Lab 31: ocean: ocean floor mapping

1. Introduction to Ocean Floor Mapping

- **Objective:** Introduce the concept and importance of ocean floor mapping.
- **Activities:**
  - **Warm-Up Question:** “What do you know about the bottom of the ocean?”
  - **Presentation:**
    - Explain why the ocean floor is mapped (e.g., understanding ecosystems, navigation, natural resource exploration, studying plate tectonics).
    - Share key statistics (e.g., over 80% of the ocean floor is still unmapped).
    - Briefly introduce mapping methods: sonar, satellite altimetry, and submersibles.
  - **Media:** Show a video or animation about ocean floor mapping (e.g., NOAA or National Geographic resources).

2. Techniques for Mapping the Ocean Floor (20 minutes)

- **Objective:** Explore the tools and methods scientists use to map the ocean floor.
- **Activities:**
  - **Interactive Presentation:**
    - **Sonar (Sound Navigation and Ranging):** Explain how sound waves are used to measure depth and create a profile of the seabed.
    - **Satellite Altimetry:** Discuss how satellites measure sea surface height to infer underwater topography.
    - **Submersibles and ROVs (Remotely Operated Vehicles):** Explain how they are used to explore and map areas in detail.

3. Features of the Ocean Floor (20 minutes)

- **Objective:** Identify key ocean floor features and their formation.
- **Activities:**
  - **Presentation with Diagrams:**
    - Highlight features like mid-ocean ridges, trenches, seamounts, abyssal plains, and underwater volcanoes.

    - Discuss how plate tectonics shapes these features.
  - **Interactive Activity:**
    - Using google earth, create an island map of the sea floor

4. Application: Importance of Ocean Floor Mapping (15 minutes)

- **Objective:** Relate ocean floor mapping to real-world applications.
- **Activities:**
  - **Case Studies:**
    - **Tsunami Prediction:** Explain how mapping helps identify earthquake-prone areas.
    - **Marine Conservation:** Discuss how it informs habitat protection (e.g., coral reefs).
    - **Search and Recovery:** Highlight its role in finding shipwrecks or lost aircraft (e.g., MH370).

5. Hands-On GIS Activity: Visualizing Ocean Floor Data (20 minutes)

- **Objective:** Use technology to explore real-world ocean floor data.
- **Activities:**
  - Use an online tool like **Google Earth Ocean** or **NOAA Bathymetry Data Viewer**.
  - Explore and identify key features (e.g., the Mariana Trench, Mid-Atlantic Ridge).
  - Questions:
    - What is the deepest part of the ocean you can find?
    - Identify a mid-ocean ridge and describe its location.
    - What patterns do you notice in ocean floor features?

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