Key Stage 3 & Key Stage 4

HABITATS & ADAPTATIONS

General points about this talk:

Talks generally last 30-40 minutes and take place out in the Park in all weathers; please ensure that your pupils wear suitable clothes for the conditions.

Talks are generally led by the keepers and may vary between different staff members. We will adapt this talk according to the age of students.

We endeavour to keep group sizes fairly small as some of this talk may take place in our Tropical House. To this end most groups will be kept below 20 students.

The normal meeting point for this talk will be at either our penguin or meerkat enclosure in the Walled Garden. However, if you prefer we can also hold this talk using larger mammals including rhinos, lions and camels or with the lemurs in the Madagascar walkthrough area.

What we will cover in the talk:

Most animals are adapted to survive in a particular habitat. Over a period of evolutionary time, they have developed special features that help them survive in their environment. We call this adaptation. An example of this is the body of a fish. Their bodies have changed to allow them to survive underwater. They have gills to take oxygen out of the water, fins to swim with and streamlined bodies to help them move easily through the water.

In our Habitats and Adaptations talk we will take a look at animals from different habitats and the adaptations they have to survive in the different conditions. We may also look at how adaptations come about through variation over time and the 'survival of the fittest' theory. Variation can have environmental or genetic causes but will not always have a genetic basis: so a man who goes to the gym a lot will not necessarily have strong, muscly children. This talk varies according to the animal section we visit but will always look at animals from hot and cold areas and may also visit animals from grasslands, rivers or rainforest.

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Animals we may include:

We cannot guarantee which animals you will see during your talk but you will visit at least three animals which may include some of the following:

Humboldt penguin	Linne's two-toed sloth
Slender-tailed meerkat	Wolverine
Asian short-clawed otter	Snowy owl
Common squirrel monkey	Asiatic lion
Azara's agouti	Bactrian camel
Aldabra giant tortoise	White rhino
Black-tailed prairie dog	Giraffe

Areas of the new National Curriculum that this talk addresses:

KS3

Biology

Genetics and Evolution:

- Differences between species
- The variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection
- Changes in the environment which may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction

Relationships in an Ecosystem:

- The interdependence of organisms in an ecosystem, including food webs

Geography

Human and Physical Geography:

- Understand how human and physical processes interact to influence and change landscapes, environments and the climate
- How human activity relies on the effective functioning of natural systems

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KS4

Biology

Ecosystems:

- Levels of organisation within an ecosystem
- Some abiotic and biotic factors which affect communities
- The importance of interactions between organisms in a community
- How materials cycle through abiotic and biotic components of ecosystems
- Organisms are interdependent and are adapted to their environment
- The importance of biodiversity
- Positive and negative human interactions with ecosystems

Evolution, Inheritance and Variation:

- Genetic variation in populations of a species
- The process of natural selection leading to evolution
- The evidence for evolution
- Developments in biology affecting classification

Geography

People and Environment:

- Global ecosystems and biodiversity – An overview of the distribution and characteristics of large scale natural global ecosystems.
- For selected ecosystems draw out the interdependence of:
    - climate, soil, water, plants, animals and humans
    - the processes and interactions that operate within them at different scales
    - the issues related to biodiversity and to their sustainable use and management

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Areas of GCSE Exam Boards that this talk addresses:

AQA

Biology

4.7.1.1 Communities:

- Students should be able to describe: different levels of organisation in an ecosystem from individual organisms to the whole ecosystem, the importance of interdependence and competition in a community.
- Students should be able to, when provided with appropriate information: suggest the factors for which organisms are competing in a given habitat, suggest how organisms are adapted to the conditions in which they live.

4.7.1.4 Adaptations:

- Students should be able to explain how organisms are adapted to live in their natural environment, given appropriate information.
- Organisms have features (adaptations) that enable them to survive in the conditions in which they normally live.
- These adaptations may be structural, behavioural or functional.

Levels of Organisation:

- Producers are eaten by primary consumers, which in turn may be eaten by secondary consumers and then tertiary consumers.
- Consumers that kill and eat other animals are predators, and those eaten are prey.
- In a stable community the numbers of predators and prey rise and fall in cycles.

4.7.3.1 Biodiversity:

- Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem.
- A great biodiversity ensures the stability of ecosystems by reducing the dependence of one species on another for food, shelter and the maintenance of the physical environment.
- The future of the human species on Earth relies on us maintaining a good level of biodiversity.
- Many human activities are reducing biodiversity and only recently have measures been taken to try to stop this reduction.

4.7.4.1 Trophic Levels:

- Students should be able to describe the differences between the trophic levels of organisms within an ecosystem
- Trophic levels can be represented by numbers, starting at level 1 with plants and algae, further trophic levels are numbered subsequently according to how far the organism is along the food chain
- Level 1: Plants and algae make their own food and are called producers
- Level 2: Herbivores eat plants/algae and are called primary consumers
- Level 3: Carnivores that eat herbivores are called secondary consumers
- Level 4: Carnivores that eat other carnivores are called tertiary consumers
- Apex predators are carnivores with no predators
- Decomposers break down dead plant and animal matter by secreting enzymes into the environment, small soluble food molecules then diffuse into the microorganism

Geography

3.1.2.1 Ecosystems:

- Ecosystems exist at a range of scales and involve the interaction between biotic and abiotic components

3.1.2.2 Tropical Rainforests:

- Tropical rainforest ecosystems have a range of distinctive characteristics
- Deforestation has economic and environmental impacts
- Tropical rainforests need to be managed to be sustainable

3.1.2.3 Hot Deserts:

- Hot desert ecosystems have a range of distinctive characteristics
- Development of hot desert environments creates opportunities and challenges
- Areas on the fringe of hot deserts are at risk of desertification

3.1.2.4 Cold Environment:

- Cold environments (polar and tundra) have a range of distinctive characteristics
- Development of cold environments creates opportunities and challenges
- Cold environments are at risk from economic development

OCR

Biology

Gateway	Twenty First Century
Ecosystems: • B4.1E - describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem • B4.1G - describe the importance of interdependence and competition in a community • B4.1H - describe the differences between the trophic levels of organisms within an ecosystem Natural Selection and Evolution: • B5.2C - explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment • B5.2D - describe evolution as a change in the inherited characteristics of a population over time, through a process of natural selection, which may result in the formation of new species	How are Organisms in an Ecosystem Interdependent?: • B3.3.4 - describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem • B3.3.6b - describe the differences between the trophic levels of organisms within an ecosystem

Geography

A	B
Ecosystems of the Planet: • 2.1.1 - Ecosystems consist of interdependent components • 2.1.2 - Ecosystems have distinct distributions and characteristics • 2.1.3 - There are major tropical rainforests in the world • 2.1.4 - There are major coral reefs in the world • 2.1.5 - Bio-diverse ecosystems are under threat from human activity	Why are Natural Ecosystems Important?: • 4.1.A - What are ecosystems Why Should Tropical Rainforests Matter to us?: • 4.2.A - What biodiversity exists in tropical rainforests? • 4.2.B - Why are tropical rainforests being 'exploited' and how can this be managed sustainably? Is there more to Polar Environments than Ice?: • 4.3.A – What is it like in Antarctica and Artic? • 4.3.B – How are humans seeking a sustainable solution for polar environments?

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EDEXCEL

Biology

Ecosystems and Material Cycles:

- 9.1 - Describe the different levels of organisation from individual organisms, populations, communities, to the whole ecosystem
- 9.2 - Explain how communities can be affected by abiotic and biotic factors
- 9.3 - Describe the importance of interdependence in a community
- 9.4 - Describe how the survival of some organisms is dependent on other species, including parasitism and mutualism
- 9.9 - Explain the positive and negative human interactions within ecosystems and their impacts on biodiversity
- 9.10 - Explain the benefits of maintaining local and global biodiversity, including the conservation of animal species and the impact of reforestation

Geography

A	B
Overview of Global Ecosystems and their Importance: • 3.1 - Large-scale ecosystems are found in different parts of the world and are important Tropical Rainforests: • 3.4 - Tropical rainforests show a range of distinguishing features • 3.5 - Tropical rainforest ecosystems provide a range of goods and services some of which are under threat Deciduous Woodlands: • 3.6 - Deciduous woodlands show a range of distinguishing features • 3.7 - Deciduous woodlands ecosystems provide a range of goods and services some of which are under threat	People and the Biosphere: • 7.1 - The Earth is home to a number of very large ecosystems (biomes) the distribution of which is affected by climate and other factors Forests Under Threat: • 8.1 - The structure, functioning and adaptations of the tropical rainforest • 8.2 - The taiga shows different characteristics, reflecting the more extreme and highly seasonal climate

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