Secondary School Discovery Pack

dynamic earth

Learning for Sustainability

NAME

Scotland's Time Lords

Welcome to the start of your journey! This gallery is all about how geologists have transformed our understanding of planet Earth.

- Can you identify the key Time Lords in the gallery and give a description of what they contributed to our geological heritage? Complete the plaques below.

__ a m __ __ H __ __ __ __ n

I discovered 'D __ __ __ T __ __ __ '. The idea the Earth is really old.

C __ __ r I __ __ L __ __ I I

I am the great c __ __ __ __ __ __ __ __ __ __ __.

(I share ideas with others)

Ben P __ __ __ __ and __ o h __ Horne

We worked out how m __ __ __ __ __ __ __ __ are formed.

Art __ __ __ H __ __ __ __ s

I worked out how to uncover the a __ __ of __ __ c k __.

Ma __ __ e Th __ __ p

I mapped the sea floor, discovering d __ __ __ o __ __ __ __

mountains and t __ __ __ __ __ __ s.

Continental drift was initially proposed by Alfred Wegener in the early twentieth century. He proposed that 250 million years ago, Earth's tectonic plates came together to for this super continent.

- Can you name it?

- Use the Puffersphere in the middle of the room to draw what scientists will predict the continents will look like in 250 million years time.

The Time Machine

You are about to be transported back to the very beginning of time, 13.7 billion years ago, aboard our very own Time Machine!

You're about to experience what geologists now call 'deep-time'. So step on board and let the Time Machine deliver you safely to the very beginning of everything!

How It All Started

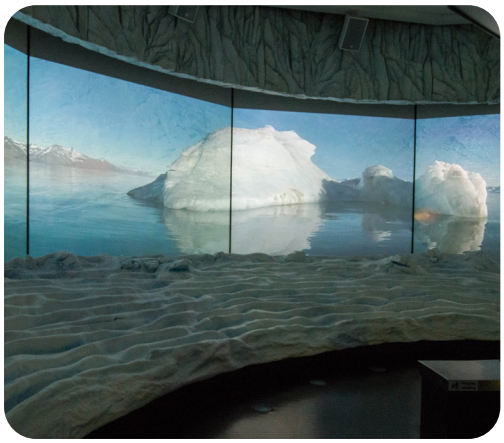
Welcome aboard the spaceship! From the observation deck, let Captain ODE guide you though the wonders of our universe.

You'll witness the Big Bang and see how galaxies, our solar system and our own planet formed, before landing safely on Earth.

Restless Earth

Captain ODE has landed the spaceship in an active volcano – things are about to get heated! You're about to see, hear and feel how dynamic our planet is.

In the 'Scotland's Time Lords' gallery, you learned how continents move around - now you're going to discover what natural effects can be caused by this restless Earth!



Shaping the Surface

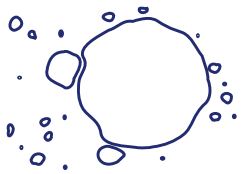
Time to cool off! You're now going to fly over dramatic landscapes carved out by glaciers. You'll soar over Scotland and Norway and discover the huge effect ice has had in shaping our landscape.

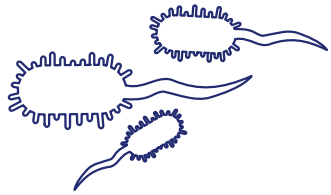
Casualties and Survivors

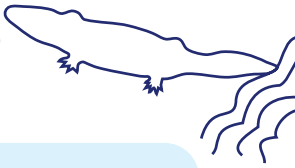
In this next gallery, it's time to explore how life on our planet has changed over time through the process of evolution. But remember, evolution often goes hand in hand with extinction, so watch out!

- Can you fill in the missing details of the evolution timeline?

_____ million years ago	Planet Earth formed.
_____ million years ago	First life appeared.
_____ million years ago	Simple blue-green algae developed in the oceans.
1000 million years ago	
600 million years ago	
_____ million years ago	The Cambrian Explosion - animals evolved quickly into lots of different varieties.
500 million years ago	
_____ million years ago	Animal life invaded the land starting with millipedes, centipedes, spiders and scorpions.
_____ million years ago	Fish developed lungs and legs and crawled onto the land.
300 million years ago	
220 million years ago	
_____ million years ago	Meteorite impacts wiped out dinosaurs and mammals took over.
_____ million years ago	The first human life appeared.







- What are the ingredients for life? Complete the equation below

There have been 5 major extinctions on planet Earth. In the gallery you find out about 3 of these.

- Can you write down the causes and some of the impacts of the extinctions?

440 million years ago

245 million years ago

65 million years ago

Some scientists argue that we are currently in the middle of another extinction – making a 6th great extinction on our planet.

- Do you agree with this?

- Why do you think that way?

Discover the Deep

Made possible with Heritage Fund

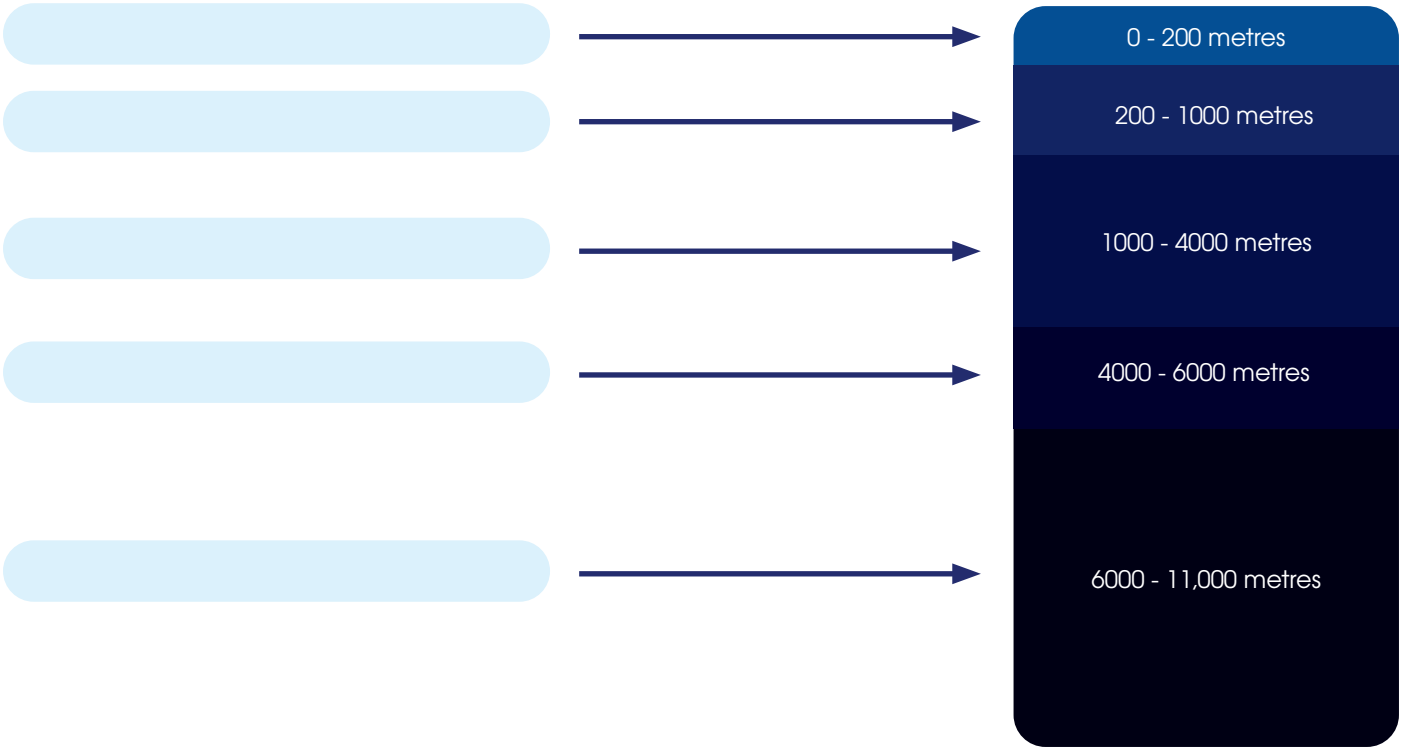
Take a deep breath as you enter the next gallery, *Discover the Deep*. Follow the journey of HMS *Challenger*, and Scotland's own Charles Wyville Thompson, whose work revealed the deep ocean to be a vast and vital system supporting live on Earth. Plunge into Scotland's ocean and discover how modern marine scientists are exploring and researching the deep!

HMS *Challenger* sailed all over the world.

- Using the map on the wall to help, can you draw HMS *Challenger's* route?

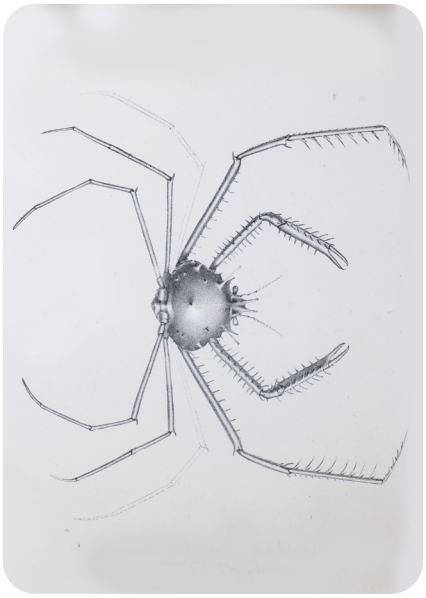
Watch the video at the start of the gallery or look at the touch screen with the light up jars in the HMS *Challenger* specimen cabinet.

- Can you label each of the Ocean depth zones on this diagram?



Find the following creatures in HMS Challenger's specimen cabinet.

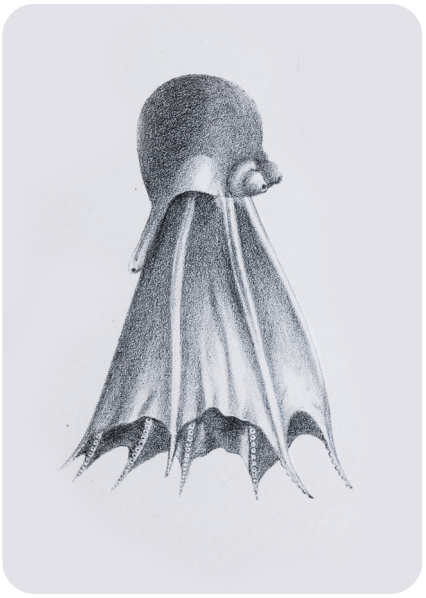
- Can you find out what depth zone are they found in and the year they were collected?



Suhm's Crab

Depth:

Year:



Telescope Octopus

Depth:

Year:

Faceless Cusk Eel

Depth:

Year:

As you enter the laboratory, look to the left.

There are lots of threats to the health of our ocean.

- Describe what some of these threats are, and the impact they have upon the ocean.

Bottom Trawling

Deep Sea Mining

Ocean Acidification

Drilling for Oil

We can all make a difference for the health of the ocean. Use the screen at the exit of the gallery to tell us how you will make a difference!

Polar Extremes

Time to wrap up warm as we head into a gallery all about the polar regions of our planet; the Arctic and the Antarctic.

The polar regions are cold because these areas receive less solar energy (heat and light) than the rest of the Earth's surface.

- There are 4 main reasons for this. Can you find out what they are?

1.

2.

3.

4.

Have a look at the ice core in the gallery. Polar ice cores tell us how concentrations of greenhouse gasses in Earth's atmosphere have changed over time, and help scientists build up a picture of how Earth's climate has changed as a result of of the actions of humankind.

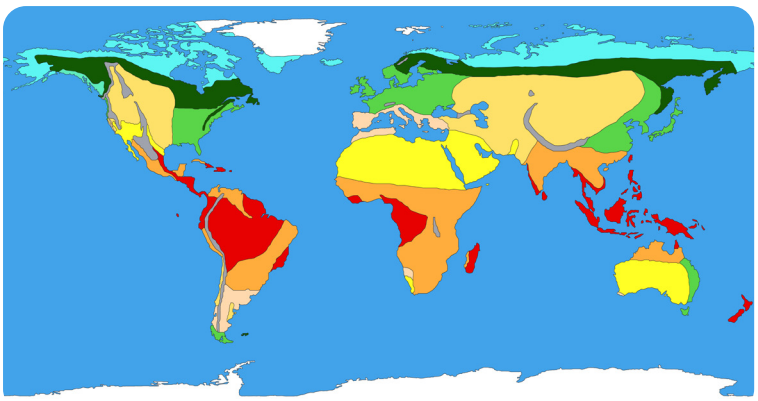
4DVENTURE

Welcome to the Arctic Base! You'll shortly be boarding a craft called 'The Endeavour' which will take you on a journey from the North Pole all the way down to the Tropical Rainforest Base at the Earth's equator.

During the flight, you'll pass through lots of different areas filled with animals and plants that have all adapted to survive in different areas.

Have a look at the map on the walls of the Arctic Base. We call these different areas 'biomes'. A biome is the name given to an area with particular plants, animals and climate.

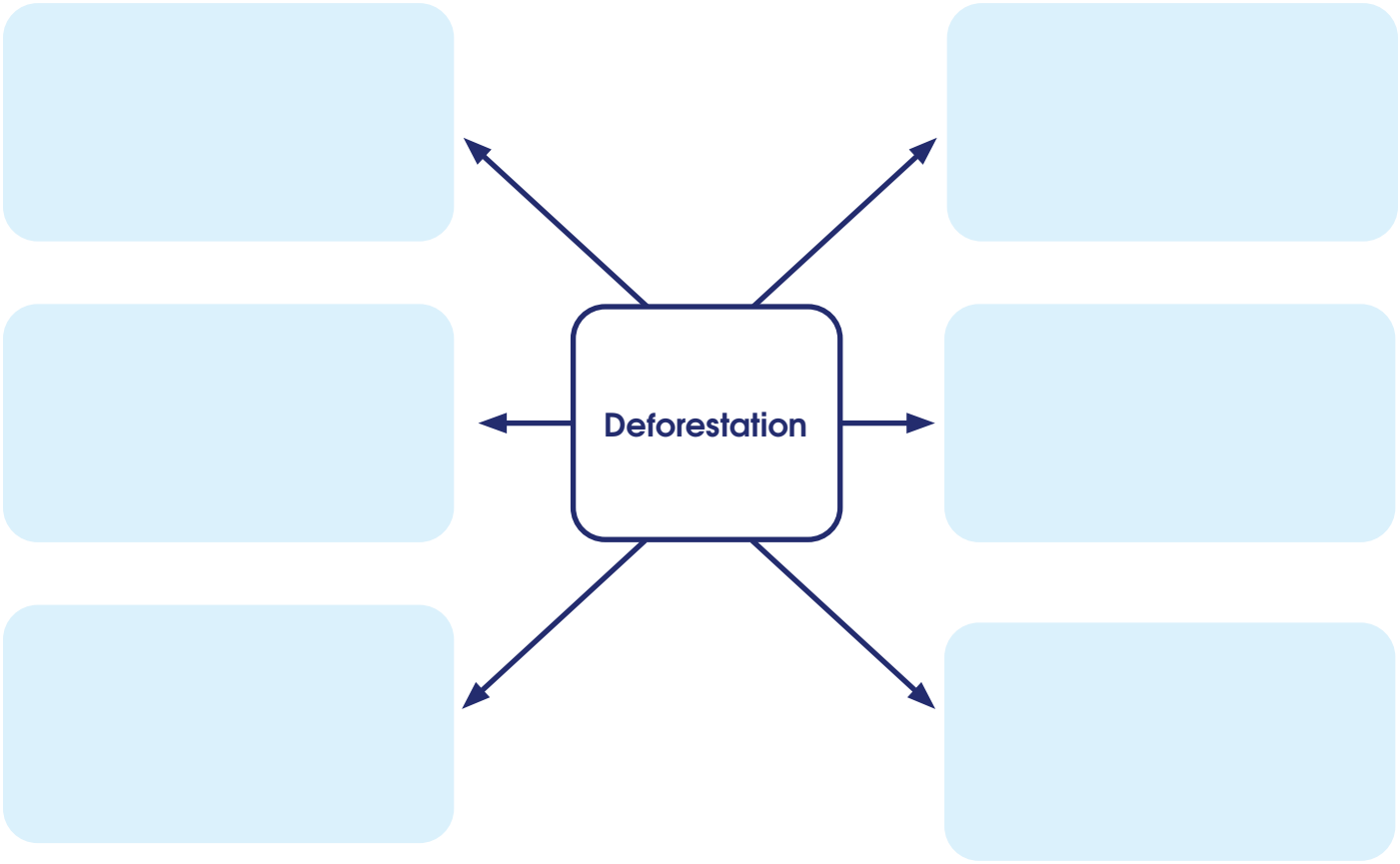
- Can you label the key with the correct biomes?



Tropical Rainforest

You have now landed safely in the West African Rainforest! Rainforests are vital environments for the health of our planet, but deforestation is affecting rainforests at an increasingly rapid rate.

- Complete the spider diagram below to show as many different reasons as you can think as to why rainforests are deforested.



- How can this deforestation contribute to global climate change?

In the Southeast Asian rainforest, there is a mountain called Mount Kinabalu. As you're climbing the stairs look at the pictures on the wall and imagine you are climbing Mt Kinabalu.