SUMMER EXPLORERS 2020

WEEK 9:

JOURNEY TO THE PERMIAN

TRAVEL TO A TIME LONG BEFORE DINOSAURS WHEN PERMIAN MONSTERS RULED THE EARTH!

The Permian Period, about 299 to 252 million years ago, was a time interval that occurred before the "Age of Dinosaurs." At this time, most of the continents on earth were linked together in one large supercontinent called Pangaea and surrounded by one large ocean. Many different types of plants and animals evolved during this time, including reptiles. Different groups of early land vertebrates living at this time would become the ancestors to the first mammals and dinosaurs. The Permian Period ended in the largest mass extinction in history. Over 90% of all plant and animal life on Earth went extinct at the end of the Permian due to climate change, especially warming of global temperatures, and volcanic activity. Together, these factors greatly changed ocean levels, temperatures and chemistry, and levels of carbon dioxide and oxygen in the air and water. Survivors of this extinction would repopulate the Earth over time with a different diversity of species. Learning about the Permian Period can tell us about what life on Earth was like in the past and how it changed over time!

DAY 3: HOTPLATE TECTONICS

Though it happens slowly, the surface of the Earth has changed a lot over time. Even the continents, or the large pieces of land on the surface of Earth like North America and Africa, have changed their location over millions of years. This is because the top layer of the Earth is made up of large, solid pieces of rock called plates. Most plates are made up of the continents that we see and the ocean floor that we cannot; some plates are only the ocean floor. The plates float on another layer of partially melted rock. The heat from the center of the Earth causes Earth's plates to always be in motion on this layer of melted rock. As the plates move, the continents and ocean floors move too. Scientists call this plate movement plate tectonics. During the Permian Period, nearly all of the continents on Earth were joined together in one large continent called Pangea. As time passed and the Earth's plates kept moving, Pangea broke up into smaller continents, including most of the continents we know today. Let's do an experiment to see plate tectonics in action!

Before you start, you should have:

- One sponge
- Scissors
- A skillet or small saucepan
- Water
- A stove or hotplate

Get Started:

1. Completely soak the sponge with water, then wring out the extra.
2. Cut the sponge in half (ask an adult if you need help).
3. Fill the skillet with at least one inch of water.
4. Place the skillet on the stovetop.
5. Place the sponge pieces into the surface of the water. Make sure to keep the pieces in place together, as if the sponge hadn't been cut apart.
6. Look at the sponge pieces in the water and think:
   - What do you think will happen when you turn the stove on?
   - Will the sponge pieces stay together or drift apart?
   - Why do you think so?
7. With an adult, turn the stovetop on high heat.
8. Watch what happens to the sponge pieces after you turn the heat on.
9. When you are finished, turn the stovetop off and wait until the water and sponge pieces are cool before cleaning up (about 15-20 minutes).
10. Tell someone about what you observed:
    - What happened to the sponge pieces when you turned the stovetop on?
    - Why do you think the pieces drifted apart?
    - Does the Earth have one large continent like Pangea today?
    - What causes the continents on Earth to move over time?

Keep exploring!

- Cut the sponge (or several sponges) into the shapes of the actual continents we have today before doing the experiment. Use this map to see how these continents were arranged to form Pangea: https://commons.wikimedia.org/wiki/Pangea#/media/File:Pangaea_continents.png
- Place two or three drops of food coloring in the water before turning the stovetop on. When you turn the stovetop on, watch how the food coloring moves when the water heats up to see how the water moves the sponge pieces.

More information on Pangea and plate tectonics

https://www.youtube.com/watch?v=KfYn9KVya-Q

https://spaceplace.nasa.gov/tectonics-snap/en/

https://oceanservice.noaa.gov/facts/tectonics.html#:~:text=The%20plates%20can%20be%20thought,sometimes%20away%20from%20each%20other.

What did you discover?

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