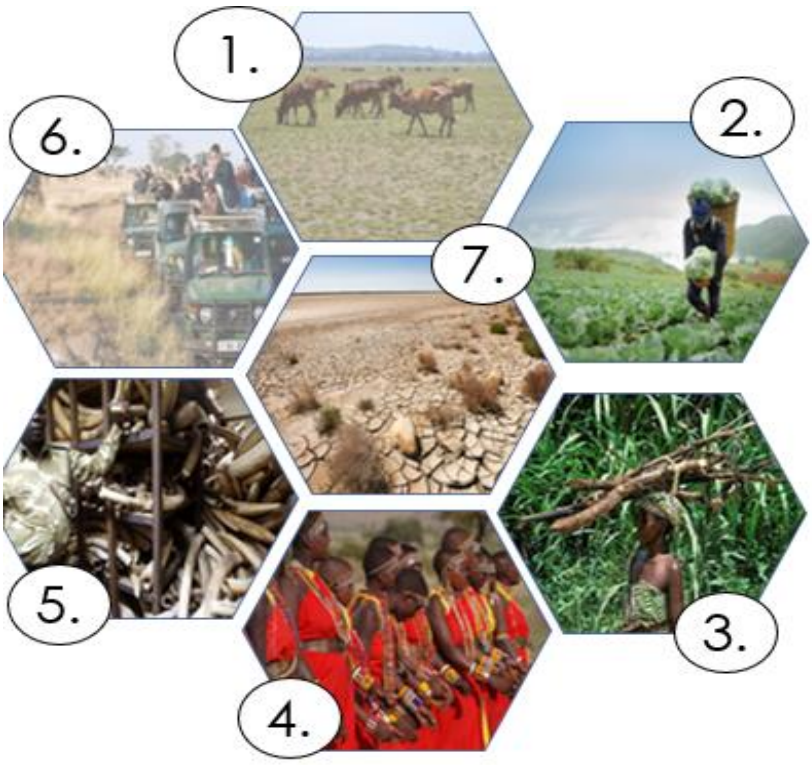
Name two uses of the Serengeti?

Describe a human use that is damaging the Serengeti

Lesson 4

Date:

Do Now!



What do each of the images on the board represent?

What links the images?

_____

_____

_____

What is the biggest threat out of these 7? Why do you think that?

_____

_____

_____

_____

_____

_____

Title: What damage has there been to the semi-arid grasslands?
LO: To understand how the Serengeti is being damaged by human activity

What is biodiversity?

Match the key word to the definition

Conservation		A group who do not intend to have an impact on a natural environment, and to save an environment for future generations.
Desertification		Protecting and preventing the development of natural areas for the benefit of local biodiversity.
Sustainable Community		The growth and spread of deserts, possibly due to human activity like deforestation.

Complete the table on the next page before answering these exam questions.

Explain how hot semi-arid grasslands are being damaged by human activity (4)

Suggest two ways in which the semi-rid grassland food web can be affected by human activity (4)

What damage is human activity causing?

Activity	Description of the activity	Local scale damage	Effect on biodiversity	Global scale damage
Tourism				
Farming				
Poaching				
Collecting fuelwood				
Grazing animals				

Homework: Complete this sheet and upload your exam answers to Teams.

Meanwhile, Elsewhere...

We have been learning about the damage that human activity can cause in the Serengeti. How is this different to human activity in the Tundra?

Describe where the tundra biome is located. Remember C.L.O.C.C

Drilling for oil and mining for coal are two activities which are causing damage in the tundra. What issues are these two human activities causing?

One possible management strategy is using renewable energy sources. How would this solve problems in the Tundra?

Lesson 5 Date:

Lesson Title: How can the semi-arid grassland be managed and conserved?
LO: To understand how the Semi-Arid Grassland (Serengeti), can be managed to help reduce the issues caused by human activity.

Why does the semi-arid grassland need to be protected/managed?

What solutions are there for managing the problems in the Serengeti?

Management Strategies in the Serengeti

Strategy	What is it? What does it do?	What problems could it help to solve?	Are there any other benefits?
Planting Acacia https://youtu.be/AfbM-DNMnNg			
Drip Irrigation Systems			
Bunds (magic stones)			

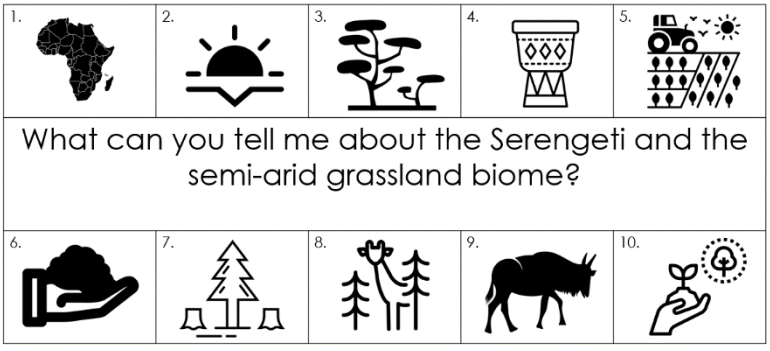
How could a sustainable future be achieved in the Serengeti?

3 ways humans are using semi-arid grasslands	3 ways humans are damaging semi-arid grasslands	3 ways the semi-arid grasslands are being conserved/managed
1. 2. 3.	1. 2. 3.	1. 2. 3.

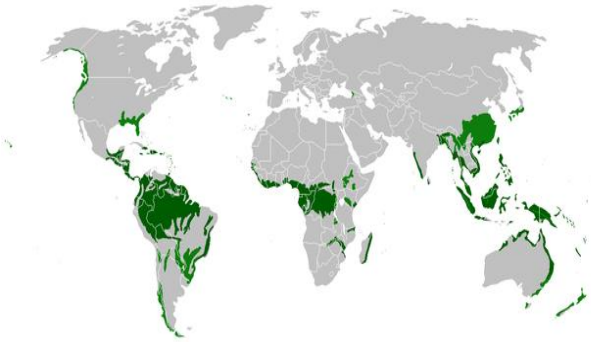
Homework: Revise the Serengeti Case Study sheet from the back of this workbook. Complete the revision quiz:
https://docs.google.com/forms/d/1oZ04ugi7DCor6fZ7nlHesbAn631DN92ImeSEtWuRzQY/edit

Lesson 6 Date:

Do Now!



Title: What are the characteristics of the rainforests?
LO: To be able to describe the climate and identify the species that live in the rainforest.



Describe the distribution of the tropical rainforest ecosystem (3) (upload this answer to Teams)

Which case study are we going to use for tropical rainforests?

What continent is it in?

Which countries does it cover?

What river runs through the centre of it?

Factual Information:

What animals and plants live in this location?

Recap: What is the definition for the following words?

Primary Consumer Producer Detritivore

Use the information about plants and animals on this page to create a food web for the Amazon Rainforest.
Add arrows to show the transfer of Energy
Label the trophic levels.

			
Vampire Bats A secondary consumer, eats grasshoppers and other small insects.	Python A top predator, preys on macaws, bats and sloths.	Ant Eater Preys on termites and other small insects, preyed on by pythons and jaguars.	Sloth Eats small insects and plants, preyed on by jaguars and pythons.
			
Grasshopper A primary consumer, prey of the frogs, iguanas and vampire bats	Banana Tree Eaten by a number of consumers.	Jaguar A top predator, preys on frogs, monkeys and sloths.	Spider Monkey A primary consumer eating banana trees, preyed on by jaguars and pythons.
			
Tree Frog Preys on small insects and preyed on by Jaguars	Macaw Preys on plants and seeds. Preyed on by top predators.	Termites A primary consumer, prey of sloths, frogs and anteaters.	Orchid Eaten by a number of consumers.

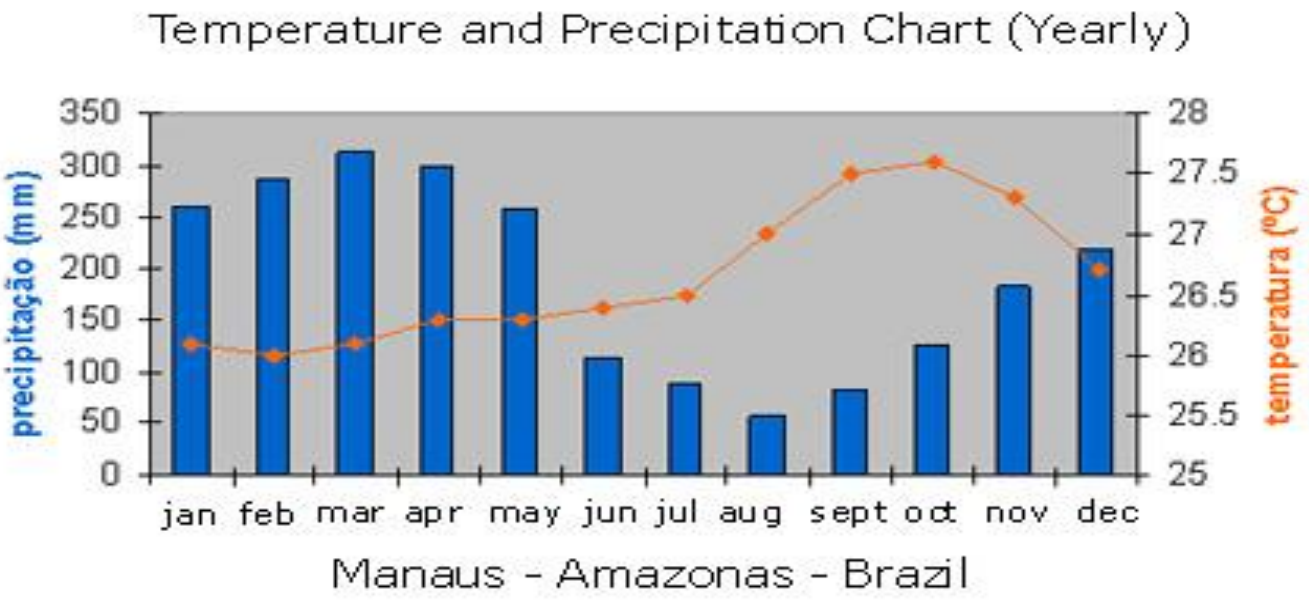
Create your food web on this page

Complete one of the sections of the table.

2+	4+	6+
Describe what primary and secondary consumers are, give examples from the food web you created. *A primary/secondary consumer is…, for example…* Give suggestions as to what could happen if all of the producers in this food web became extinct. *If all producers became extinct, this would….as a result this would…*	Give suggestions as to what could happen if all of the producers in this food web became extinct, using examples. Explain what 'transfer of energy' means. Why is the food web important?	Explain what 'transfer of energy' means. Why is the food web important? Imagine that a disease wipes out all of the frogs. How would this affect the ecosystem in the short term and long term?

Complete your answer here.

What is the climate like in the Amazon Rainforest?



1. How does the climate change throughout the year?

2. Pick out 2-3 other key points from this climate graph. E.g. Wettest month, driest month (**always add data**), are there seasons?

3. What 3 words could we use to describe the climate in the Amazon Rainforest?

Plenary: If this is the answer what is the question?

Answer	What question could you ask?
1. Laterite	
2. Python	
3. Banana Trees	
4. Hot, wet and humid all year round	
5. Brazil	
6. 23.5 degrees either side of the equator	
7. Detritivores	
8. Macaws	

Lesson 7 Date:

Do Now: Are these sentences true or false? If they are false you must correct the answer to make it true.

Question	True/False	Re-write if false to make it true
The rainforest is only found in Brazil.		
An example of a primary consumer in the rainforest is a fruit bat.		
Soil in the rainforest is very fertile.		
Heavy rainfall in the rainforest causes soil erosion.		
The climate of the rainforest is humid.		
Orchids are an example of a secondary consumer in the rainforest.		
Rainforests are found around the Equator.		
Detritivores are scavengers.		

Title: What adaptations do plants have in the rainforest?
LO: To explain how plants are adapted to living in the rainforest biome

What are adaptations? Can you think of any examples for the rainforest?

Complete this exam question after completing the adaptations sheet. Upload this exam answer to Teams.

Explain how tropical rainforest vegetation adapts to the climate (4)

Rainforest Structure

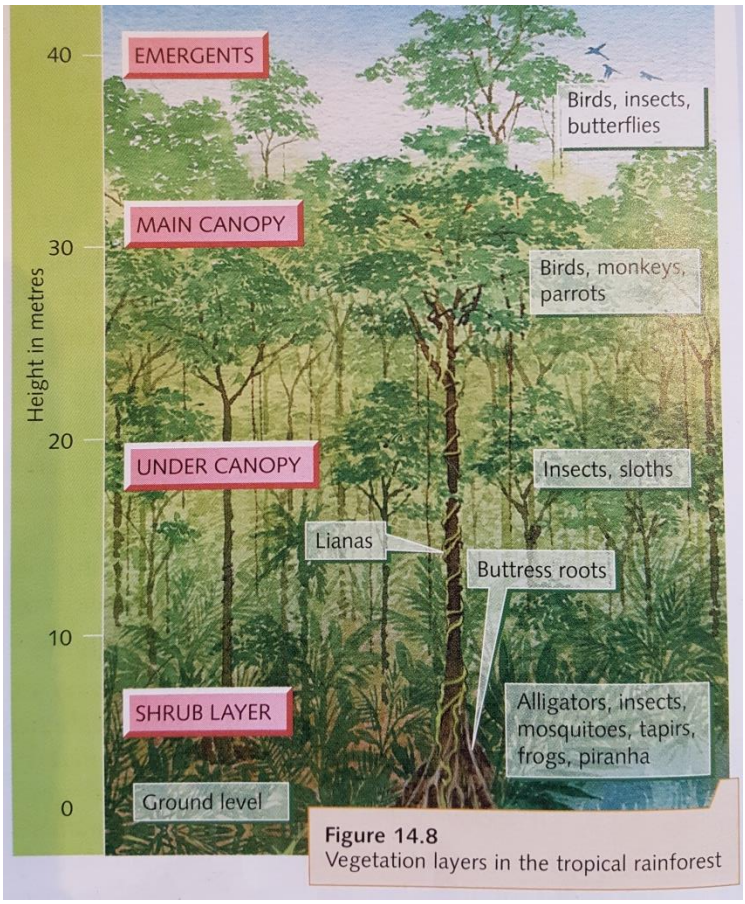


Figure 14.8
Vegetation layers in the tropical rainforest

Word Bank: Sunlight, light, plants, emergent, 30m, 20m, shrub, layers, canopy, roots, 40m, adaptation, rain, pointed.

The rainforest vegetation has very distinctive _____. At ground level, there is a _____ layer. At around _____ in height, there is the under _____. The main canopy is at around _____ in height, this is where most of the trees reach at full growth. Finally, the highest trees are known as _____ and can reach over _____ in height.

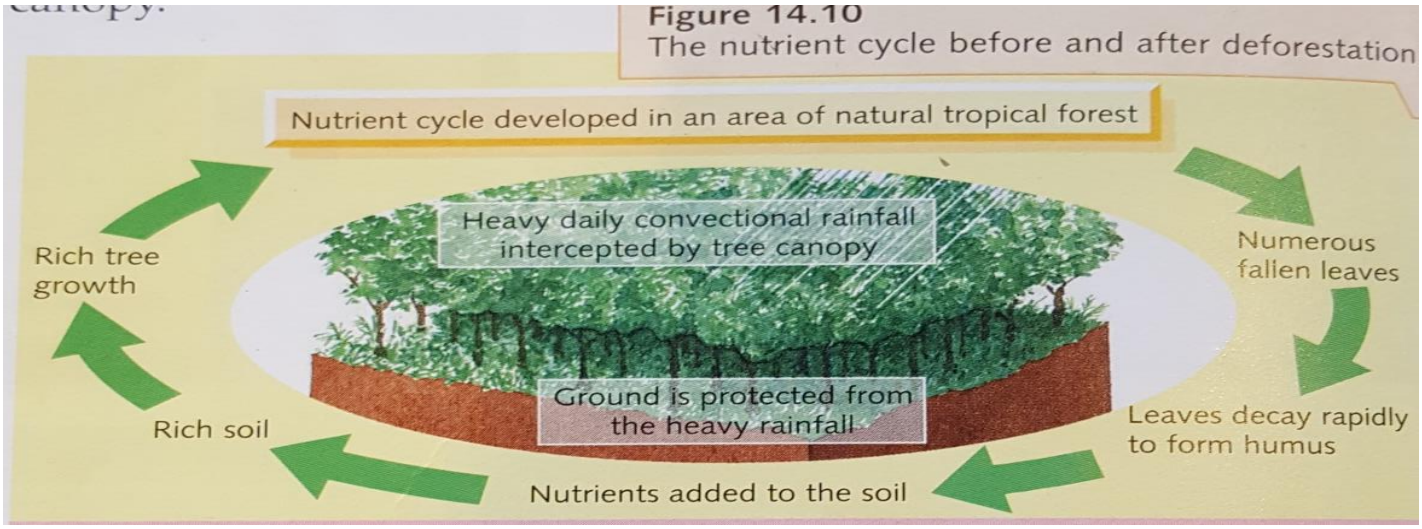
The trees have buttress _____, which help the tall trees to stand. Lianas, which are vine-like _____, use the trees to wind up and reach the _____.

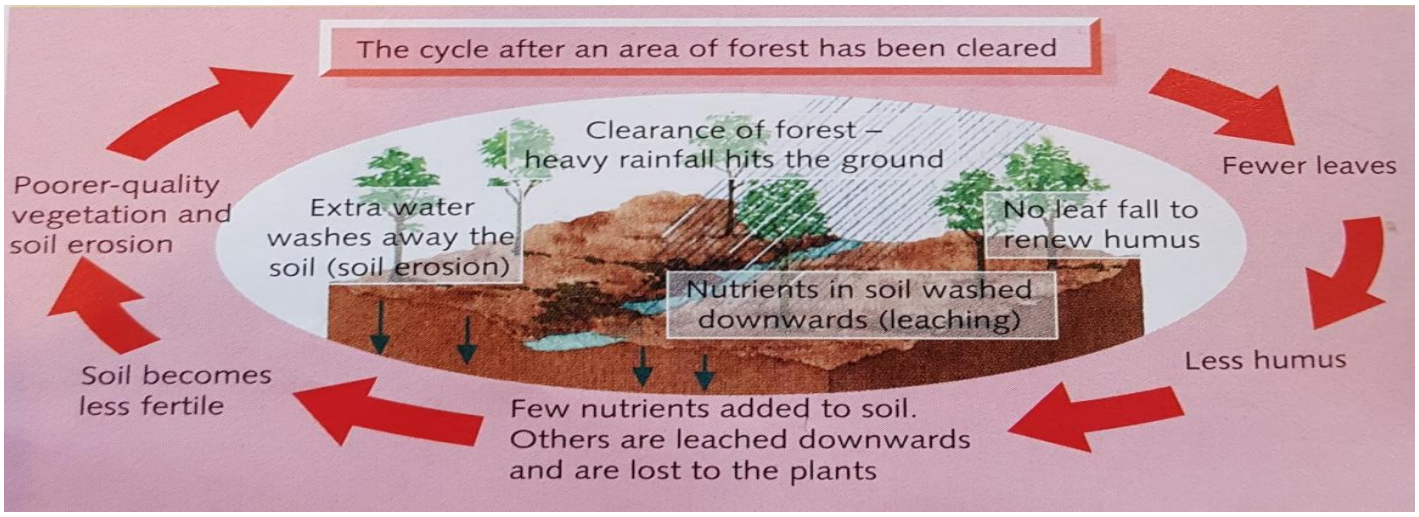
In the shrub layer there is little _____, therefore there is little growth here except some plants which have adapted to less sunlight.

Drip-tip leaves are an _____ of rainforest plants.The have a waxy coating and a _____ tip to allow the heavy _____ to quickly from the leaves on to the layers below.

Word	Definition
Emergent Layer	
Canopy	
Shrub Layer	
Buttress Roots	
Lianas	
Drip-tip leaves	

Why is nutrient cycling so important in the rainforest?





Green Task:

1. Why might there be fewer leaves after deforestation?

2. Why are nutrients lost from the soil?

3. Why will fewer trees grow after deforestation?

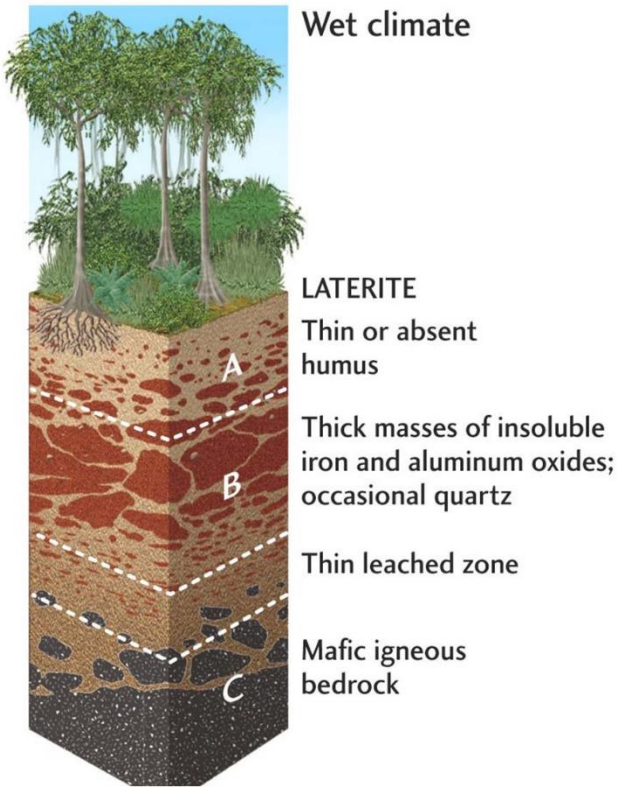
Orange Task:

In an extended paragraph, explain why removing trees can have devastating consequences for the nutrients in the soil of the rainforest.

Red Task:

In an extended paragraph, analyse the impacts in the long term on the nutrient cycling of the rainforest as a result of human activity.

What type of soil is found in the Amazon Rainforest?

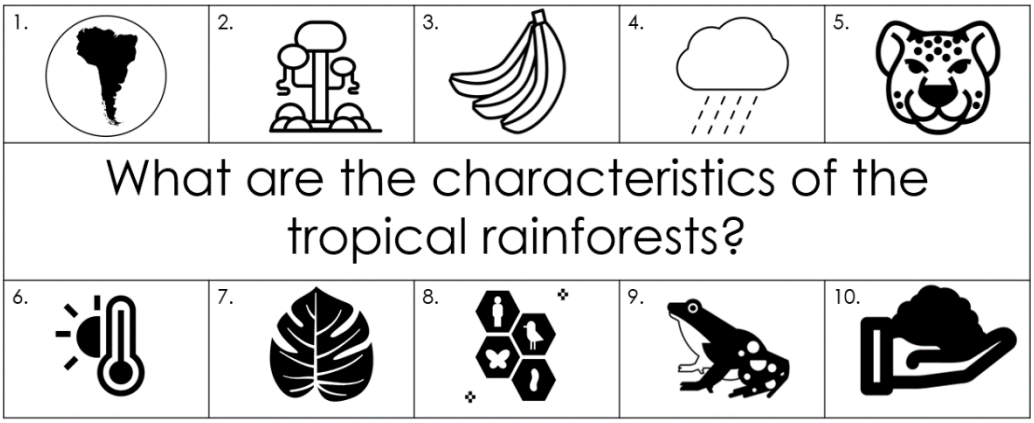


Draw your own version of the soil diagram in this box

Add annotations to your diagram using the labels below.

- Most tropical rainforest soils are relatively poor in nutrients.
- Millions of years of weathering and torrential rains have washed most of the nutrients out of the soil.
- Tropical rain forest soils contain less organic matter than temperate forests and most of the available nutrients are found in the living plant and animal material.
- Constant warmth and moisture promote rapid decay of organic matter. When a tree dies in the rainforest, living organisms quickly absorb the nutrients before they have a chance to be washed away.
- When tropical forests are cut and burned, heavy rains can quickly wash the released nutrients away, leaving the soil even more impoverished.

Lesson 8 Date:
Do Now:



Title: What impact do humans have on the rainforest?
LO: To describe and explain how humans can have impact on the rainforest.

What do each of these photos represent?

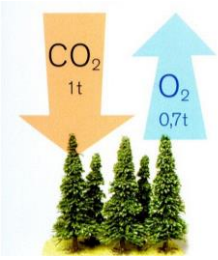
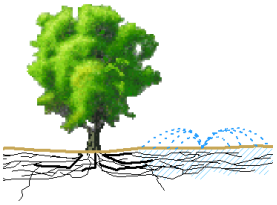
		
		

How do humans use the rainforest?

Read the information in the table. Use this information to help you to answer the questions below.

1. What is deforestation? 2. Why is deforestation leading to a loss of medicines? 3. What could be done to ensure that there won't be a shortage of medicines?	1. Why is deforestation harmful to the environment? 2. What has led to an increase in deforestation and why? 3. Why is the rainforest an important asset to the medical industry?	1. Why is the rainforest an important asset to the medical industry? 2. Why has more been invested into mining and other exploitative industries than into medicines? 3. What could be done to ensure that we can continue to cure diseases with the rainforest plants?

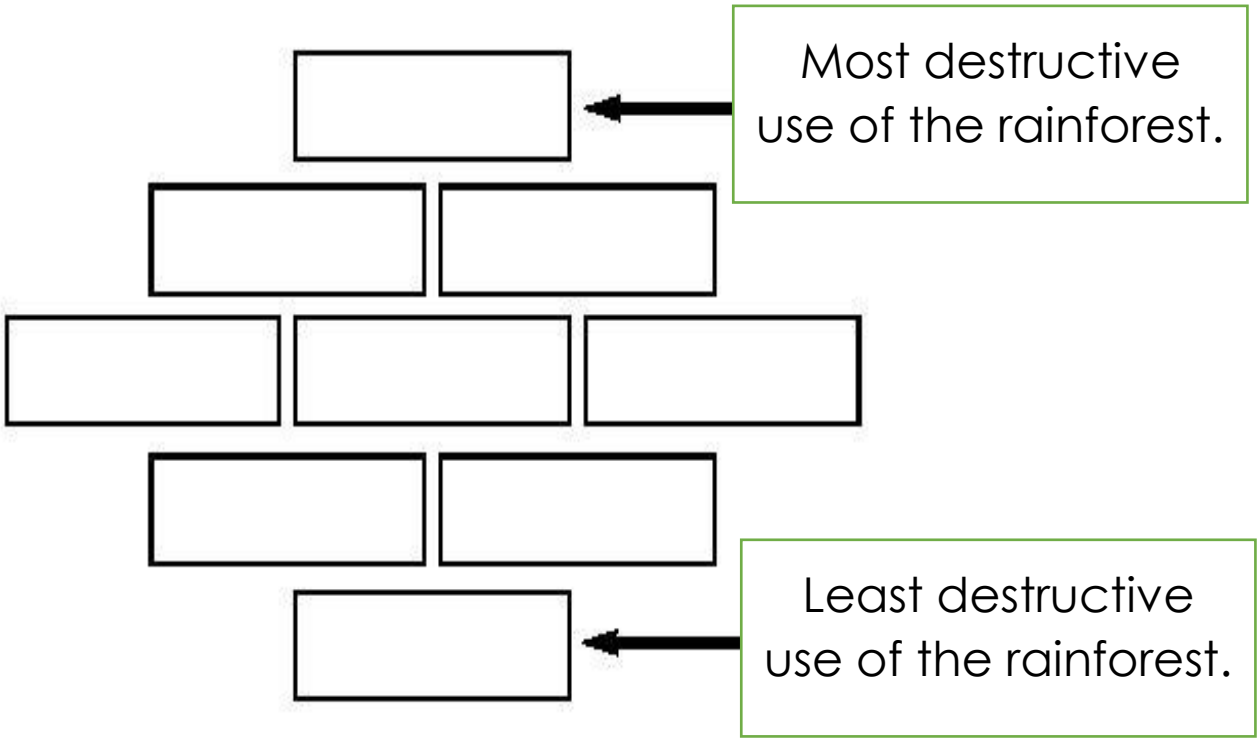
Complete your answer in this box.

The Amazon rainforest is located in South America 	Many different plants and animals live in the rainforest. It is thought that there are still some undiscovered plants which could hold the key to solving some diseases.
The rainforest "breathes out" oxygen to help humans to live. Rainforests are called carbon sinks as they "breathe in" carbon dioxide. 	The plants found in the rainforest help to make medicines. Some of the medicines found have helped to make breakthroughs in fighting cancer. 
The native people of the rainforest use the plants as their own medicines. They have done this for their entire existence.	Scientists have spent a lot of time in the rainforests. Some of the plants appear to only have a small supply. Some plants are difficult to get to as they are epiphytes.
The rainforest acts as a "giant sponge" by soaking up lots of water. This reduces flooding for thousands of people. 	The rainforest provides wood for furniture that is sold all around the world, but the trees are chopped down to make the furniture. 
The rainforest is being deforested at an alarming rate. This is done to make room for farms and ranches. Companies in America such as McDonalds use beef that is reared in the Amazon Rainforest.	Underneath the rainforest there are resources of gold, silver and other important minerals. Large mines are created which are very deep and ugly. They are scars on the landscape.
Gold and silver mining are common, but it means that there is further deforestation. Roads are also made in the rainforest to allow the mining vehicles to be moved. This creates further deforestation and pollution. When trees are cut down further carbon dioxide is released into the air which adds to global warming.	A large amount of money is being invested into finding new medicines and cures. More money is being invested in mining and farming.

Put the 9 uses of the rainforest into the diamond nine. The top answer should be the most destructive use of the rainforest.

- Logging
- Ranching
- Medicine
- Tourism
- Mining
- Farming
- Rubber Tapping
- Scientific research
- Land for homes

Explain your top and bottom answers.



Geography Bingo

Use 9 of the words in the list to fill in the 3x3 grid below. Make sure they are words that you know the meaning of. Listen out for definitions, cross them out when you hear them

Tundra
Taiga
Desert
Deciduous forest
Rainforest
Adaptation
Nutrient Cycle
Producer
Consumer
Decomposer
Abiotic
Biotic
Scavenger
Food web
Ecosystem
Biome
Food Chain

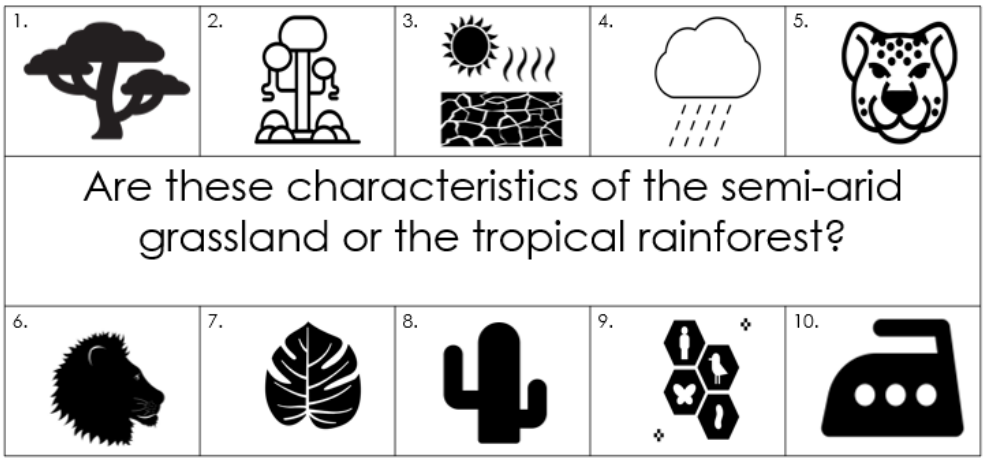
Homework – complete the sheet on the human uses of the rainforest.

Read through the statements below. Complete the key to show which you think are <u>positive</u> impacts and which are <u>negative</u>:

Transportation Better transportation means easier access to raw materials like minerals and timber. Forest resources can be transported away and sold	**Infrastructure** Hospitals and education can be improved from the money gained from selling natural resources	**Roads** These divide up parts of the forest and can cut off connections between different systems.
Profits Selling resources can be used to improve a country's infrastructure	**Land Clearance** Farming, transportation and mining can lead to deforestation. Hardwood tree take many years to grow so can be difficult to replace	**Fertile Soils** That make farming possible are quickly washed away when the forest is cleared. If soil ends up in rivers it can lead to flooding
Raw Materials Tropical hardwoods such as ebony and mahogany, can be sold for a good price abroad	**Loss of Animals Habitat** This occurs when trees are cut down. Deforestation can result in endangering animals and plant life, or even lead to them becoming extinct	**Mineral Deposits** The Amazon includes bauxite, iron ore, manages, gold, silver and diamonds
Large-Scale Farming Brings money into the country and provides food and jobs for the country's growing population	**Profits** From large-scale farming and selling resources often go back to rich country's or large companies and don't benefit the rainforest	**Small-Scale Farming** Provides food for rainforest communities and the landless poor of Brazil
	**Amazonian Indians** Five years ago, there were an estimated ten million tribesmen living in the rainforest, today there is estimated only 200,000	

Lesson 9 Date:

Do Now!



Title: Sustainable Management of the Rainforests in Costa Rica.
LO: To understand how we can use the rainforest more sustainably.

Describe the location of Costa Rica
Remember to use C.L.O.C.C

Is the Amazon Rainforest found in Costa Rica?

Facts about the Costa Rican Rainforest

How can we use the rainforest more sustainably?
Complete the table. 4 of the 6 strategies are talked about in this video clip:
https://www.bbc.co.uk/bitesize/clips/zhnkjxs

National Parks	Small Scale Tourism	Wildlife Corridors
Sustainable Farming	Sustainable Logging	Debt-for-Nature Swaps

Exam Question (remember to copy this into teams)

Explain how an ecosystem you have studied is being managed sustainably (6)

Hints and tips

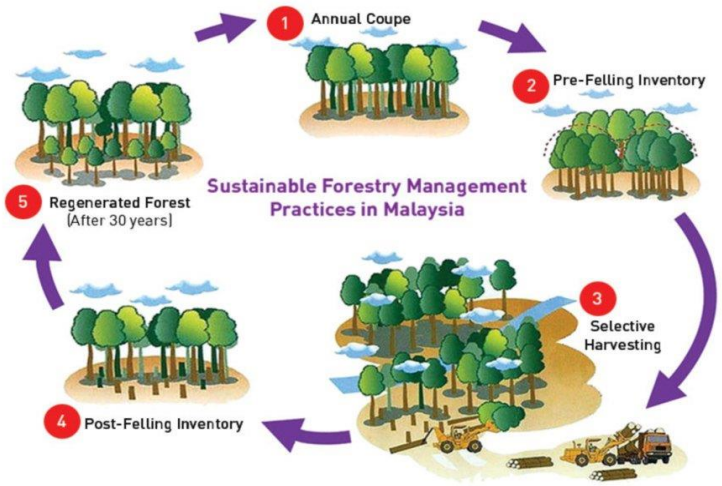
1. Explain: Give details on how the ecosystem is being sustainably managed. Why are those methods sustainable?
2. Name the ecosystem – what type of ecosystem is it?
3. Sustainable: Able to be maintained at a certain level without much human intervention. The methods will also not damage the environment.

Complete this for homework and revise the key words

Meanwhile, Elsewhere…

We have been learning about sustainable management in the Costa Rican Rainforest. How is this different to sustainable management in Malaysia?

Describe where Malaysia is located. Remember to use C.L.O.C.C



In Malaysia they carry out a practice called Sustainable Forestry Management. Look at the diagram opposite. Why would this process be sustainable?

What are the possible advantages and disadvantages of this scheme?

To find out more about the sustainable forestry management scheme in Malaysia visit:

https://www.bbc.co.uk/bitesize/guides/zwy7sg8/revision/5
https://cleanmalaysia.com/2015/10/10/sustainable-forest-management-in-malaysia/
http://geographyrevisionaqa.weebly.com/malaysia-case-study.html

Keyword	Definition
CONSERVATION	Saving and protecting the environment, for example through national parks.
SUSTAINABLE	Something that can be maintained or can continue to be done without it having damaging consequences for the future.
NUTRIENT CYCLE	Movements of nutrients such as calcium, potassium and magnesium within the ecosystem e.g. through decay and growth.
DRIP IRRIGATION	A type of irrigation which has the potential to save water as it is dripped slowly onto the roots of plants rather than flooding the soil surface.
DESERTIFICATION	The process by which fertile land becomes desert as a result of drought, deforestation or inappropriate agriculture.
DISTRIBUTION	The way something is spread out or arranged over an area.
LATERITE	A reddish clay material which forms the topsoil in some tropical areas
TERTIARY CONSUMER	Animals that kill for food, they are carnivorous and are at the top of the food chain.
ECOTOURISM	A form of tourism which is environmentally responsible, small scale and low impact.
BUTTRESS ROOTS	Large, wide roots which are found on all sides of a shallow rooted tree. They prevent the trees from falling over.

Lesson 10 Date:

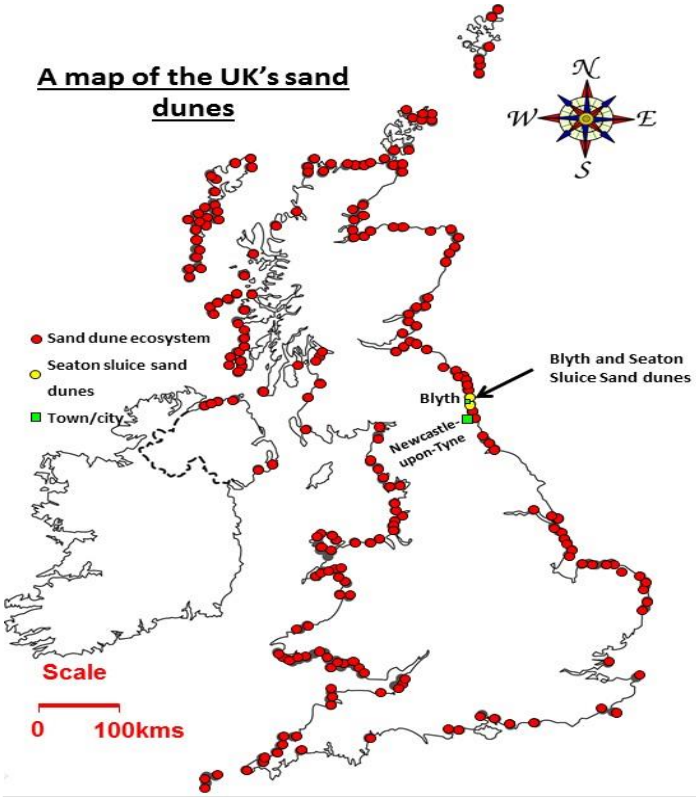
Title: What is a small-scale ecosystem
LO: To understand what a small-scale ecosystem is and to be able to describe examples.

What do you already know about ecosystems?
Sort the examples into the two columns.

Small Scale Ecosystem	Large Scale Ecosystem

Pond
Savanna
Desert
Garden
Beach
Forest
Tundra
Taiga
Rainforest
Semi-Arid Grassland
Churchyard
School field

What is a small-scale ecosystem?



How much of the UK coastline is sand dune systems?

Describe the location of sand dune ecosystems in the UK (3)

Key information about sand dunes as ecosystems

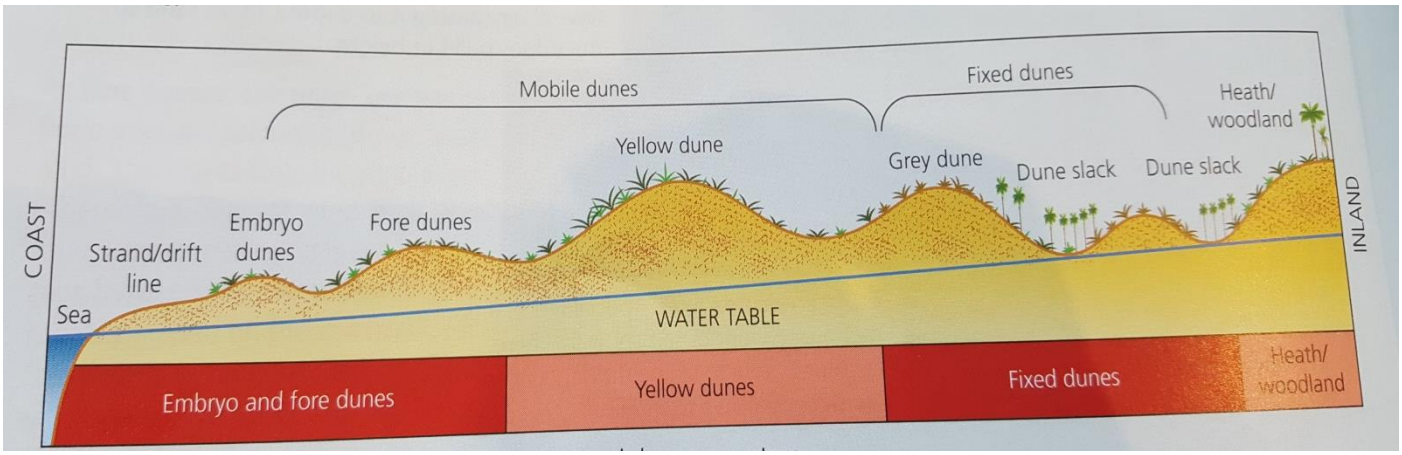
How do sand dunes form?

Read the following list, **highlight** the 5 statements you think are TRUE ONLY.

For sand dunes to form you need…

1. A regular and plentiful supply of **sediment** (sand!)
2. Storm conditions
3. A wide, sandy beach exposed at low tide
4. Onshore winds to move grains up the **beach profile**
5. Winds blowing out into sea
6. Human intervention
7. Adequate vegetation to stabilise the dunes
8. Protection from humans and storms

What is a transect?



Complete the cloze exercise

Embryo Dunes

Near the top of a beach is a strand line – this is the pile of flotsam and jetsam which has been dropped by the sea at the high tide mark. The _____ line slows the flow of air over the beach and some sand is _____ by the wind so small dune begin to form. Only specialised _____ that can tolerate the _____ conditions, like sea rocket, can grow here.

Mobile (yellow) Dunes

As time passes, the tough _____ grass with its long flexible leaves colonises. It can tolerate the strong _____. The plants slow down the wind speed and more sand are deposited. Piles of sand grow larger and ridges of sand several metres high are formed. But there are gaps between the plants and on windy days the sand is easily _____ on the windward side of each ridge. The first two or three _____of the sand dune system are mobile because their _____ is changing.

Fixed Dunes

Further inland the conditions for plant life are not quite so _____. It is less windy and there is less salt spray. The dunes here have a wider variety of plants including a narrow leaved grass called fescue. With more roots to _____ the soil there is less chance for the sand to be eroded on a windy day so the dune ridges become _____ into position. There are dips between the ridges called dune _____.

Word Bank

PLANTS MARRAM HARSH RIDGES POSITION STRAND BIND
SALTY FIXED SLACKS ERODED WIND DEPOSITED

Complete one of the questions on how a sand dune system changes with distance from the sea. (you will need to copy this into Teams)

2+	4+	6+
Describe how the sand dunes change from the sea to the back of the sand dunes inland. (4 marks)	Describe how the sand dunes change from the sea to the back of the sand dunes inland. Suggest reasons for those changes. (5 marks)	Describe how the sand dunes change from the sea to the back of the sand dunes inland. Give detailed reasons for those changes. (6 marks)

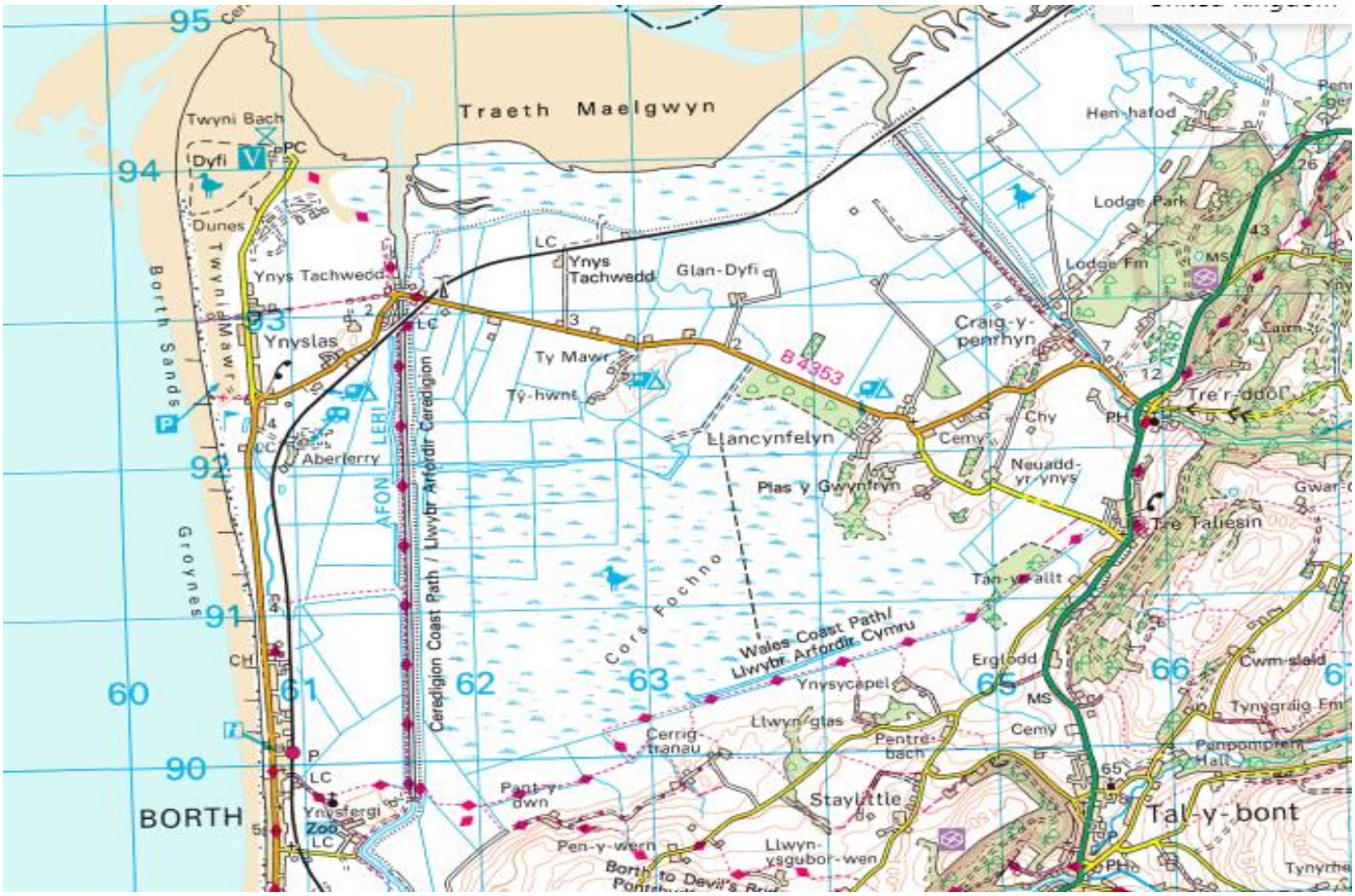
Complete your answer here.

Homework: Revise the Amazon Rainforest case study. The sheet is at the back of this workbook

Lesson 11 Date:

1. 	2. 	3. 	4. 	5. 
What can you recall about the Amazon Rainforest case study?				
6. 	7. 	8. 	9. 	10. 

Title: How do small-scale ecosystems benefit local communities?
LO: To explain the importance of small-scale ecosystems to the local community and to understand the role that stakeholders play.



What is the 6-figure grid reference of?

1. The Nature Reserve north of the dunes
2. The telephone box in Ynyslas
3. The camping/caravan site close to the B4353
4. Borth railway station
5. Borth zoo

Describe the location of Ynyslas Dunes. Remember C.L.O.C.C

Key information about Ynyslas Dunes.

<u>What benefits does Ynsylas have for the local community?</u>

<u>Read through the information below and answer the questions on benefits of the ecosystem</u>

Ynyslas is a natural feature but is protected as a National Nature Reserve (NNR) in Wales. This means that it is considered to be a very important feature of the natural environment and should be conserved and managed so that it is sustainable for future generations.

Local communities' benefit in a number of ways from Ynyslas both economic and socially. Furthermore, the wider environment also benefits giving further reason to look after this fragile ecosystem.

Ynyslas has many benefits:

1. Social – Ynyslas has a wide range of benefits to the local people. Firstly, it benefits to locals through tourism. This can be an economic benefit and brings in money to the area. This is a particular benefit to those who run businesses such as hotels, cafes and other tourist facilities. Many locals would also argue that having a nature reserve such as Ynyslas on their doorstep is good for wellbeing and mental health particularly regular users like dog walkers.
2. Economy – the local economy benefits hugely from the tourists who visit the area. This includes many school groups and researchers who visit the area or the environmental interest. It is also an area where holidaymakers come to enjoy the seaside.
3. Environmental – as Ynyslas is considered an NNR, this means it is protected and, as such, means that the biodiversity of the area is protected. Biodiversity means that there are a wide range of species in the area and this is very valuable in this fragile ecosystem. The environment benefits from this biodiversity, not only locally but globally.
4. Flooding – Sand dunes act as a natural defence from the sea and Ynyslas protects locals' houses from flooding during stormy weather on the coast.

<table>
<tr><th colspan="2">Case Study: Small-scale ecosystem in the UK
Ynyslas Sand dunes</th></tr>
<tr><td>What are sand dunes?</td><td>What would you find at Ynyslas? Describe the environment.</td></tr>
<tr><td colspan="2">How does Ynyslas benefit local communities?</td></tr>
<tr><td>Biodiversity</td><td>Benefits of Tourism</td></tr>
</table>

Benefits to local people	Flood Defences
What pressures are there on Ynyslas?	

Lesson 12 Date:

Do Now:

Rainforests Quiz

1. How have trees adapted to heavy rainfall in the rainforest?
    a. Drip tip leaves
    b. Buttress Roots
    c. Rapidly growing
    d. Shedding leaves

2. Which of these countries have rainforests in them?
    a. America, Mexico, Canada
    b. Germany, UK, France
    c. Costa Rica, Cameroon, Brazil
    d. China, Japan, Russia

3. What is logging?
    a. Using trees for firewood
    b. Cutting down trees for timber
    c. Deforestation
    d. Removing trees for farming

4. Which of these is permanently damaging the rainforest?
    a. Ecotourism
    b. Sustainable logging
    c. Cattle ranching
    d. Creating National Parks

5. Which of these is a global effect of deforestation?
    a. Increased levels of CO2 in the atmosphere, contributing to the greenhouse effect
    b. Soil becomes infertile so crops cannot grow
    c. Tribespeople lose their homes
    d. Increase in hydroelectric power due to dams being built

6. What is sustainable logging?
    a. Removing all the trees in an area to reach the ones you want
    b. Creating areas where only certain trees can be cut down
    c. Stopping deforestation altogether
    d. Removing one already fallen tree, using buffalo, to reduce damage to surrounding trees

7. Why is the government particularly interested in the rainforest?
    a. The value of the land and raw materials within the rainforest means they can become richer and reduce international debts
    b. They want to remove all tribespeople

c. They want to clear the rainforest for farming
d. They need to use the trees to create building materials

8. What does exploitation mean?
    a. Reducing deforestation
    b. Taking advantage of the rainforest for economic gain
    c. Creating more agricultural areas
    d. Increasing tourism in the rainforest

9. Why is a reduction in the numbers of tribespeople in the Amazon Rainforest a concern?
    a. More hazardous animals as they hunt effectively so keep numbers down
    b. The tribespeople care for the rainforest and understand its value so campaign for it
    c. They are important for tourism in the rainforest
    d. They help to protect the Amazon River

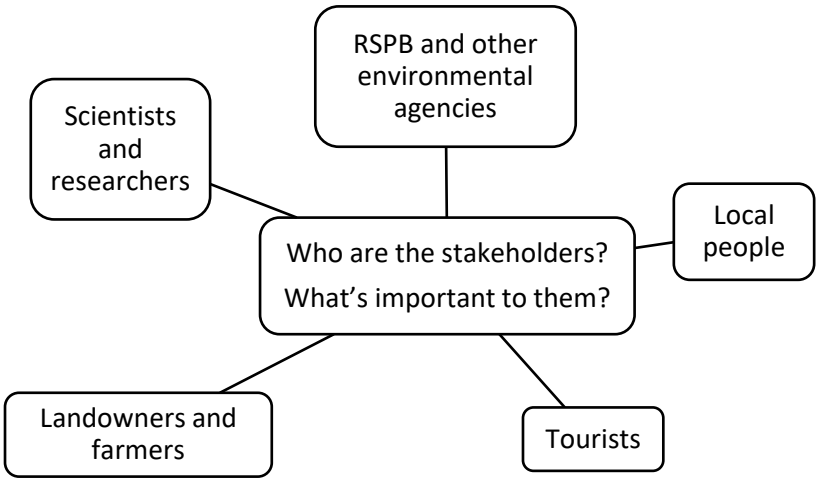
10. How will the loss of the rainforest affect the environment?
    a. Land is taken from tribespeople
    b. The Brazilian economy will suffer due to less tourism
    c. Less minerals so mining will cease
    d. Reduced biodiversity

Title: How can sand dunes be sustainably managed?
LO: To understand how a sand dune ecosystem in the UK is managed for a sustainable future.

Who are the stakeholders at Ynsylas Dunes?

What is a stakeholder?

Complete the spider diagram below. Who are the stakeholders and what is important to each of them? Why might they disagree?



Read through the information on the next page and summarise the actions within each decade. How did the management strategies change?

1960s	1980s	1990s	2000s

Changing styles of conservation management at Ynyslas sand dunes

Conservation management of the sand dunes at Ynyslas began in 1969 when the area was designated as a National Nature Reserve. During the 1960s some parts of the dune system had been damaged by off-road vehicles. In some places the marram grass, the roots of which help to bind the loose sand, had been destroyed by people driving into and parking in the dunes. The wind had then eroded huge hollows in the windward slopes of the dune system creating ugly scars known as blow-outs. The management strategies used by wardens at Ynyslas have gradually changed since 1969. These changes are summarised in Figure 39.

► **Figure 39** The changing style of management at Ynyslas.

N

sea

1969

Our first priority was to prevent further damage to the landscape by vehicles, so we sank posts into the beach to prevent cars driving into the dunes. We built wooden boardwalks across the dunes in two places to prevent further trampling and erosion.

1980s

In the 1970s and 1980s we worried that the blow-outs would never recover. We felt that visitors were causing erosion of the sand dunes. So we fenced off some areas to prevent trampling. We also created wind traps with brashings (branches and wire) which we thought would encourage layers of sand to be deposited. We planted new marram grass and put up signs to explain what we were doing.

The fencing used in the 1980s to protect some areas of the dunes

1990s

However, we found that people used to walk around the edge of the fenced-off areas and that would create new trampled paths where nothing would grow. So we removed the fences in the 1990s. Nowadays we accept that sand erosion is part of a natural process in the dunes. The blowing sand creates habitats for rare plants so we don't want to stop this natural development.

We used to have litter bins around the site, and large signs explaining our conservation work.

embryo dunes

blow-out

blow-out

beach

We found that the litter bins used to overflow and rubbish blew about, so we got rid of all the bins.

2000s

Lots of song birds live in the dunes including linnet, stonechat, skylark and meadow pipit. We have one area where ringed plovers breed. These small birds nest on the ground and are easily disturbed. So we have fenced off the shingle area where they nest.

A lot of rabbits live in the dunes. They keep the grass short and stop it from choking the less competitive flowering plants. The rabbit dung makes the soil much more fertile and as many as 40 different species of flowering plants can grow in just 1 square metre. Also some birds nest in the abandoned rabbit burrows. So we like to have a healthy population of rabbits. However, our neighbour is the golf course. They don't want too many rabbits burrowing into the putting greens and creating damage. So we erected a rabbit-proof fence along our southern boundary. The problem is that this fence now has holes in it and will be costly to maintain.

parking area

posts to prevent cars driving into the dunes

visitor centre

In recent years we have enlarged and improved the visitor centre and the boardwalks. Now anyone can easily cross the site to get to the beach. Wheelchair users can access the visitor centre along the boardwalks.

The boardwalk and visitor centre

caravan park

2016

One of our biggest management problems today is dog fouling. People are banned from walking their dogs in the summer months on Borth beach to the south. So they come up to Ynyslas to walk their dogs. The problem is that there are very few bacteria in the sandy soil so the dog excrement does not bio-degrade. It lies around for ages and is a nuisance for other visitors.

Were the strategies used at Ynsylas successful?

Complete the table below. This information will also help you to complete the exam question.

Issue	Management strategy used to help solve the issue	Was it successful or not? Why?
Sand Erosion		
Nestng Birds		
Rabbits and the nearby golf course		
Dog fouling		
Wheelchair access		

Homework:
Create a plan to help you to answer the exam question:
'The complexity of managing a small scale ecosystem such as Sherwood Forest in Nottinghamshire is the same for other small scale ecosystems.' Do you agree or disagree with this statement? (8 marks +4 SPAG)

Remember the structure:

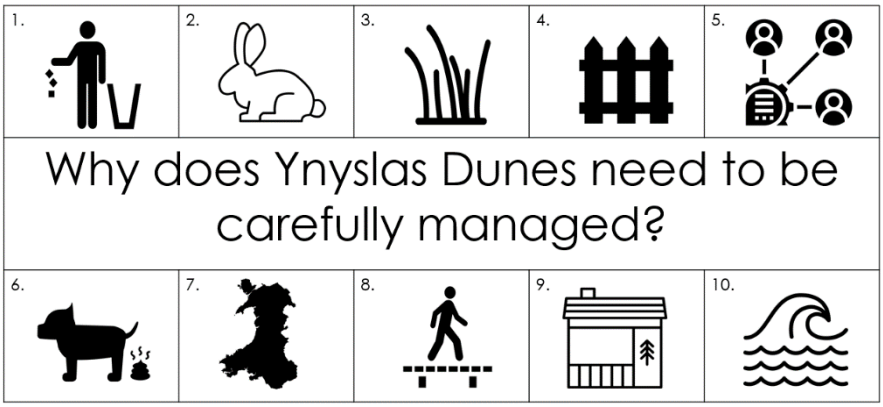
1. **Introduction** – short but clearly shows the intentions of your writing.
2. **Agree** – what evidence do you have from all your Ynyslas work that management is very complex here? Consider how challenging it is for different stakeholders.
3. **Disagree** – what evidence do you have that management at Ynyslas is simple? Are there any examples you have where a strategy they have used has been quick/easy to put in place and worked immediately?
4. **Conclusion** – do you agree or disagree with the statement? Summarise why and refer back to the original question.

Plan your exam answer here.

Introduction – short but clearly shows the intentions of your writing.
Agree – what evidence do you have from all your Ynyslas work that management is very complex here? Consider how challenging it is for different stakeholders.
Disagree – what evidence do you have that management at Ynyslas is simple? Are there any examples you have where a strategy they have used has been quick/easy to put in place and worked immediately?
Conclusion – do you agree or disagree with the statement? Summarise why and refer back to the original question.

Lesson 13 Date:

Do Now!



Title: AO3 8 mark exam question
LO: To understand how to put together an AO3 exam question and be able to successfully plan and write an 8 mark answer.

Annotate the exam question – what does the question mean?

'The complexity of managing a small-scale ecosystem such as Sherwood Forest in Nottinghamshire is the same for other small-scale ecosystems.' Do you agree or disagree with this statement? (8 marks +4 SPAG)

Write your exam answer here. Please copy this onto Teams for homework.

'The complexity of managing a small-scale ecosystem such as Sherwood Forest in Nottinghamshire is the same for other small-scale ecosystems.' Do you agree or disagree with this statement? (8 marks +4 SPAG)

Revisiting your answer following feedback

'The complexity of managing a small-scale ecosystem such as Sherwood Forest in Nottinghamshire is the same for other small-scale ecosystems.' Do you agree or disagree with this statement? (8 marks +4 SPAG)

Take 10

Amazon Rainforest

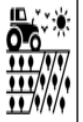
Case study knowledge is important. Learn these 10 facts and apply them to your 6 and 8 mark questions.

It covers around 40% of South America. 	It is home to around 20% of species on Earth. 
Mining and deforestation have dramatically changed the landscape. 	90% of tribes have been wiped out in last 100 years. 
Mining, Farming, Ranching, Industry, Logging and overpopulation cause deforestation. 	Deforestation reduces biodiversity, changes hydrology and leads to soil erosion. 
Sustainable management: Selective logging, ecotourism, protected areas, afforestation, monitoring. 	Example food chain: Banana Tree ->Grasshopper ->Frog ->Jaguar 
Soil type: Latosols – poor quality, shallow, acidic. Infertile but a lot of leaf litter on top. 	Climate: 25-30°C temperature and rain almost every day. 

Take 10

The Serengeti

Case study knowledge is important. Learn these 10 facts and apply them to your 6 and 8 mark questions.

It is located in Eastern Africa – in Tanzania and Kenya. 	The Maasai are a tribe that live on the Kenyan Serengeti. They are nomadic farmers. 
The Serengeti is a national park which means it is protected. 	Poaching is the illegal killing of animal e.g. around 150,000 wildebeest are killed a year. 
Tourism has both +/- impacts. E.g. it increases income, but has environmental impacts e.g. pollution. 	Commercial farming has led to mono-cropping and areas of infertile soil. 
Deforestation is a issue as it can lead to desertification as wind erosion occurs. 	Management: Education, mulching controlled burning, crop rotation, bunds, drip irrigation, intercropping, afforestation. 
Soil type: Laterite – not very fertile and red in colour due to iron content. 	Climate: Wet and dry season. Hot all year round. Little rain in dry season. 

Take 10

Ynyslas Dunes

Case study knowledge is important. Learn these 10 facts and apply them to your 6 and 8 mark questions.

10km North of Aberystwyth on the wet coast of Wales. 	Conservation begun in 1969. Wooden posts were sunk into the beach and a boardwalk was built. 
In the 1980s areas were fenced off. Marram Grass was planted. Signs were put up. 	In the 1990s the fences were removed. Bins were installed. 
In the 2000s the bins were removed, areas were re-fenced and a rabbit-proof fence was installed. 	In 2005 the visitor centre was enlarged and the boardwalk was improved. 
In 2016 the biggest problem is dog poo. Dogs are banned in the summer months. 	Stakeholders: Tourists, residents, RSPB, council, golf course owners. 
Difficulties: Popularity, litter, conservation, land demand, trampling. 	Benefits: Recreation, education, income, protection from flooding, increased biodiversity. 

Past Exam Example Questions

Explain why vegetation can survive in the climate of hot semi-arid grasslands (4)

For a named ecosystem you have studied, describe how the ecosystem has been managed (4)