Plate Tectonic Theory

In this presentation you will:
- explore historical development that supports plate tectonic theory

Introduction

The outer layer of the Earth is broken up into a number of different plates, that are constantly moving at a very slow speed.

The study of the movement of these plates has led to a greater understanding of how features such as volcanic eruptions, earthquakes and mountain formations occur.

Catastrophism and Uniformitarianism

Until the 1700s it was widely viewed that the position of continents and the shaping of the Earth’s surface was down to catastrophic events, such as large meteorites striking the Earth.

Catastrophism and Uniformitarianism

In 1785 James Hutton, a Scottish geologist, proposed the "Uniformitarian Principle".

This means that geological forces can be gradual as well as catastrophic, and that they are still happening now as they have for millions of years.

This is how the surface of the Earth has been formed.

Continental Drift

Many people had noticed that the coastlines of the continents appear to fit together like puzzle pieces.

As early as 1596, Abraham Ortelius, a Dutch map maker, had suggested that the Americas had at some point been ripped away from Europe and Africa.

Continental Drift

In 1912 a scientist named Alfred Wegener theorized that the continents had once been joined together. He proposed they had then drifted to their current locations over millions of years.

Unfortunately he had no scientific proof to back up his theory, and could not explain where the force would come from to move continents.

This became the theory of continental drift.
Continental Drift
Fossils of the same species of plants and animals had been found across different continents.

This supported Wegener’s theory that the continents had once been joined together.

Continental Drift
Areas of folded and deformed rock also suggested that movements of the crust had occurred in the past.

Continental Drift
Continental drift was disputed by scientists for many years. However, as more evidence was found, it became universally accepted. It has since been incorporated into the theory of plate tectonics, a wider theory of plate motion.

Plate Tectonics
With modern measuring and sensing equipment it is possible to identify where the plate boundaries are, and to measure their movement.

This data supports the theory of plate tectonics.

Question 1
Who was one of the first people to be recorded as suggesting the position of features (countries/continents) on Earth may have moved over time?

A) James Hutton
B) Alfred Wegener
C) Abraham Ortelius
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What Causes Plate Motion?
Imagine you are cooking an egg in a pot of water. As the water is heated and the temperature increases, the egg floating at the surface begins to move.

The hottest particles of water rise to the surface, where they then cool and sink back down in a cycle called a convection current.

The movement in the hot water causes the egg to move.

What Causes Plate Motion?
In a similar way, convection currents within the Earth's mantle cause the plates floating above to move.

While convection in the pot takes a matter of seconds convection within the mantle takes millions of years.

Question 2
Where do the convection currents that cause plate motion originate?
A) Crust
B) Mantle
C) Outer core
D) Inner core

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Question 3
Are the tectonic plates that make up the Earth’s crust still moving?

Answer Yes or No.

Yes

Summary
In this presentation you have seen:

- how the historical development of evidence supporting plate tectonics evolved