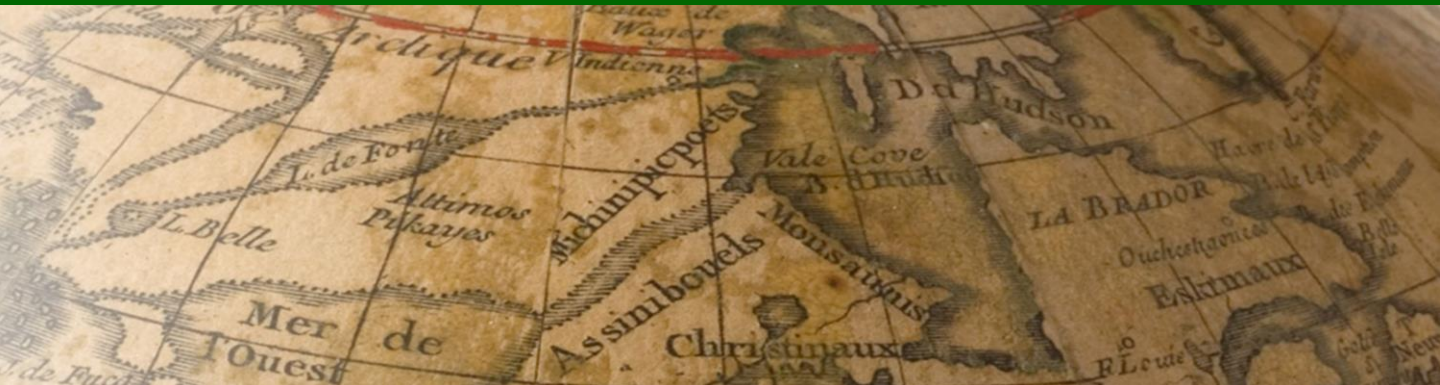# The Duston School TDS 4-19

Knowledge Organiser World Studies

KS4 Geography
Topic 3 – Ecosystems
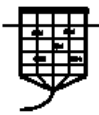
Name:

Class Teacher:

Big Questions:

1. What are the key characteristics of the world's ecosystems and how are they distributed?

2. What role does climate and local factors play in the distribution of ecosystems?

3. What resources are provided by the biosphere?

4. What ecosystems does the UK have and where are they found?

5. How do the biotic and abiotic components of the tropical rainforest interact?

6. Why do rainforests high biodiversity and how are species adapted to it?

7. Why are tropical rainforests important and why are they under threat?

8. What political and economic factors have contributed to the sustainable management of the Costa Rican rainforest?

9. How do the biotic and abiotic components of the deciduous forest interact?

10. Why do deciduous forests have moderate biodiversity and how are species adapted to it?

11. Why are deciduous forests important and why are they under threat?

12. What different approaches have been used to ensure the sustainable management of The New Forest?

HOMEWORK
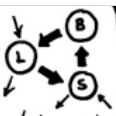
Big Question	Task	Due Date
3	Revise pages 6-8	
6	Revise page 11-13	
9	Revise pages 16-18	
12	Revise pages 21-23	
15	Revise pages 26-27	

Key terms found in the glossary on pages 4 – 5 will be tested throughout the unit

Glossary

Key term	Icon	Definition
Abiotic		The physical, non-living environment e.g. water, wind and oxygen.
Altitude		Height above sea level
Aquaculture		Breeding of fish in pens under controlled conditions.
Biodiversity		The amount and variety of species present in an area.
Biomass		The amount of weight of living or recently living organisms in an area
Biome		An ecosystem on a global scale
Biosphere		The part of the Earth and its atmosphere in which living organisms exist or that is capable of supporting life.
Biotic		The living organisms found in an area
Carbon Sink		An environmental reservoir that absorbs and stores more carbon than it releases.
Climate		The average weather conditions in a particular location based on the average weather experienced there over 30 years or more.
Coniferous		Trees which stay in leaf all year round (evergreen)

Glossary

Key term	Icon	Definition
Deciduous		Broad-leaved trees e.g. oak, which lose their leaves in autumn
Ecosystem		A community of plants and animals and their non—living environment
Ecotourism		Travel to natural areas that does no damage, conserving the environment and improving the wellbeing of local people
Epiphytes		An epiphyte is an organism that grows on the surface of a plant and derives its moisture and nutrients from the air, rain, water or from debris accumulating around it.
Food web		A network of food chains by which energy and nutrients are passed from one species to another.
Leaching		Created by heavy rains that remove nutrients from the soil
Litter		Leaves, twigs and other dead organic material that falls on the surface of the soil
Nutrient cycle		The movement and exchange of organic and inorganic material into living matter.
Shifting cultivation		Shifting cultivation, also known as slash and burn agriculture, is an agricultural system that involves clearing a section of land and using it for farming activities for a relatively short time before abandoning it.
Sustainable management		Using energy resources in a way which ensures that they are not exploited and will hopefully be able to meet the needs of future generations.

BQ1. What are large scale ecosystems and where are they found?

A biome is a large geographical area of distinctive plant and animal groups, which are adapted to that particular environment. The climate and geography of a region determines what type of biome can exist in that region.

An ecosystem is a system in which organisms interact with each other and with their environment.

	Temperature	Rainfall	Plants	Animals
Tundra (Canada)	-34°c and 12°c	200mm	60 day short growing season Shallow roots Mosses, lichens	Brown bears
Temperate forests (UK)	4°c and 17°c	1,000mm	Trees loose their leaves 4 layers i.e. canopy etc.	Rabbits and deer
Tropical forests (Brazil)	27°c and 30°c	2,200mm	Poor quality soil 4 layers Evergreen	Sloth Howler monkeys
Deserts (Australia)	30°c and 35°c	Unpredictable and low	Prickly pear cactus	Camels
Boreal forests (Russia)	-10°c and 15°c	500mm	Trees have thick bark Needle leaves Evergreen	Red foxes Black bears
Tropical grasslands (Kenya)	25°c and 30°c	1,000mm	Grasses grow during wet season Few trees e.g. acacia	Giraffes
Temperate grasslands (Argentina)	10°c and 18°c	500mm	No trees just grasses Converted to farmland e.g. Prairies	

BQ2. What role does climate and local factors play in the distribution of biomes?

Climate

Temperature decreases with **latitude**. The equator receives the most heat from the sun as it is directly overhead.

High surface temperatures at the equator drive the Hadley cell i.e. hot air rises, condenses to clouds, creating high amounts of rainfall.

Tilt of the earth on its axis creates seasons. The equator is least effected by the tilt, so precipitation is similar all year round

Inter-Tropical Convergence Zone (ITCZ) shifts northwards in June, bringing a wet season to the tropical grasslands in the Northern Hemisphere.

Altitude: For every 100m in height the temperature decreased by roughly 1°c

Soils: Thinner soils such as in the Boreal forests contain less organic matter and may be acidic.

Distance from the sea: Land heats and cools faster than the sea. On the coast, winters are relatively mild and summers are cool. Inland, temperatures are higher in the summer and cooler in the winter. . (Remember Tea and Toast!) Temperate grassland and deserts are affected by this.
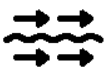
Ocean currents: Warm ocean currents moderate the land temperature of cold areas

Relief/topography: High mountains force air to rise and cool , meaning precipitation is high in the mountains. Creates the **rain shadow effect** as once the air has passed over it, it has lost its moisture.

BQ3. What is the distribution and characteristics of the UK's main ecosystems?

Moorland
❑ Found in highland areas with heavy rainfall. Examples: Dartmoor and mid Wales
❑ Moorlands have been created by people. The hills used to be covered in trees but developed through grazing sheep and grouse shooting.
❑ Plants: acidic soils = bell heather and bracken.
❑ Animals: red deer and foxes

Heathland
❑ Lowland areas in the UK. E.g. Cornwall, Devon, Dorset
❑ Heathlands have dry sandy soils which is free draining, acidic and has few plant nutrients.
❑ Plants: small shrubs like heather and gorse, silver birch trees colonise the area if not controlled.
❑ Animals: rabbits and hares, reptiles

Woodland
❑ England, Wales and Ireland the native trees are broad leaved deciduous trees such as Oak and Ash.
❑ Broad leaved trees tend to be deciduous, which means they lose their leaves in the autumn and regrow them each spring.
❑ Coniferous woods are made up of conifers which have needle-like leaves. They shed and replace their leaves throughout the year.

❑ Plants: apart from trees, mosses and lichens grow under the canopy, bluebells and ferns.

❑ Animals: roe deer and badger.

Wetlands
❑ Wetlands in areas such, the East Anglian Fens and the Norfolk Broads.

❑ Lowland fens have peaty, fertile soils that are periodically waterlogged. Much of the land has been drained to use as farmland.

❑ Plants: reeds and bulrush grow along the sides of the streams.
❑ Animals: otters

Ecosystems Homework 1: Answer the following

Why did Cadbury move from Bristol in 2011?	
Outline two causes of population change in Bristol (2)	
Define the term mass movement	
As the river enters the middle course why does the channel become wider?	
Name the period of time between peak rainfall and peak discharge	
State the three indicators used in the Human Development Index (3)	
What process results in the formation of large clouds?	
Name two economic impacts of Hurricane Sandy on Cuba (2)	
Explain one way the USA government responded to Hurricane Sandy	
Define the term 'biome'	
State two features of a the climate of a tropical rainforest(2)	
Where are tropical rainforests commonly found?	
Where are deserts commonly found?	
How does latitude impact ecosystem distribution? (2)	
	Total out of 22:

Ecosystems Homework 1: Check your answers

Why did Cadbury move from Bristol in 2011?	Cadbury closed its manufacturing plant in Keynsham because Kraft brought the company.
Outline two causes of population change in Bristol (2)	Migrants arriving from Eastern Europe Loss of working class due to deindustrialisation
Define the term mass movement	Movement of soil and rock debris down slopes in response to the pull of gravity
As the river enters the middle course why does the channel become wider?	Due to the lack of gradient the river starts to erode laterally (sideways)
Name the period of time between peak rainfall and peak discharge	Lag time
State the three indicators used in the Human Development Index (3)	Life expectancy/ number of schooling years/ Gross National Income
What process results in the formation of large clouds?	Condensation
Name two economic impacts of Hurricane Sandy on Cuba (2)	Total damage to Santiago de Cuba was £50m Total losses were US$2 billion 5% drop in Cuba's GDP
Explain one way the USA government responded to Hurricane Sandy	Provided US$60 billion in aid to victims FEMA put resources in place before the hurricane hit. Promised improved weather forecasting
Define the term 'biome'	An ecosystem on a global scale
State two features of a the climate of a tropical rainforest(2)	Temperature range between 27c and 30c Annual rainfall 2200mm
Where are tropical rainforests commonly found?	5°N and S of the Equator
Where are deserts commonly found?	Along the tropics of Capricorn and Cancer
How does latitude impact ecosystem distribution? (2)	Temperature decreases with latitude. The equator receives the most heat resulting in tropical rainforests. Due to the curved earth the poles receive the least = polar biome
	Total out of 22:

BQ4. What are the key resources provided by biomes?

Food	Medicine	Building material	Fuel
• Fish, nuts, fruits, replacing natural vegetation with crops	• Periwinkle, aloe plants and poppies for morphine.	• Timber, clay bricks, cereal plants used for roofing.	• Animal dung, timber, biofuels.

Commercial exploitation

1. **Energy:**

Oil is extracted from the ground and used to power engines in forms of transportation.

Coal is mined and used in developing countries for industry and some parts for heating homes.

Wind turbines built on land and sea to provide energy using the wind.

Solar panels put into fields to provide electricity using solar radiation.

2. **Water**

Domestically used for drinking, washing, toilets and cleaning.

Used in production of electricity in HEP

Farmers use it for irrigation of their crops e.g. In USA, 37% of all water use is for irrigation

3. **Mineral resources**

Gold and silver used in jewellery

Concrete is made from limestone, sand and gravel

BQ5. How important are marine ecosystems as a resource?

Marine ecosystems are divided up by:

Inshore habitats – close to the shore and are important for tourism and recreation

Offshore ecosystems – found away from the shoreline and are important for commercial fishing and energy production.

Importance:

Provide goods and services e.g. 90% of our imports travel through Ports

Absorb greenhouse gases whiles releasing oxygen

Moderate our climate, making it warmer in the winter than it should be given our latitude and cooler and in the summer

Opportunity for leisure and recreation, employing 114,670 people and bringing £1.29 billion into the economy.

Role of human activities

Over-fishing – laws have been introduced at a national and EU level to address this e.g. Creation of Marine Protected Areas (MPA) where no fishing is allowed.

Extraction of oil and natural gas – can lead to pollution of the seas

Eutrophication – fertilisers used on farmland are washed into the sea
Construction of **deep water ports** needed for global trade – disturb the sea bed
Construction of large **offshore wind farms** – interfere with bird migration routes and disturb animals that rely on sound to navigate.

BQ6 &7. What are the characteristics of a rainforest ecosystems?

Abiotic characteristics

Climate

Temperature range between 27c and 30c

Very little light variation throughout the year – 12 hours daylight, 12 hours night

Soils

Poor quality

Nutrients are washed through the soil in heavy rain

Forms a hard pan – layer of solid nutrients lower down in the soil that cannot be accessed by plants.

Water

Rains every day – total annual rainfall of 2,200 mm

Biotic characteristics

Plants

Are deciduous but different species lose their leaves at different times and only for a few weeks.

Grow up to 30-40m

Animals

Sloth live in the canopy. Use camouflage via the green algae on their fur to escape predators.

Toucans live in the canopy. They have long bills to reach fruit on branches that are too small to support their weight.

Humans

People hunt animals for food, spread the seeds of the rainforest plants through fruit, seeds they eat.

Ecosystems Homework 2: Answer the following

°Geography

Outline one feature of Sao Paulo's' situation	
Outline two ways that quality of life has been improved in Sao Paulo (2)	
Name two types of erosion that would be involved in the formation of a wave-cut platform (1)	
As the river enters the middle course why does the channel become wider?	
Name two of India's main exports (2)	
Oceans transfer what percentage of the total heat from the tropics to poles?	
Give on example of a service provided by a biome	
State three goods provided by the biosphere (3)	
How does latitude impact ecosystem distribution? (2)	
Why is the ITCZ important?(2)	
Name three ecosystems found in the UK (3)	
Describe the characteristics of heathlands	
Name two areas of the UK which have wetlands (2)	
How much is the UK's marine resources estimated to be worth?	
Name one way humans have tried to protect marine ecosystems	
	Total out of 24:

Geography

Outline one feature of Sao Paulo's' situation	❑ Hilly Plateau ❑ City divided into two by the Anghangabau River ❑ 520m above sea level
Outline two ways that quality of life has been improved in Sao Paulo (2)	❑ Site and service schemes i.e. The migrant is given rights of ownership ❑ Rehabilitation (Multiroes self-help scheme) i.e Residents of the shanty towns are provided with the materials to improve their existing shelters.
Name two types of erosion that would be involved in the formation of a wave-cut platform (1)	Hydraulic action and abrasion
As the river enters the middle course why does the channel become wider?	Due to the lack of gradient the river starts to erode laterally (sideways)
Name two of India's main exports (2)	petroleum products, gems and jewellery, pharmaceutical products and transport equipment.
Oceans transfer what percentage of the total heat from the tropics to poles?	25%
Give on example of a service provided by a biome	Forests remove carbon dioxide from the atmosphere (carbon sinks/ Forests give out oxygen, purifying the atmosphere./ Forests protect watersheds from soil erosion and intercept precipitation – preventing flash flooding./ Forests provide leaf litter which forms humus – this makes the soil more fertile for growing crops
State three goods provided by the biosphere (3)	Food/ medicine/ fuels/ building materials
How does latitude impact ecosystem distribution? (2)	Temperature decreases with latitude. The equator receives the most heat resulting in tropical rainforests. Due to the curved earth the poles receive the least = polar biome
Why is the ITCZ important?(2)	The ITCZ shifts northwards in June, following the overhead Sun, to bring a wet seasons to the tropical grasslands of the Northern Hemisphere
Name three ecosystems found in the UK (3)	Moorland/Heathland/Woodland/Wetland
Describe the characteristics of heathlands	Heathlands have dry sandy soils which can have depressions that are peaty and boggy. The sandy soil is free draining, acidic and has few plant nutrients. In the past heathlands were used for sheep grazing and for building materials.
Name two areas of the UK which have wetlands (2)	Somerset Levels, the East Anglian Fens and the Norfolk Broads
How much is the UK's marine resources estimated to be worth?	£46 billion
	Total out of 24:

BQ6 &7. What are the characteristics of a rainforest ecosystems?

The hot, damp conditions on the forest floor allow for the rapid decomposition of dead plant material.

This provides plentiful nutrients that are easily absorbed by plant roots.

If vegetation is removed, the soils become infertile
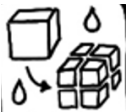
Chemical weathering is the most common due to the warm and wet conditions.

Nutrient Cycle (Gersmehl model)

Majority of nutrients are stored in the biomass, small amounts stored in the litter and soil.

Caused by heavy rainfall, leaching nutrients down through the soil to areas that the plants can not reach.

Very high biodiversity due to hot and wet conditions and consistent hours of sunlight = few limiting factors.

Input dissolved in rain (from the atmosphere)

Fallout as tissues die

Biomass

Litter

Loss in runoff (water running over the surface taking away nutrients)

Release as litter decomposes

Uptake by plants

Soil

Loss by leaching (washed away by water)

Input from weathered rock

Nutrient stores

Nutrient transfers
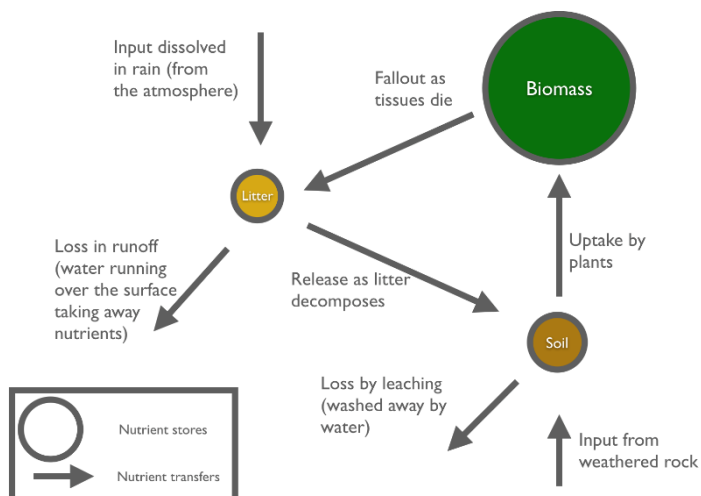
BQ8. How biodiverse is the rainforest and how are species adapted to the environment?

High biodiversity

1 Optimum conditions for plant growth

2 Rainforests are very old = evolutionary variation in species

3 Complex layered structure, creating a range of wildlife habitats i.e.

4 Stratification: Emergent, canopy, understorey, shrub layer, forest floor.

5 Long hours of sunlight and warm temperatures are excellent for

photosynthesis

Vegetation	Animals
Plants adapt to high levels of rainfall – thick waxy leaves with pointed drip tips.	Many animals have adapted to living in the canopy where there is plenty of food.
Trees have large crowns (where they absorb sunlight) with very few branches.	Animals hunt at night when they have more energy and it is cooler.
Large trees have buttress roots to support them.	Many animals are camouflaged to avoid predators.
Epiphytes grow on the trees.	Some animals have a good sense of smell or hearing because of low light levels on the forest floor.
Fungi have adapted to take nutrients from dead organic matter in the litter layer.	Animals learn to swim or have webbed feet because of the many rivers in TRF.
Evergreen appearance due to constant growing season, even though many trees are deciduous.	
Trees' roots spread far horizontally due to thin soils.	

BQ9 & 10. WHY ARE RAINFORESTS UNDER THREAT?

Mining

For resources such as iron ore, copper and gold

Pollution: A pollutant used in gold extraction is mercury. For example, 90% of fish caught in the gold mining areas of the Tapajós River in Brazil were contaminated with mercury.

Energy

More than 125 new HEP dams are to be built in the Amazon in the next 15 years.

Destroy aquatic habitats and affecting fish populations.

The reduced water flow downstream disturbs riverbeds and affects floodplain farmers

Spread of disease-carrying organisms including snails and mosquitoes

Logging

Loss of **bio-diversity** *and* **extinction**. Many species live in, on, or near primary trees.

Erosion. Trees and leaves (**leaf litter**) provide nutrients for the soil in rainforests. Trees also prevent erosion by absorbing water, thus preventing the washing away of nutrients in the top-soil.

Flooding. Trees keep the soil stable by absorbing rain water.

Forest fragmentation affects the living space of species. It cuts their habitat into *fragments* or *pieces*.

Population growth

Brazil's population has doubled in the last 40 years. Amazonian Region population has increased 23% to 25 million.

Ecosystems Homework 3: Answer the following

Name two physical factors influencing the global pattern of development (2)	
Outline two pieces of evidence about the 3 gorges dam (top-down) development project (2)	
Outline two pieces of evidence about the micro-hydro dams (bottom-up) development project (2)	
Why are Indian and Pakistan in dispute? (2)	
Name three ecosystems found in the UK (3)	
Describe two characteristics of moorland areas (2)	
Name two regions in the world where hot deserts are found (2)	
Define the term biomass	
What is the name of the model demonstrating nutrient cycling?	
Name the three parts of the Gersmehl nutrient model	
Why are soils poor in the tropical rainforest? (2)	
How have lianas adapted to the TRF?	
State two other adaptations of plants in the TRF (2)	
How have flat-tailed geckos adapted to the TRF?	
Name two physical factors influencing the global pattern of development (2)	
	Total out of 24:

Ecosystems Homework 3: Check your answers

°Geography

Name two physical factors influencing the global pattern of development (2)	Climate / presence of natural resources/ geographical position/ natural hazards
Outline two pieces of evidence about the 3 gorges dam (top-down) development project (2)	❑ Supplies 22,500 mw to large cities ❑ Improved trade –allows container ships access ❑ Controls flooding = improved agricultural ❑ 1.4 mill people moved from their homes ❑ Costs $22 billion ❑ Led to extinction of the Yangtze river dolphin
Outline two pieces of evidence about the micro-hydro dams (bottom-up) development project (2)	❑ Generate 500kw of energy ❑ Provides energy and jobs ❑ Cuts down the need for fuelwood
Why are Indian and Pakistan in dispute? (2)	❑ India and Pakistan have fought **3 wars (1947, 1965 and 1999)** over the disputed territory of Kashmir ❑ India controls the Northern part of Kashmir and Pakistan the Southern. ❑ Both India and Pakistan are nuclear powers.
Name three ecosystems found in the UK (3)	Moorland/Heathland/Woodland/Wetland
Describe two characteristics of moorland areas (2)	Have been created by people. The hills used to be covered in trees and shrubs but the moorland ecosystem has developed through grazing the land with sheep and managing it for grouse shooting.
Name two regions in the world where hot deserts are found (2)	Australia and Sahel
Define the term biomass	The amount of weight of living or recently living organisms in an area
What is the name of the model demonstrating nutrient cycling?	Gersmehl model
Name the three parts of the Gersmehl nutrient model	Biomass/ Soil/ Litter
Why are soils poor in the tropical rainforest? (2)	❑ Tropical rainforest soils are shallow and acidic - iron oxides stain the top layers red. ❑ The soil is infertile and one of the poorest in the world ❑ Heavy rainfall quickly washes away any nutrients that are not taken up by the trees
How have lianas adapted to the TRF?	Have their roots in the ground but use other trees to climb up to the rainforest canopy to maximise sunlight.
State two other adaptations of plants in the TRF (2)	Drip tips/ thin bark/ leaf angling/ red leaves/ buttress roots
How have flat-tailed geckos adapted to the TRF?	Are the same colour as their surroundings. These lizards make themselves almost **invisible by day**
	Total out of 24:

BQ9 & 10. Why are rainforests under threat?

How will climate change impact the tropical rainforests?

TRF Structure

Likely to change to seasonal tropical rainforest = dry season

Most trees drop leaves in dry season to avoid water loss

No canopy in dry season = thick underbrush can grow

Falling leaves creating thick litter but slow decomposition in the dry season = soil bigger nutrient store and biomass store is smaller.

Functioning

Less vegetation cover, so when it rains = increased surface runoff = more sediment washed into drainage systems = polluting water quality

Less dense vegetation = lower rainfall

Drier forest = more CO_2 emitted than it soaks up and increased chance of forest fires.

Biodiversity

Species cannot cope with fluctuations in climate e.g. Flying fox bats will die due to heat levels

Other alien species will spread out and out-complete TRF species

TRF on mountains will not heat up as much so biodiversity will be higher here.

BQ11. How can rainforests be managed sustainably? Costa Rica

Sustainable Rainforest Management in Costa Rica

Factors leading to decline of the Costa Rican rainforest

Cattle Ranching and agricultural development by clearing land through slash & burn methods.

Gold and other metal mining meant large scale soil and rock removing. This meant areas were deforested and chemicals entered water systems.

By 1990, 32,000 hectors of forest were cut down each year – devastating the fragile ecosystem.

Governance	Commodity Value	Ecotourism
• 1979 the government passed a law giving tax deductions and grants to owners of rainforest if they conserved the forest 1995 Government created 28 National Parks with 24% of the country's land protected • Forest protection certificates issued, with $50 per hectare of land/year for land they protect • 1997- **Certificate for Sustainable Tourism (CST)** for businesses that prove their commitment to sustainable tourism.	• Agroforestry encourages growing trees and crops together • Afforestation has led to the replanting of trees to replace original forest • Selective logging of trees to ensure max sustainable yield • Forest management and monitoring plans • Educate and train local people and land owners • Carbon credits: Wealthy countries buy them to offset their carbon emissions	**Association Mitsinjo** • 10,000 hectare natural reserve created in 1999 by residents to work as guides for tourists visiting the area. • Money from tourism accounts for 1/3rd of income • Prevents illegal logging and hunting • 2002 created a rainforest restoration project: Farmers agree to set aside some land as a nursery for young rainforest trees in return for help in improving their yields.
Impact • Laws and enforcement meant that deforestation had fallen from 1.8 to almost zero by 2005.	**Impact** • Carbon credits: Costa Rica is earning money from the rainforest without cutting the trees down e.g. 1999, earned $20 million.	**Impact** • 1 million new trees • Funded better healthcare and environmental education • 14,000 people live in the area, but many live in poverty. • Association depends for 2/3rds of its income on international aid organisations.

BQ12 & 13. WHAT ARE THE CHARACTERISTICS OF A DECIDUOUS WOODLAND?

Abiotic characteristics

Climate

- Temperature range between 4c and 17c
- Long periods of light in the summer, around 18 hours and short days in the winter i.e. 8 hrs

Soils

- Soil is fertile and not as deep as TRF as they are younger
- Autumn leaf fall ensures there are plenty of nutrients
- Earthworms in the soil help to mix up the nutrients
- Leaf litter and ground layer of plants prevent much surface runoff.

Water

- Total annual rainfall 1,000 mm

Biotic characteristics

Plants

- In spring, species in the herb layer flower early, before the trees in the canopy block out the available light. Deciduous trees then grow thin, broad lightweight leaves.
- In the winter, the trees loose their leaves as it becomes colder and the days are shorter.
- Deep root system to access groundwater and nutrients

Animals

- Hedgehogs hibernate from November to April
- Squirrels store food in the ground under fallen leaves so they have food in the colder months.

Humans

- There are 3000 New Forest ponies, which live wild in the New Forest. They graze selectively, meaning they eat tall grasses but leave flowers behind.

Ecosystems Homework 4: Answer the following

Question	Answer
Define the term 'urbanisation'	
Name one key factor has driving the rates of urbanisation in emerging countries?	
Name two types of mass movement	
Name two ways Bristol's population was impacted by migration (2)	
What measurement is used to consider the level of inequality in a country?	
Define the term 'Gross Domestic Product'	
Name an area of periphery in India	
State two other adaptations of plants in the TRF (2)	
Name the three parts of the Gersmehl nutrient model	
Explain how relief/topography impacts on climate (2)	
State two reasons why rainforests are under threat (2)	
Explain how climate change will impact on the tropical rainforest structure (2)	
Explain how climate change will impact on the functioning of the tropical rainforest (2)	
Outline two factors that have led to the decline of the Costa Rican rainforest (2)	
Define the term 'urbanisation'	

Total out of 22:

Ecosystems Homework 4: Check your answers

°Geography

Define the term 'urbanisation'	The increase in the proportion of people living in towns and cities compared to living in the countryside
Name one key factor has driving the rates of urbanisation in emerging countries?	Natural increase/rural-urban migration
Name two types of mass movement	Sliding and slumping
Name two ways Bristol's population was impacted by migration (2)	❑ Increased the number of people in all age ranges but particularly 16-49 = 30% rise ❑ Large student population 10.3% decline in White British population ❑ 2.5% increase in Other White = Eastern European
What measurement is used to consider the level of inequality in a country?	Gini Coefficient
Define the term 'Gross Domestic Product'	The value of all goods and services produced in a country during a year, in US dollars.
Name an area of periphery in India	Bihar
State two other adaptations of plants in the TRF (2)	Drip tips/ thin bark/ leaf angling/ red leaves/ buttress roots
Name the three parts of the Gersmehl nutrient model	Biomass/ Soil/ Litter
Explain how relief/topography impacts on climate (2)	High mountains force air to rise and cool , meaning precipitation is high in the mountains. Creates the **rain shadow effect** as once the air has passed over it, it has lost its moisture.
State two reasons why rainforests are under threat (2)	Mining/Energy/ Logging/ Population increase
Explain how climate change will impact on the tropical rainforest structure (2)	❑ Likely to change to seasonal tropical rainforest = dry season ❑ Most trees drop leaves in dry season to avoid water loss ❑ Falling leaves creating thick litter but slow decomposition in the dry season = soil bigger nutrient store and biomass store is smaller.
Explain how climate change will impact on the functioning of the tropical rainforest (2)	❑ Less vegetation cover, so when it rains = increased surface runoff ❑ Less dense vegetation = lower rainfall ❑ Drier forest = more C02 emitted than it soaks up and increased chance of forest fires.
Outline two factors that have led to the decline of the Costa Rican rainforest (2)	❑ Cattle Ranching and agricultural development by clearing land through slash & burn methods. ❑ Gold and other metal mining meant large scale soil and rock removing. By 1990, 32,000 hectors of forest were cut down each year –devastating the fragile ecosystem.
	Total out of 22:

BQ14. How biodiverse are deciduous woodlands?

Moderate biodiversity:

- Lower food production levels in the winter
- Smaller size ecosystems that the TRF = less space for plant and animal species
- Higher latitude = lower temperatures and fewer sunlight hours: not as efficient for photosynthesis or food production for animals.
- Has a **stratified structure** i.e. the vertical layering of a habitat; the arrangement of vegetation in layers. It classifies the layers vegetation largely according to the different heights to which their plants grow .

Plant adaptations

Oak Tree:

1. Spread branches horizontally to capture sunlight
2. Leaves are broad and soft. Width = increased amount of sunlight. Soft because they don't need a waxy coating to protect them from excess water loss.
3. Autumn the supply of water to leaves is stopped causing the leaf to fall off. This allows the oak to survive through the winter months.
4. Leaves and acorns contain acid tannin which is poisonous to animals e.g. horses = protection from grazing.
5. Large root system = anchors the tree during winter gales and accesses groundwater during drier months.

Animal adaptations

1. **Migration** – bird species move south to warmer winter conditions. E.g. Swallow leaves in September for C. Africa.
2. **Hibernation** – Animals spend the winter months in a deep sleep, in which their metabolic rate drops so that they only need a small amount of energy to survive. E.g. Hedgehogs
3. **Food storage** – Species like squirrels store nuts on either the forest floor (red) or bury them (grey). This also helps acorns to germinate as they often forget where they have buried them.

BQ15. WHAT GOODS AND SERVICES CAN DECIDUOUS WOODLANDS PROVIDE?

Goods

Timber

- Production increased by 6.9% between 1998 and 2007
- In 2014, 13million tonnes of timber was produced
- Used in construction and furniture making

Fuel

- Of the 0.4 million tonnes in 2009, 69% was used as fuel
- Fuel for major power stations through co-firing
- Increasing popularity of wood burning stoves – 2 million tonnes/year needed in 2016

Non-timber forest products (NTFP)

- Forest moss – used by florists
- Venison – deer meat
- Rearing birds e.g. partridge for shooting

Services

Recreation

- 250-300 million day visits to woodlands each year in the UK
- Valued at £484 million in 2010
- Venue for activities e.g. GoApe
- Health benefits e.g. cycling

Conservation

- New Forest is important for woodland birds e.g. 75% of UK's Dartford warblers live there

Carbon Capture

- UK's woodlands capture 1 million tonnes of carbon each year

Ecosystems Homework 5: Answer the following

Question	Answer
How are metamorphic rocks formed?	
There are 4 sources of coastal sediment – Name 2 (2)	
Name two types of river transportation (2)	
Explain one **economic** factor leading to uneven development in the UK	
Describe how air moves in a Hadley cell (3)	
When did Hurricane Sandy strike Cuba and the USA	
What type of pressure system is a tropical cyclone?	
Outline two factors that have led to the decline of the Costa Rican rainforest (2)	
Name the ecotourism project in the Costa Rican rainforest	
Name two abiotic characteristics of deciduous woodlands (2)	
Outline two reasons why deciduous woodlands have moderate biodiversity (2)	
Outline how the oak tree is adapted (2)	
Outline how animals are adapted to living in deciduous woodlands (2)	
State two services provided by deciduous woodlands (2)	
How are metamorphic rocks formed?	
	Total out of 24:

How are metamorphic rocks formed?	igneous or sedimentary rocks are put under great pressure or are close to a source of heat
There are 4 sources of coastal sediment – Name 2 (2)	Rivers/ Cliff erosion/ constructive waves/ longshore drift
Name two types of river transportation (2)	Traction/ Saltation/ Suspension/ solution
Explain one **economic** factor leading to uneven development in the UK	Infrastructure In London it is the best allowing companies who locate there to trade all over the country/ most FDI is focused in London
Describe how air moves in a Hadley cell (3)	❑ At the Equator, the trade winds meet. The warm air rises quickly causing thunderstorms. ❑ An area of low pressure is formed in the ITCZ. ❑ The air at the top of the cell moves towards 30°North and 30°south where it becomes cooler and sinks back to the Earth's surface.
When did Hurricane Sandy strike Cuba and the USA	October 2012
What type of pressure system is a tropical cyclone?	**Non-frontal** intense low pressure
Outline two factors that have led to the decline of the Costa Rican rainforest (2)	❑ Cattle Ranching and agricultural development by clearing land through slash & burn methods. ❑ Gold and other metal mining meant large scale soil and rock removing. By 1990, 32,000 hectors of forest were cut down each year –devastating the fragile ecosystem.
Name the ecotourism project in the Costa Rican rainforest	Association Mitsinjo
Name two abiotic characteristics of deciduous woodlands (2)	❑ Temperature range between 4c and 17c ❑ Autumn leaf fall ensures nutrients ❑ Earthworms help to mix up the nutrients ❑ Total annual rainfall 1,000 mm
Outline two reasons why deciduous woodlands have moderate biodiversity (2)	❑ Lower food production levels in the winter ❑ Smaller size ecosystems that the TRF ❑ Higher latitude = lower temperatures and fewer sunlight hours: not as efficient for photosynthesis or food production for animals. ❑ Has a **stratified structure**
Outline how the oak tree is adapted (2)	❑ Branches horizontally to capture sunlight ❑ Large root system = anchors the tree during winter gales and groundwater during drier months.
Outline how animals are adapted to living in deciduous woodlands (2)	❑ **Migration**–bird species move south to warmer winter conditions. ❑ **Hibernation**–Animals spend the winter months in a deep sleep = metabolic rate drops ❑ **Food storage** –Species like squirrels store nuts. This also helps acorns to germinate as they often forget where they have buried them.
State two services provided by deciduous woodlands (2)	Recreation/ conservation/ Carbon capture
	Total out of 24:

29

BQ16. What threats are there to deciduous woodlands?

Timber extraction

- New Forest in 1608 – 124,000 trees used for navy timber
- **WW1:** Used to build trenches
- **1919:** Shift to planting of coniferous trees which produce softwood, which grows faster = generates money quicker.
- Recent deforestation occurring in the 20th Century when it was cut down and replaced with coniferous forest: 38% loss of ancient woodland
- Coniferous have lower biodiversity as dense evergreen canopy doesn't allow for light to reach the ground.

Agricultural change

- Only 7% of ancient woodland cleared for farming.
- Woodland usually surrounded by farmland so can be affected by pesticides and herbicides that are sprayed on crops.

Climate change

Biodiversity: Milder winters

- Key processes i.e. seed germination are triggered by cold temperatures. Without this, processes become altered.
- New tree species not adapted to cold winter are able to out-compete native deciduous trees if winters become milder.
- Pests and diseases can now spread as they are not killed off during cold winters.

2. Functioning: Increased risk of drought

- Not adapted to survive drought conditions year after year
- Beech trees are particularly vulnerable to stress = less able to fight disease and pests

3. Structure: Increased risk of fire

- High temperatures and drought make forest fires more likely
- Other ecosystems are adapted to fire, plant species from these could replace deciduous woodland plants.

BQ17. What are the characteristics of the New Forest?

The New Forest

The New Forest is a National Park, which requires sustainable management for a number of reasons.

1 The National Park is a popular tourist attraction, with over 15 million visitors each year contributing towards the local economy.

2 The movement of visitors through the forest is increasing litter, causing erosion of paths and increasing air pollution from traffic.

3 Softwood and hardwood timber is being extracted for commercial use.

4 40 per cent of the woodland is privately owned, and is often left unmanaged.

Woodland Management	Wildlife management	Recreation/Education
• When conifers in conservation areas are cut down for timber, they are replaced by native species of deciduous trees. • Pesticides and herbicides are used sparingly to avoid damage to the ecosystem. • Foresters work in the forest in the winter when there are few visitors. • Tree felling controlled – some trees left; older trees felled and left to rot on the forest soil = maintains nutrient cycle. • Designating woodland SSSIs or Special Conservation Areas (SCA) • Marketing and selling sustainable timber products by Forest Marque.	• Work in the forest between April and August is minimal so not to disrupt nesting birds. • Monitor grazing • Fencing off areas of forest against animal grazing • Encourage growth and development of a variety of habitats and ecological niches • Preventing invasive species	• Green Leaf Tourism scheme – promotes the use of local products; businesses give percentage of land for wildlife and encourage tourists to walk or use bikes. • Awareness raising by National Park Authority (NPA) to educate people on the importance of sustainability in the New Forest. • Sustainable Transport schemes for tourists e.g. bike and electric car hire) to reduce congestion and air pollution. • Well managed visitor centres • Signposted woodland trails • Car parks • Well managed activities, e.g. Go Ape

7 Large-scale ecosystems, such as tundra, are found in different parts of the world.

    (a) (i) State **two** characteristics of a tundra ecosystem.

                (2)

1 ....

2 ....

      (ii) Identify **two** countries where a tundra ecosystem is located.

                (2)

☐   **A**   Australia

☐   **B**   Canada

☐   **C**   Libya

☐   **D**   Spain

☐   **E**   Norway

    (c) Tropical rainforests provide goods and services for people, but are also under threat.

        Study Figure 10 in the Resource Booklet.

        Calculate the range and median annual deforestation (km^2) shown on Figure 10

                (2)

Range = ... km^2

Median = ... km^2

    (d) (i) Explain **one** cause of deforestation in deciduous woodlands.

                (2)

....

....

....

....

Ecosystems, Biodiversity and Management

Year	Annual deforestation (km^2)
2005	19 014
2006	14 285
2007	11 651
2008	12 911
2009	7 464
2010	7 000
2011	6 418
2012	4 571
2013	5 891

(Source from: http://rainforests.mongabay.com/
amazon/deforestation_calculations.html)

Revision Support

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Successful completion of each sub unit i.e. 3.1 Large-scale ecosystems

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