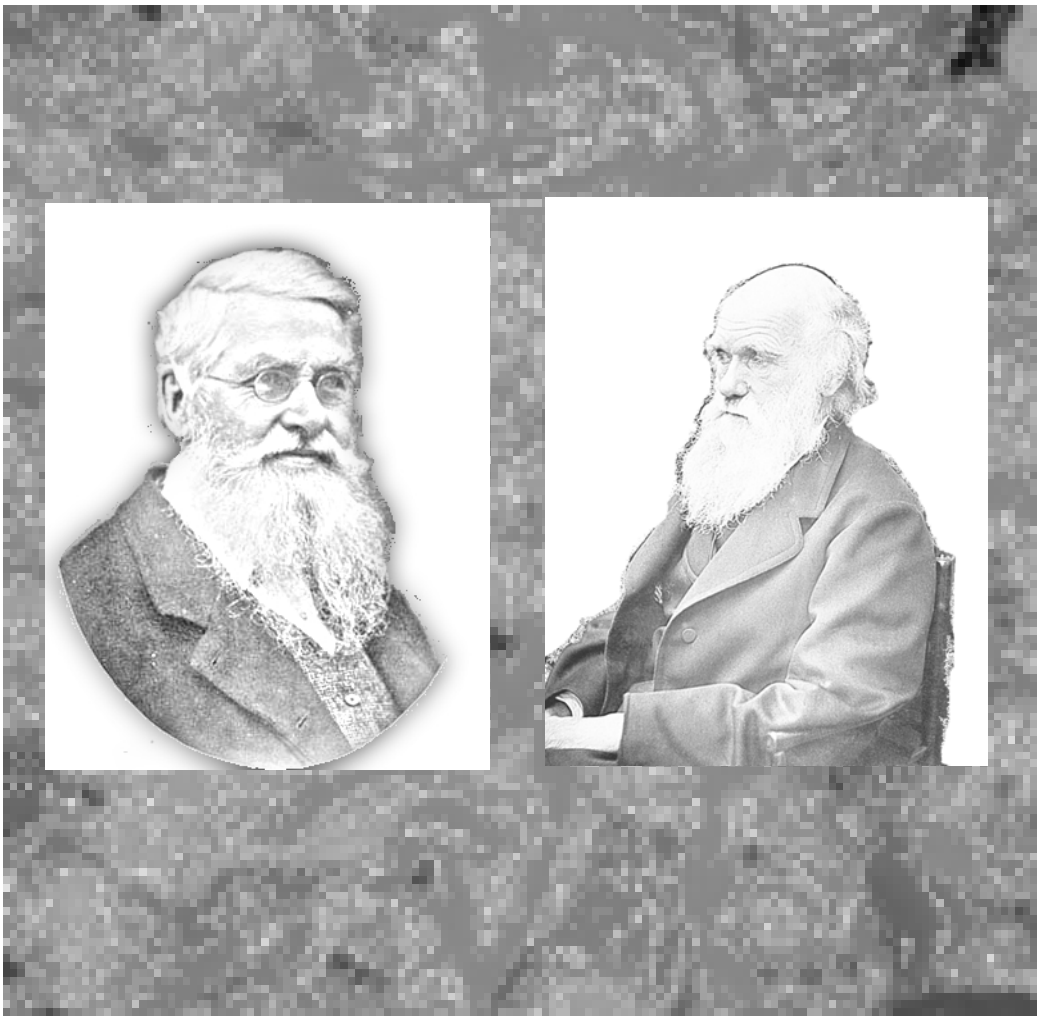
Evolution – Year 10

More thoughts about evolution

A Museum visit



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Government of South Australia
Department of Education and Children's Services

Your museum visit.

These pages direct you to real museum examples supporting the ideas and information you may have read in the paper *Thoughts About Evolution*. The last page has a map to help you plan your museum tour.

Visit the Ediacaran Gallery. [Level 3]

The fossil record shows that animals in the past were different to animals that live today. This is one of the facts that supports the theory of **evolution by natural selection.** Nicolas Steno was one of the first people to argue that fossils were actually the remains of living things. At first, not everyone was convinced.


Charniodiscus

In more recent times there have been different arguments about fossils and what they represent. For example, when Reg Sprigg discovered fossils on Ediacara Station in the Flinders Ranges in 1946 few palaeontologists agreed with him when he said that they were the remains of some of the oldest animals on the planet. However, since then a great deal of research has been done and we know much more about them.

Have a look around the gallery at the Ediacaran fossils and make some notes about them under the following headings.

What are Ediacaran animals?

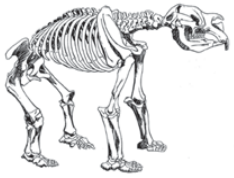
What do we know about where Ediacaran animals lived?
How do we know this?

Record two or three facts about how Ediacaran animals lived.
[You may find information on feeding, growth, defence, movement, reproduction ...]


Reg Sprigg


Dickinsonia

Move to the Megafauna display.



Darwin and Wallace knew that some animals had become extinct, and that only the fittest species survived. The first scientist to explain extinction was Georges Cuvier who showed that some species of elephant had disappeared from the Earth. We can see Australian fossils that tell the same story.

In the Megafauna Gallery you can see fossils of Australian animals that became extinct thousands of years ago. (Relatively recently in the history of the planet.) Look around and make notes about these extinct animals under the following headings.

Similarities;
Which of these extinct animals have something in common with animals that are alive today? What do they have in common?

Differences;
What are the main differences between these animals and modern Australian animals?

Move to the Cretaceous display

Another fact that helped establish the theory of **evolution by natural selection** was that the Earth had been around long enough for species to evolve. By studying rock layers and their formation, scientists worked out that the earth was millions of years old, and that many changes had taken place over this time.

We can see evidence of some of these changes in this gallery. Look at the large photograph on the wall. It shows where the fossils in this room were found.

What sort of environment does the photograph show? _____

Look at the fossilised animals.
What sort of environment would they have lived in?_____

Give a possible explanation why the two answers above are not the same.

Find fossils with labels that give information about the environment or how animals lived in the Cretaceaous Period. Summarise the information.

Move to the Biodiversity Gallery [Level 2]

Another idea that helped Darwin and Wallace develop their understanding of **evolution by natural selection** was the fact that animals seemed to be organised into groups, and that some groups seemed closely related to each other while other groups were more distantly related. The system that Carolus Linnaeus invented made these groupings very obvious.

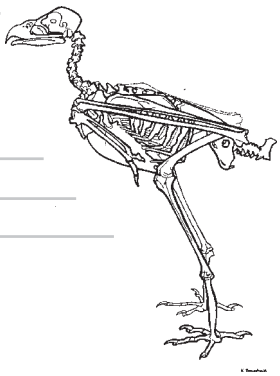
Find the skeleton display.

It shows that relatedness can be observed inside animals as well as outside.

The skeletons belong to animals that are all related. (Technically they belong to the Sub-phylum Vertebrata, but usually people just call them vertebrates.)

What are three things that all these skeletons have in common?

Find the bird skeletons.
List three ways all the bird skeletons are different to the others.



Look at the electronic interactive.
What is the main idea it is trying to communicate to museum visitors?

Find the Evolution display *(opposite the skeletons).*

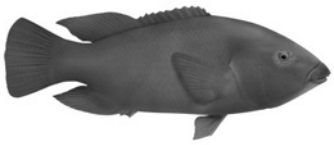
Darwin used his studies of the breeding of domestic animals to support his theory . He found clear evidence of changes in pigeons and other animals that people had bred over many generations. He also collected evidence of changes in wild animal populations over time. He would have been interested in the evidence of evolutionary change that can be seen here in South Australia.

In South Australia we have clear evidence of evolution in Tiger Snake populations.

Read the information about snake evolution.
Summarise it using no more than 25 words and no more than two diagrams.

Find the *Need to breed* exhibit *(In the marine area. Giant Cuttlefish.)*

In his book *On the Origin of Species* Darwin wrote a chapter on sex. In it he explained that, even if an animal was very well adapted to its environment, it would not leave many offspring if it could not attract a mate.



Read about the reproduction systems of the animals in the display.

Select two animals with interesting information.
Use dot points to summarise the most relevant facts about their breeding systems.

Animal 1	Animal 2
•	•
•	•
•	•
•	•
•	•
•	•

Exploring the Biodiversity Gallery

The theory of evolution by natural selection explains the wonderful variety we see in the biological world. In this gallery you can see South Australian biodiversity and how species in different environments have adapted their environments. The gallery is divided into four environmental zones, or biomes; arid (red painted walls), temperate (green walls), coastal (brown) and marine (blue).

Biomes

Find an interesting animal in each of the four biomes and make notes of the adaptations that help them survive in their environment. (You might need to check out the computer screens for a few different animals before you find some appropriate information.)

Temperate

Arid

Coastal

Marine

More Biodiversity Gallery

Beaks

In his book, *On the Origin of Species,* Darwin noted that in the Galapagos Islands finches on different islands had different beak shapes to catch and eat different foods. Their beaks are often referred to as important examples of evolution by natural selection. (Although this was only one small part of the evidence Darwin used in his book).

This is not only true in the Glapogos islands. Evolution by natural selection is the best explanation for the fact that birds' beaks everywhere have different shapes to do different tasks and eat different foods.

Use the specimens in this gallery or information on the computer screens to give examples of the ways birds' beaks are adapted to their ways of life.

Drawers

Look through the drawers in the gallery.
None of them contain exhibits specifically about evolution by natural selection, but many have displays that are examples of evolution at work, or can be explained by the theory.

Find a drawer that you can use to explain some ideas about evolution. Describe the drawer's contents briefly and explain how the contents relates to evolution by natural selection.