Lesson Plan: Mapping the Ocean with Marie Tharp

Student: Cami (Age 6)
Focus: Introduction to scientist Marie Tharp, the concept of seafloor mapping, and the creative process of scientific discovery.

Materials Needed:

- A medium-sized cardboard box or shoebox
- Blue construction paper or blue paint
- Modeling clay or Play-Doh in various colors (brown, green, grey, etc.)
- A few small rocks or pebbles (optional)
- Glue or tape
- A blank sheet of paper (the "map")
- Crayons, markers, or colored pencils
- A short, age-appropriate book or video about Marie Tharp (optional, for enrichment)

Lesson Steps

Part 1: The Big Question & A Super Scientist (10 minutes)

Goal: To spark Cami's curiosity and introduce the main character of our story, Marie Tharp.

1. **Engage with a Question:** Start by asking Cami, "If you could drain all the water out of the ocean, what do you think you would see at the very bottom? Would it be flat and sandy like a beach, or something else?" Let her share her ideas freely.
2. **Introduce Marie Tharp:** Say something like, "That's a great question, and a long time ago, most people thought it was just flat and muddy. But a scientist named Marie Tharp had a different idea. Her job was to make the very first map of the entire ocean floor, but she wasn't allowed to go on the ships to collect the information herself! Instead, her partner sent her long lists of numbers that told her how deep the ocean was in different places."
3. **The Big Discovery:** Explain, "As Marie turned those numbers into pictures on a map, she discovered something amazing that no one had ever seen before: there are huge mountains and deep valleys under the ocean! The biggest mountain range on the whole planet is hiding under the water. She had discovered the Mid-Atlantic Ridge. At first, some people didn't believe her, but she knew she was right, and she proved it with her maps!"

Part 2: Cami's Expedition - Build the Seafloor (20-25 minutes)

Goal: For Cami to creatively apply the concept of underwater topography by building her own 3D model.

1. **Prepare Your "Ocean":** Have Cami prepare her shoebox. She can either glue blue construction paper to the bottom and sides or paint them blue to represent the ocean water.
2. **Build the Mountains (Mid-Ocean Ridge):** Give Cami brown or grey modeling clay. Tell her, "Now you get to be the scientist who builds the seafloor! Let's start with Marie Tharp's big discovery. Use the clay to build a long mountain range running down the middle of your ocean box." Encourage her to make it bumpy and tall.

3. **Add the Rift Valley:** Show her how Marie Tharp found a deep valley, or a crack, running right through the middle of the mountains. Say, "Can you use your finger or a craft stick to press a little valley right down the center of your mountain range?"
4. **Add Other Features:** Let her creativity shine! Ask, "What else might be down there?" She can add smaller mountains (seamounts), flat plains (abyssal plains), or use pebbles to add texture. This is her ocean floor to discover and create.

Part 3: Map Your Discovery! (15 minutes)

Goal: To simulate Marie Tharp's work by turning a 3D model into a 2D map, reinforcing the connection between data/observation and representation.

1. **Set Up the Map:** Give Cami the blank sheet of paper and drawing tools. Say, "Marie Tharp took what she discovered and drew it on a map so she could share it with the world. Now it's your turn! You are going to be the cartographer (a map-maker) for your new ocean."
2. **Draw the Map:** Encourage Cami to look closely at the shoebox model she just built and draw it on her paper. Prompt her with questions like:
    - "Where is your big mountain range on the map?"
    - "Can you draw the line for the deep valley?"
    - "How can you show the flat parts versus the bumpy parts using colors or shapes?"

    Teacher's Note: The goal is not a perfect, to-scale drawing. The goal is for her to translate her 3D creation into a 2D representation, just as Marie Tharp translated numbers into a 2D map.

3. **Name Your Discovery:** Every explorer gets to name their discoveries! Let Cami name her ocean, her mountain range, and any other features she created. She can write (or you can help her write) the names on her map.

Part 4: Share and Discuss (5 minutes)

Goal: To solidify learning by having Cami articulate what she learned and created.

1. **The Scientist's Presentation:** Ask Cami to present her findings. Have her hold up her shoebox model and her map and explain what she discovered at the bottom of the ocean.
2. **Connect Back:** Conclude by saying, "You just did exactly what Marie Tharp did! You looked at information (your model) and created a map to show others what's there. You proved that the bottom of the ocean isn't flat—it's full of amazing mountains and valleys, all thanks to a curious scientist and her maps!"

Extension Ideas (Optional)

- **Bath Time Sonar:** In the bath, have Cami close her eyes while you place a waterproof toy at the bottom. She can use her hands to gently feel the shape of the toy and guess what it is, similar to how ships used sound (sonar) to "feel" the bottom of the ocean.
- **Explore with Google Earth:** Use the Google Earth application to explore the ocean floor. Zoom in and show her the real Mid-Atlantic Ridge, demonstrating how Marie Tharp's maps have been proven by modern technology.