Unit 3
Physical Oceanography

UEQ: What geological processes are responsible for the physical features of the Earth.

Concept 2: Continental Drift and Plate Tectonics

- <u>LEQ's</u>
  1. What is the Continental Drift Theory?
  2. How did scientists develop the Continental Drift theory?
  3. What is the theory of Plate Tectonics?
  4. How does Plate Tectonics relate to the Continental Drift Theory?

LEQ1: What is the Continental Drift Theory?

- In 1912 a German scientist named Alfred Wegener proposed that all the known continents were once one large continent called Pangaea surrounded by one large sea called Panthalassa.
  - These words come from Greek words.
    - Gaea is the Greek Goddess of Earth
    - Thalassa means sea
    - Pan means all

LEQ1: What is the Continental Drift Theory?

- Wegener looked at maps and saw that the continents seemed to fit together like puzzle pieces.
  - He proposed that the continents were drifting apart by floating on the mantle and had been drifting apart for 200 million years.

LEQ2: How did scientists develop the Continental Drift Theory?

- Evidence to support Continental Drift:
  - Fossils of the same animals and plants have been found on continents that are not currently connected but would have been in Pangaea.

LEQ2: How did scientists develop the Continental Drift Theory?

– Rock Layers on one continent line up with rock layers on other continents that would have been connected in Pangaea.

LEQ2: How did scientists develop the Continental Drift Theory?

- Mountain Ranges that are the same size, age, and rock types spread across more than one continent without continuing under the ocean.

LEQ2: How did scientists develop the Continental Drift Theory?

– Glacier evidence is found on multiple continents, some of which are located in regions that the glaciers should not have reached, unless the glacier happened on Pangaea.

LEQ2: How did scientists develop the Continental Drift Theory?

- Even with all of this evidence to show that Pangaea had indeed existed, Wegener could not fully explain how the continents were moving.
- Without an explanation for how Continental Drift was occurring, the scientific community rejected this theory.

LEQ 3: What is the theory of Plate Tectonics?

- During the same time period as Wegener, new technology was being created that allowed scientists to “see” the sea floor.
  - SOund Navigating And Ranging = SONAR
  - This allowed maps to be made of the sea floor.
- Technology continued to improve through World War II.

LEQ 3: What is the theory of Plate Tectonics?

- In 1960 two scientists used the SONAR data and were able to determine that the sea floor is constantly spreading in some regions and being recycled in others.

LEQ 3: What is the theory of Plate Tectonics?

- The theories of Continental drift and the information of Sea Floor Spreading were combined into the theory of Plate Tectonics.
  - The theory of Plate Tectonics states that Earth's crust is split in many plates that flow along the mantle. These plates can move in three ways:
    - Towards each other = converging
    - Away from each other = diverging
    - Sliding past each other = transforming
  - There are 52 total plates, 14 major and 38 minor