



## Key Stage 3 & Key Stage 4 **EVOLUTION**

### 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 busy areas of the Park. To this end most groups will be kept below 20 students.

The meeting point for this talk will be advised at the time of booking.

### What we will cover in the talk:

Evolution is where species of all living things have changed and adapted over time. Many theories have been developed for how evolution occurs but the most widely accepted theory is Darwin's Theory of Evolution by Natural Selection. This is where individuals in a species show a wide range of genetic variation. Some of the individuals will therefore be better suited to the environment than others and so will be more successful in passing on their genes. This causes a gradual and continuous change in a species so that it evolves to perfectly adapt to its environment.

In this talk we look at some different animals we have here at the Park and how they have evolved to be perfectly adapted to their environment. We will look at one group of animals (mammals/birds/reptiles) and discuss where different species diverged and how this happened, whether it be by specialised diets, habitats or behaviours.

### Animals we may include:

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

Humboldt penguin	Linne's two-toed sloth	Emu
Asian short-clawed otter	Wolverine	Lemurs
Common squirrel monkey	Snowy owl	Weaver birds



Azara's agouti	Asiatic lion	Hornbill
Aldabra giant tortoise	Waldrapp ibis	Blue & Gold macaw
Royal python	Bearded dragon	

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

## KS4

### Biology

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



Areas of GCSE Exam Boards that this talk addresses:

## AQA

### Biology

#### 4.6.2.1 Variation:

- Students should be able to describe simply how the genome and its interaction with the environment influence the development of the phenotype of an organism.
- Students should be able to:
  - state that there is usually extensive genetic variation within a population of a species
  - recall that all variants arise from mutations and that: most have no effect on the phenotype; some influence phenotype; very few determine phenotype.

#### 4.6.2.2 Evolution:

- Students should be able to 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 a new species.
- Students should be able to explain how evolution occurs through natural selection of variants that give rise to phenotypes best suited to their environment.

#### 4.6.3.1 Theory of Evolution:

- Students should appreciate that the theory of evolution by natural selection developed over time and from information gathered by many scientists

#### 4.6.3.2 Speciation:

- Students should be able to:
  - describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection
  - explain the impact of these ideas on biology
- Students should be able to describe the steps which give rise to new species.

#### 4.6.3.4 Evidence for Evolution:

- Students should be able to describe the evidence for evolution



# OCR

## Biology

### Gateway

Natural Selection and Evolution:

- B5.2A - State that there is usually extensive genetic variation within a population of a species
- B5.2B - describe the impact of developments in biology on classification systems
- 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
- B5.2E - describe the evidence for evolution
- B5.2F - describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology

### Twenty First Century

How was the theory of evolution developed?:

- B6.1.1 - State that there is usually extensive genetic variation within a population of a species
- B6.1.2 – Recall that genetic variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype
- B6.1.3 - Explain how evolution occurs through natural selection of variants that give rise to phenotypes better suited to their environment
- B6.1.5 - Describe evolution as a change in the inherited characteristics of a population over a number of generations through a process of natural selection which may result in the formation of new species
- B6.1.8 - Describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection
- B6.1.10 - Explain the impact of these ideas on modern biology and society

How does our understanding of biology help us classify the diversity of organisms on Earth?:

- B6.3.1 - Describe the impact of developments in biology on classification systems, including the use of DNA analysis to classify organisms



# EDEXCEL

## Biology

Natural Selection and genetic modification:

- 4.1 - Describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology
- 4.2 - Explain Darwin's theory of evolution by natural selection
- 4.6 - Describe how the anatomy of the pentadactyl limb provides scientists with evidence for evolution
- 4.7 - Describe how genetic analysis has led to the suggestion of the three domains rather than the five kingdoms classification method

