Shark Sanctuaries: Diving into Earth's Underwater Zones

Materials Needed:

- Computer with internet access
- Printer (optional)
- World Map (physical or digital)
- Paper (plain and colored)
- Colored pencils or markers
- Access to online resources (e.g., National Geographic Ocean, NOAA Ocean Explorer, Aquarium websites)

Introduction: Where Do Sharks Hang Out? (10 mins)

Sharks are amazing creatures, but they don't all live in the same place! Just like animals on land live in deserts, forests, or tundras, sharks live in different parts of the ocean. These 'neighborhoods' are defined by Earth science factors: how deep the water is, how warm or cold it is, how much sunlight gets through, and even the water pressure! Today, we're going on an expedition to explore the incredible underwater worlds sharks call home and see how Earth's features shape these awesome predators.

Activity 1: Mapping Shark Hotspots (20 mins)

Let's start by figuring out where sharks tend to congregate. Using online resources (try searching for 'shark distribution maps' or exploring sites like National Geographic Ocean or MarineBio Conservation Society) and your world map:

1. Identify 3-5 areas around the globe known for significant shark populations (e.g., coast of California, South Africa, Australia, the Coral Triangle). Mark these on your map.
2. Research the general ocean conditions in these areas. Are they typically warm or cold? Near coasts or in the open ocean? Note these observations near your marked spots.
3. Discuss: Do you see any patterns? Do certain types of areas seem more popular for sharks? Why might that be? (Think: food sources, water temperature, currents).

Activity 2: Habitat Deep Dive - Ocean Zones Exploration (30 mins)

Now, let's explore three major ocean environments where sharks thrive. For each zone, research its key Earth science characteristics and name a type of shark that lives there.

- **Coastal & Coral Reefs (Sunlight Zone):**
  Characteristics: Shallow, warm, plenty of sunlight, lots of structures (reefs).
  Research: What are typical temperatures? How does sunlight affect life here? Find a shark that lives here (e.g., Blacktip Reef Shark, Nurse Shark). How is it suited to this busy, bright environment?
- **Open Ocean (Pelagic Zone - Twilight Zone):**
  Characteristics: Vast, deep, less light, varying temperatures, fewer places to hide.
  Research: How does pressure change as you go deeper? How does temperature vary? Find a shark that roams here (e.g., Great White Shark, Mako Shark, Blue Shark). How is it adapted for long-distance travel or hunting in open water?
- **Deep Sea (Midnight & Abyssal Zones):**
  Characteristics: Extremely deep, freezing temperatures, immense pressure, total darkness.

Research: What are the challenges of living here? Find a bizarre shark adapted to this extreme environment (e.g., Goblin Shark, Frilled Shark, Megamouth Shark). What unique features help it survive the pressure, cold, and darkness?

Optional: Create a simple chart or diagram comparing the temperature, pressure, light level, and a representative shark for each zone.

Activity 3: Shark Adaptation Showcase (25 mins)

Choose one shark species from your research (or pick a favorite!). Create a mini-report or presentation (this could be a drawing with labels, a short written report, or an oral presentation) that answers:

1. What is the primary ocean habitat/zone of your chosen shark?
2. What are the main Earth science characteristics of this habitat (temperature, pressure, light, physical features)?
3. What are 2-3 specific adaptations this shark has to thrive in these conditions? (Think about its body shape, senses, teeth, coloring, special abilities like bioluminescence, etc.). Explain *how* the adaptation helps it deal with the environment.

Wrap-up & Reflection (10 mins)

Let's discuss what we learned:

- What was the most surprising thing you discovered about where sharks live?
- How does understanding Earth's oceans (temperature zones, pressure, currents, depth) help us understand why sharks live where they do?
- Why is it important to protect these different ocean habitats?

Assessment ideas: Review the Shark Adaptation Showcase, discuss answers to reflection questions, or have the student complete a short quiz matching shark species/adaptations to their primary ocean zone.