

Name:

Geography H/W
Booklet –
Ecosystems,
Rainforests and Hot
Deserts



Section 1 - Ecosystems

Fill in these sentences:

An ecosystem is a unit that includes all of the living (_____) and non living (_____) parts.

A producer is an organism that uses sunlight and energy to produce food, an example of a producer would be _____, they are found at the _____ of a food web or food chain. A consumer is an organism that gets its energy from eating other organisms, it eats _____ or other consumers, depending on how many consumers there are, they are called _____, _____, _____. An example of a primary consumer would be _____, an example of a secondary consumer would be _____. A decomposer is an organism that gets its energy from _____ dead producers or consumers or _____, bacteria and fungi. Decomposers are important in _____ cycling within an ecosystem.

grass

rabbit

abiotic

Fallen leaves (leaf litter)

nutrient

primary

fox

biotic

breaking down

bottom

tertiary

secondary

Below are different ways the humans can impact on the ecosystem, categorize them into human or physical (natural).

Some species increase in population, while others decrease, or even disappear altogether. These shifts can be due to new species entering the ecosystem, current species impacting the ecosystem, or evolutionary changes within a certain species allowing them to better adapt to the ecosystem	
Pollution	
Over-hunting key predators such as lions, tigers and bears, they remove the very animals that keep plant consumers in balance and prevent overgrazing.	
Cutting down trees (deforestation)	
Droughts and wildfires	
Storms, including severe thunderstorms, floods, tropical storms, and tornadoes, can greatly impact ecosystems by their sheer destructive force.	
Building on the land and removing soil nutrients, surface vegetation and trees that filter the air and equalize the carbon cycle. Urbanization also displaces animals and increases environmental pollution from vehicles and factories.	

Look and Cover 1st attempt 2nd attempt 3rd attempt

Species _____ _____ _____

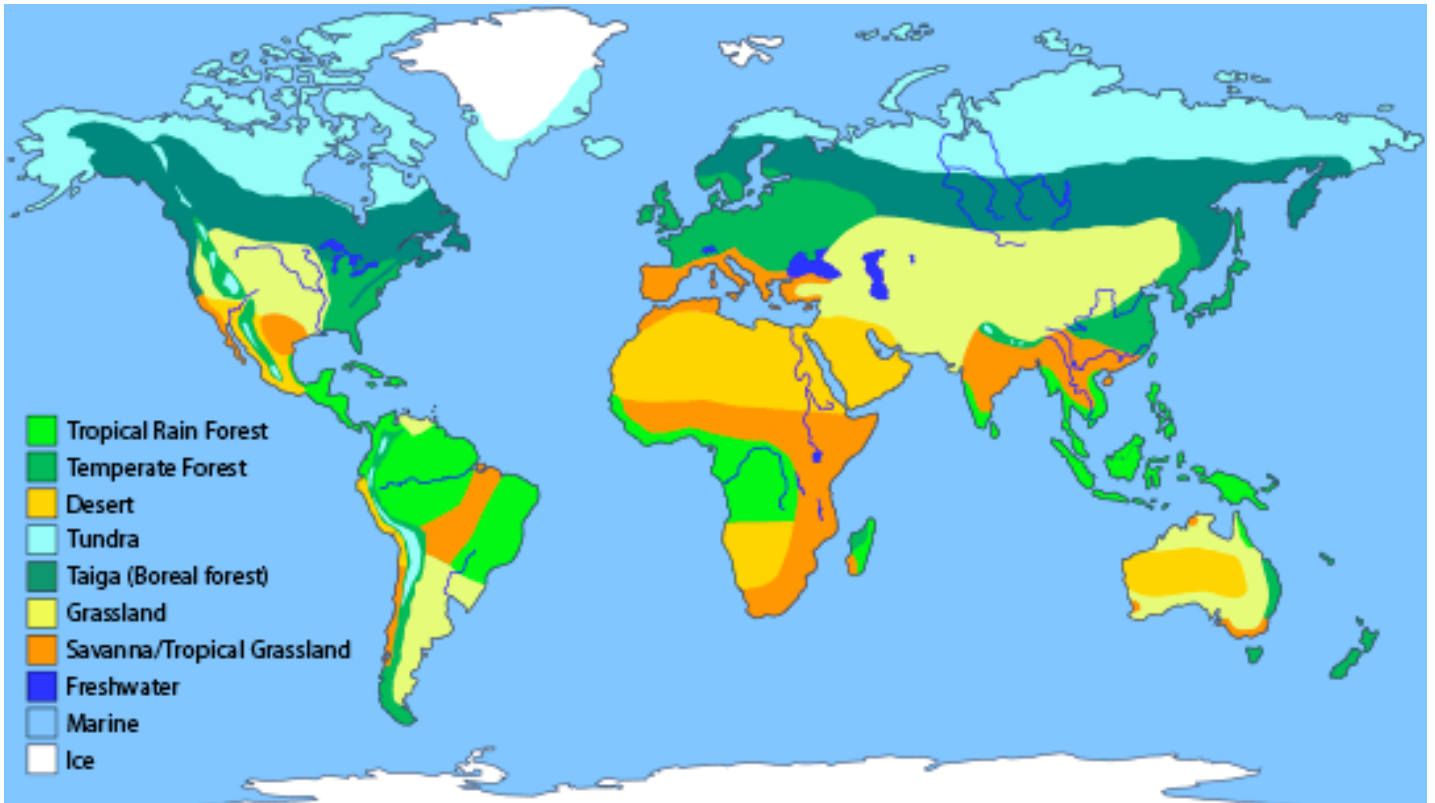
nutrients _____ _____ _____

consumer _____ _____ _____

decomposer _____ _____ _____

tertiary _____ _____ _____

Different parts of the world have different biomes. Below is a biome map of the world.



Using a world map or your knowledge of continents, and directions (N/E/S/W):

List 3 areas that have deserts:

-
-
-

List 3 areas that have temperate forest:

-
-
-

List 3 areas that have tropical rainforest:

-
-
-

Over the next 3 pages there will be information on the characteristics (soil, climate, vegetation structure). On the 4th page you will need to answer the multiple choice questions using that information.

What are deciduous forests like?

Mild, Wet Climates Have Temperate Deciduous Forests

AREAS

Most of Europe (including the UK), south east USA, China, Japan.

CLIMATE

This ecosystem has four distinct seasons — spring, summer, autumn and winter. The summers are warm and the winters are cool. There's rainfall all year round.



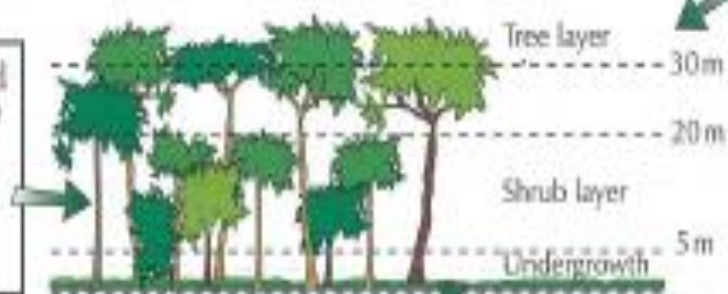
SOIL

The soil is deep and very fertile because there's a thick layer of leaf fall.

VEGETATION STRUCTURE

There are three plant layers:

At the middle level (shrub layer) there are smaller trees, e.g. hawthorn. They're about 5 to 20 m tall.



The top layer is made up of trees (e.g. oak) that grow to around 30 m tall.

At ground level there's a layer of undergrowth including brambles, mosses, lichens, ferns and flowering plants.

PLANT ADAPTATIONS

1) The trees are deciduous (they drop their leaves in autumn and re-grow new ones in spring). This reduces water loss from leaves in the months where it's harder to get water from the soil because it may be frozen and there's not much light for photosynthesis.



2) Wildflowers (e.g. bluebells) grow on the forest floor in spring before the trees grow leaves and block out the light.



What are tropical rainforests like?

Let's have an in-depth look at tropical rainforests...

Hot, Wet Climates have Tropical Rainforests

AREAS

Central America, north and east South America (the Amazon), central Africa and south east Asia.

CLIMATE

A tropical rainforest has a hot, wet climate with no definite seasons.

SOIL

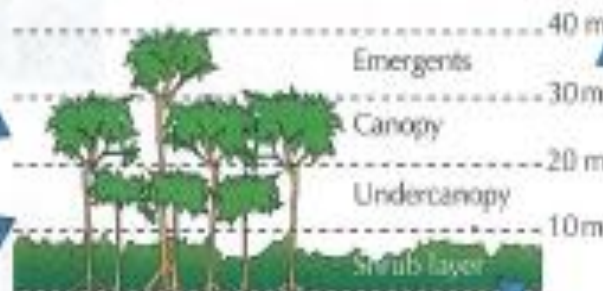
The soil isn't very fertile as heavy rain washes nutrients away. There are nutrients at the surface due to decayed leaf fall, but this layer is very thin as decay is fast in the warm, moist conditions.

VEGETATION STRUCTURE

There are three tree layers and a shrub layer:

The canopy layer is a continuous layer of trees around 30 m high.

The undercanopy layer trees are about half the height of the canopy layer.



The tallest trees (called emergents) reach around 40 m and poke out of the canopy layer. They only have branches at their crown where most light reaches them.

The shrub layer is nearest the ground at around 10 m high. Very little light reaches this level.

PLANT ADAPTATIONS

- 1) Plants are adapted to the heavy rainfall — they have thick, waxy leaves that have pointed tips. The pointed tips (called drip tips) channel the water to a point so it runs off — that way the weight of the water doesn't damage the plant.
- 2) Tall trees have big roots called buttress roots to support their trunks.
- 3) Climbing plants, such as lianas, use the tree trunks to climb up to the light.
- 4) Many trees are evergreen — they keep their leaves all year round to take advantage of the continual growing season.

Tree with buttress roots



What are hot deserts like?

Hot, Dry Climates Have Hot Deserts

AREAS

North Africa, the Middle East, south west USA, large parts of Australia.

CLIMATE

There's very little rainfall. When it rains also varies a lot — it might only rain once every two or three years. Temperatures are extreme — they range from very hot in the day (e.g. 45 °C) to very cold at night (e.g. 5 °C).

SOIL

It's usually shallow with a coarse, gravelly texture. There's hardly any leaf fall so the soil isn't very fertile.

VEGETATION STRUCTURE

Plant growth is pretty sparse due to a lack of rainfall. Plants that do grow include cacti and thornbushes.



PLANT ADAPTATIONS

1) Plant roots are either extremely long to reach very deep water supplies, or spread out very wide near the surface to catch as much water as possible when it rains.

2) Cacti have swollen stems to store water and a thick waxy skin to reduce water loss (water loss from plants is called transpiration).

3) Cacti and some bushes also have small, spiky leaves to reduce water loss.



4) The seeds of some plants only germinate when it rains — the plants grow, flower and release seeds in just a few weeks, which makes sure they only grow when there's enough water to survive.



Circle the correct answer from the options based on your reading of the previous 3 pages:

1. The soil in deciduous forests is fertile because of the thick layer of leaf fall/litter which adds nutrients to the soil TRUE/FALSE
2. There is a lot of plant growth in the desert as the soil is very fertile TRUE/FALSE
3. The rainforest has no defined seasons and is hot and wet all year round TRUE/FALSE
4. The tallest trees in the rainforest are called... SHRUB LAYER/TOP LAYER/EMERGENTS
5. The soil in deserts is usually FERTILE/UNFERTILE
6. An example of a place that has a deciduous forest biome is AUSTRALIA/UK/CENTRAL AMERICA
7. Deciduous forests have 4/3/NO distinct seasons
8. Temperatures in the desert are EXTREMELY HOT ALL THE TIME/ EXTREMELY COLD ALL THE TIME/ EXTREMELY VARIED.
9. Temperatures in the tropical rainforest are EXTREMELY HOT ALL THE TIME/ EXTREMELY COLD ALL THE TIME/ EXTREMELY VARIED.
10. Very little light reaches the CANOPY/EMERGENTS/SHRUB LAYER in the rainforest
11. In the rainforest the soil isn't very fertile because THERE ISNT MUCH LEAF LITTER/ THE NUTRIENTS ARE WASHED AWAY/ IT IS TOO COLD

Complete the table below: Tropical Rainforest Adaptations:

<u>Adaptation</u>	<u>Animal or Plant?</u>	<u>How does it help them survive?</u>
large, fan-shaped leaves		
Camouflage		
Rapid cycling of nutrients		
Brightly coloured		
	plant	the catch a lot so they can photosynthesise
Attaching themselves to another plant		
poisonous		
		Using another tall plant to climb up and reach the sunlight
Strong beaks		

Hot Desert t Adaptations:

<u>Adaptation</u>	<u>Animal or Plant?</u>	<u>How does it help them survive?</u>
Drought tolerance/fire tolerance	plant	
Getting water from food		
	animal	Staying out of the midday sun means they do not overheat or dehydrate
		Not sweating as much means that they conserve water
Storing water in their tissues		
Pioneer species		

Section 2 – Tropical Rainforests:

Match up the causes of deforestation to the pictures below:

Farming – forest is cleared to set up small subsistence farms for locals or for big commercial farms or cattle ranches.

Commercial logging – trees are felled to make money

Population pressure – as the population increases, land is cleared to make way for new houses

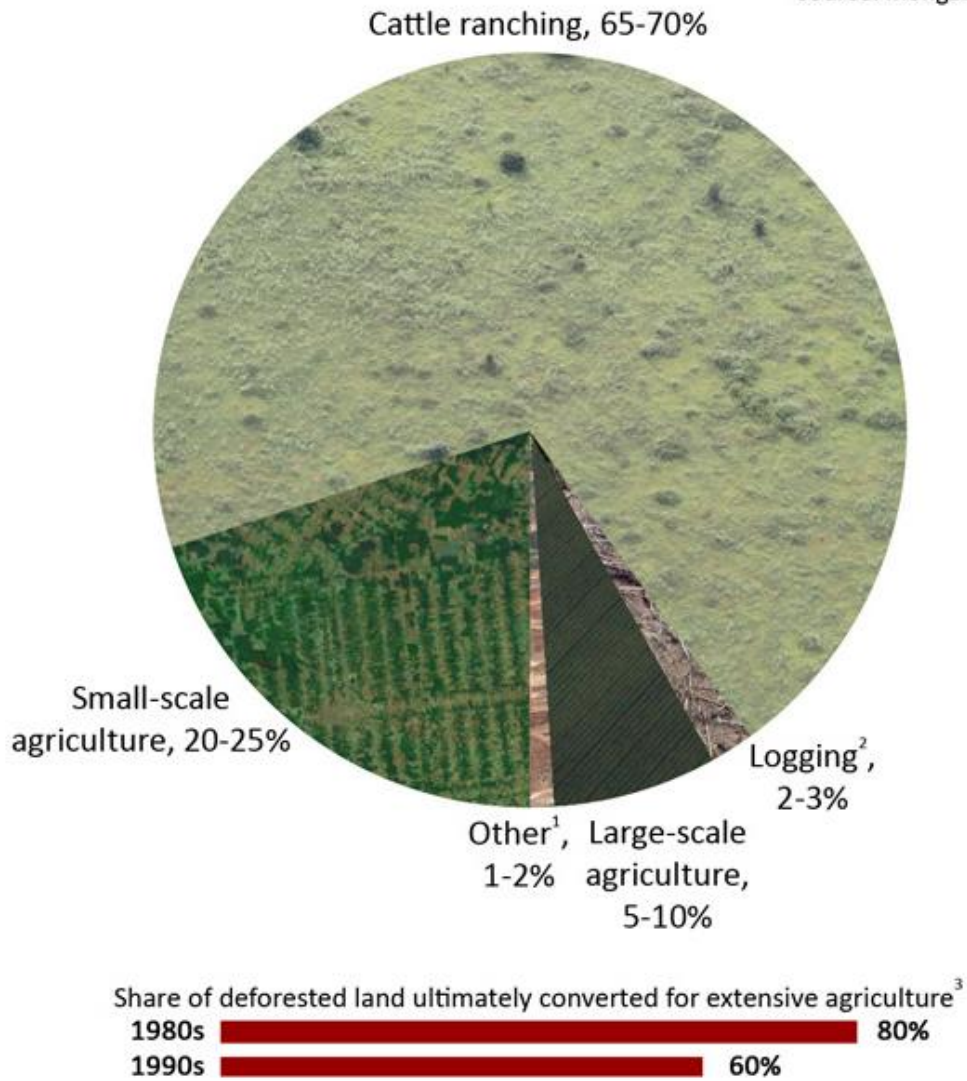
Road building – new settlements and industry in the rainforest needs roads to be built.

Mineral extraction – mining and sold to make money



Causes of Deforestation in the Brazilian Amazon, 2000-2005

source: mongabay.com



What is the biggest cause of deforestation in the Brazilian Amazon?

What is the smallest cause of deforestation other than 'other'?

Describe and Explain one cause of deforestation in the Amazon (3)

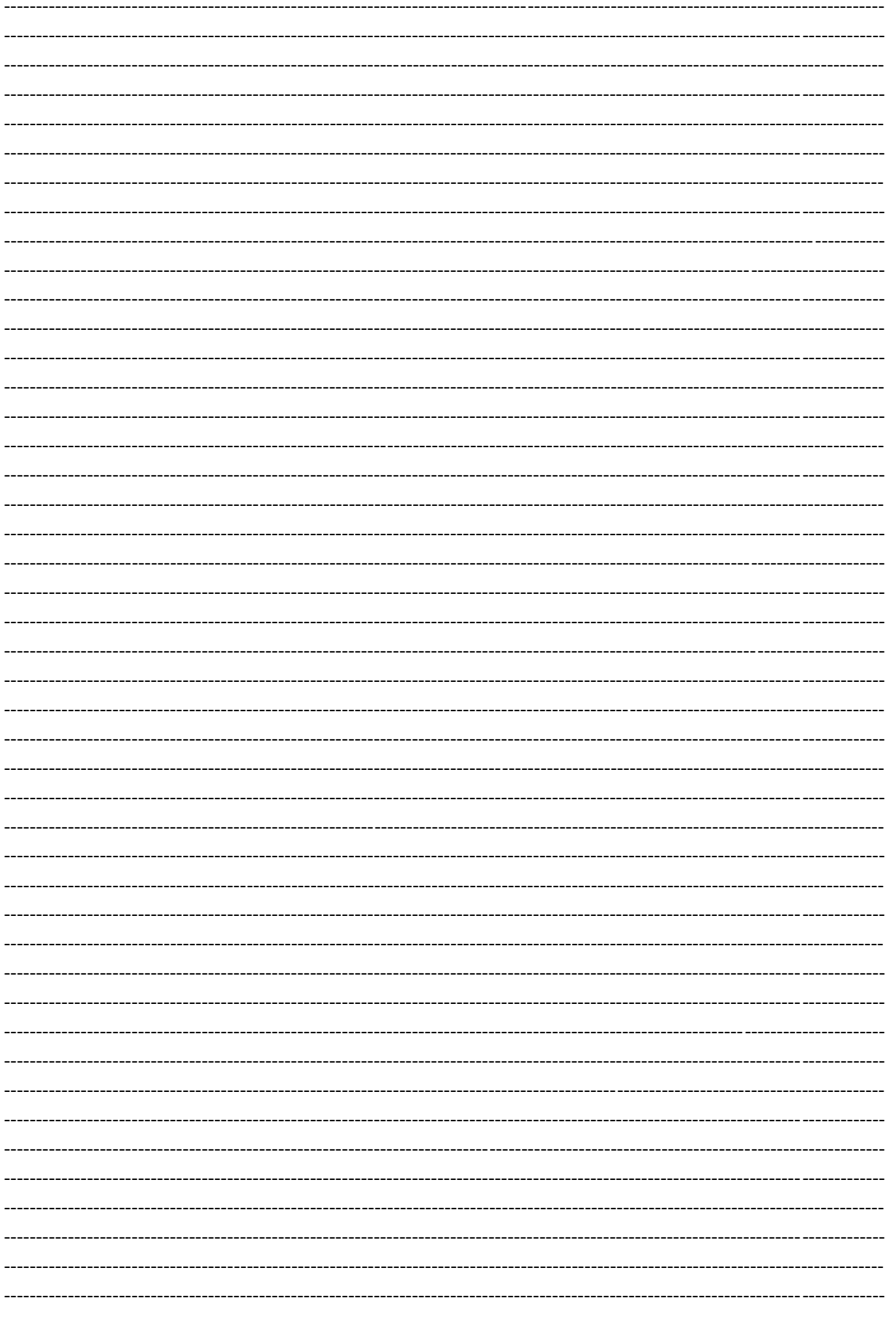
Deforestation has positive and negative social, economic, environmental and political impacts. For the table below state if it is positive or negative, social/economic/environmental or political.

Impact	Positive / Negative	social/economic/environmental or political
Logging, farming and mining create jobs		
Fewer habitats or food for animals, this reduces biodiversity		
The livelihoods of some local people are destroyed because of the loss of animals and plants they make a living from		
Soil erosion because the rain washes away the soil because the trees are there anymore to protect it		
Soil is washed into rivers and can kill fish		
Some native tribes have been forced to move and this can lead to homelessness, drug and mental health issues		
A lot of money is made from selling timber, mining and commercial farming		
There can be conflict between native people, landowners, mining companies and logging companies over the land		
There is pressure from governments to stop deforestation		

Without trees to have leaf litter from, the soil becomes less fertile because it has less nutrients		
No trees means more Co2 not absorbed which means more global warming		
Local people get more jobs and their quality of life is better		
Less interception from the tree canopy means more flooding risk		

Which are their more of, social, economic, environmental or political impacts?

What do you think is the worst impact? Why?



Rainforests are very valuable to people: label the pictures with the reasons as to why rainforests are valuable:



How can we sustainably manage the rainforest? Match the terminology to the definition

Sustainability = Doing something in a way that minimises damage to the environment

Agro-forestry

Selective logging

Forest reserves

Afforestation

Education

Monitoring

trees are only felled when they reach a particular height. This allows young trees a guaranteed life span and the forest will regain full maturity after around 30-50 years.

Ensuring those involved in exploitation and management of the forest understand the consequences behind their actions.

growing trees and crops at the same time. This lets farmers take advantage of shelter from the canopy of trees. It prevents soil erosion and the crops benefit from the nutrients from the dead organic matter.

Areas protected from exploitation – national forests

the opposite of deforestation. If trees are cut down, they are replaced to maintain the canopy.

use of satellite technology and drone photography to check that any activities taking place are legal and follow guidelines for sustainability.

For each definition of the ways you can manage the rainforest sustainably highlight in one colour how it is done, and another colour how it doesn't damage the environment (the sustainable part)

Which do you think is going to be the most successful method of management? Rank them 1-6 with 1 being the best, and 6 being the least.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Debt reduction is also a way to manage the rainforest sustainably. What is debt reduction and is it successful? (3)

In the Amazon rainforest – your case study for tropical rainforest, the main management strategies for sustainable management include:

- Replanting (afforestation) – Peru wants to plan 100,000 km² of new forest by 2018
- Banning a certain type of tree being cut down
- Ecotourism is very popular in Peru
- Increase in environmental laws
- Reducing debt – the USA and Peru have an agreement
- Increasing protected areas – Brazil has lots of National Parks

Opportunities in the Western Desert

v n c n b p t r s e s g d x s v a w y h
k c s c e o k x r v i v n b f u n g y e
d k x o u o c k o r v i r i z g r f o r
u n o r l l x h e f u g r w m e x d s i
t h i r z a m s y d r m w a n r i a e t
g s b n n z r d u n v d i e r h a g v a
m i n e r a l e x t r a c t i o n f z g
c t u d c s h s n f x i i y t b b j u e
g o y f r n n k o e r p f t k r k b i q
q i x b d t b n g t r b g x k x z c b u
k v z x l u c o c t f g a p l e i e n v
u t c i z m j e h a q f y l x g u n n k
q h k g s e l o t z r k d z k j g x b f
p u b w y e u x t c e j v x b i i j r k
p n w l o a t r n o g l z c w x x o y r
t r x r a e n k q e a l b q v y z s i p
z y d y u o j w v d s u p t h w e r s h
a y g e r z g q y c g u l f j n f y d m
h q b w e e z y t l e r u t l u c l p t
t r v n j n r g n z p y o b e a b r e q

culture
farming
heritage
hydroelectricenergy
mineralextraction
solarenergy
tourism

Have a go at the word searches to find the opportunities and challenges of living in the western desert. **Define the words after you have found them.**

Challenges in the Western Desert

g h s o p w g t f b o f j k a
k i g q n n h n n x h n y t v
y z t d j g k k r s w n v f v
s t z w u v w e j g d o d l j
v y i o r c s j l t c i o h i
g r r l j z b f e s w t c q g
t d k j i j q d d h g a i s j
u i t c g b m f f o u r u g m
e q f i p m i m g w w d c m h
r o a d s p e s a w n y n p n
s t s t l l d k s a l h k v e
v w c n n t s l x e l e h v x
l s r x v o i q t m c d n k s
e a m d k i w g i t g c l c q
d j s w k t a s z h d r a q s

accessibility
dehydration
drought
roads

How have people adapted to the climate and accessibility? For each strategy below, say if it is an adaptation to accessibility, heat/extreme sun or dry conditions.

Method	Accessibility, heat/extreme sun or dry conditions?
increased railways	
Flat roofs to collect rainwater	
White walls to reflect sunlight	
Better roads built	
Major cities can now be reached by plane	
Wearing cowboy hats	
Replacing real grass with fake grass	
Drought resistant crops for gardens	

For a hot desert environment you have studied, to what extent do the challenges limit the amount of development in that environment? [9 + 3SPaG]

What's your conclusion going to say? – are the challenges or opportunities greater?

Point -Challenge	How is it a challenge to people?	How important/significant is this? How have they adapted to this?

Desertification is the process by which land becomes drier and degraded, there are many causes of desertification. - Colour code the causes below into 'climate change factors' 'population factors' and 'pressure on resources'

Repeated drought bringing less and less reliable rainfall

Overgrazing by cattle

Soil erosion

Over cultivation

Increasing population

More wood used for fuel and shelter

Global warming and rising temperatures

Refugees arriving from conflict zones

Extreme poverty

Overuse of aquifers

Now that you have sorted them into different categories, we need to know more detail as to how humans cause the process of desertification. Fill in the gaps below:

Over cultivation of the land can _____ soils fertility, both _____ and commercial farming are the problem, more people means more food is needed and more crops are planted, draining the _____ and drying the land. Over grazing is when too many farm animals _____ all the _____ until it is unable to regrow. When there is no vegetation, the _____ cannot hold the soil together anymore.

Both of these result in _____ the exposed _____ becomes hard by the sun, when the _____ finally arrives, it washes away the soil and wears down the land. Vegetation cannot grow here again.

soil erosion

exhaust/decrease

vegetation

roots

Top soil

subsistence

eat

Rain

aquifers

Talking Desertification:

Draw a picture for each of these strategies:

Gaps (small rock dams)

Roof rainwater collection

Bunds (low stone walls)

Planting grass

Planting trees

Efficient stoves

Increasing solar power

crop rotation by farmers to allow soil to recover

What strategies help with water management?

What strategies help with soil management?

What strategies are Appropriate Technology?

What strategies help with vegetation management?

Colour code each strategy – is it Local, National or International?

