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OCEAN EXPLORATION TRUST

Author: [Jason McGee](#)

Science Lesson: Shapes of the Seafloor

Objective: TLW explore modern mapping tools that reveal ocean floor shapes via sonar and will create a modern topographic map.

“Look Fors”: TL is using vocabulary and knowledge of sonar and seafloor mapping presented in the discussion and videos to analyze, describe, and apply mapping knowledge by creating a model topographic map.

Key

TTW: The Teacher (Will)

TLW: The Learner (Will)

SG: Small Group work

PPT: PowerPoint

IOT: In Order To

- Small plastic tubs or bowls
- Play-Doh or clay
- Skewers painted (pink, orange, green)
- Shoeboxes (with pre-made poked holes through the top)
- Classroom or recycled materials (to vary ocean surfaces within the boxes)
- Round dot yard sale label stickers (pink, orange, green)
- Water
- [Topographic Map](#) worksheet
- [Mapping the Ocean Floor PPT](#)

Supplies

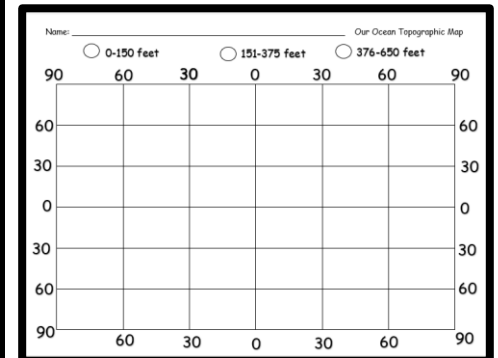
- TTW use the provided **Mapping the Ocean Floor presentation** (slides 1-5) to lead a discussion of mapping the ocean floor and its importance, what it can provide for researchers.
- TLW watch the following video at [nautiluslive.org](https://nautiluslive.org/video/2018/08/07/expedition-overview-mapping-pacific-seamounts): *Expedition Overview: Mapping Pacific Seamounts* <https://nautiluslive.org/video/2018/08/07/expedition-overview-mapping-pacific-seamounts>
- Using the information from the provided video, TTW guide the importance of mapping the ocean floor. This will be a great time to brainstorm new ideas TL would like to learn to further drive the focus of instruction as well.

1. Engage

- As a group, TLW manipulate clay or Play-Doh into mounds at the bottom of a plastic tub or bowl, simulating the varying features on the ocean floor. TTW fill the plastic tub with water. Learners will use their fingers to measure the different depths of the clay ocean floor. Observe that in some places, fingers may not be completely submerged, whereas other places, full fingers or a whole hand was submerged. TTW compare this to the ocean floor.
- *Essential Question: How would you compare this STEM experiment to the work done by mapping researchers?*

2. Explore

Student Work



TTW use these resources from NautilusLive.org:

<https://nautiluslive.org/resource/seafloor-mapping-teaching-animation>; <https://nautiluslive.org/tech/acoustic-systems>

- Using this information (and slides 6-8 in the presentation), TTW guide a discussion on the importance of sonar mapping tools to researchers.
- Using the pre-made skewers (representing the sound beams), TLW measure the depths of the shoe boxes (in *extend*). TTW guide the comparison of the pre-painted skewers to sonar mapping technology discussed in the video.

Skewers should be painted to the height of the shoeboxes using color stripes: pink at the base of the skewer (shallow water), orange in the middle of the painted area, green at the top of the painted area (deepest part of the ocean).

3. Explain

Supporting essential questions that can be used to evaluate student understanding:

- How would you compare our STEM experiment to the exploration that mappers conduct in the oceans?
- How can explorers use mapping technology to further explore the oceans?
- In your opinion, do you feel sonar technology could have a positive impact on marine life? How do you feel this could positively impact marine life? Negatively?
- How would you describe ways humans could use echolocation as an adaptation to better our lives and meet our needs?
- How would you compare the varying maps made in different shoeboxes? How would you compare this to the oceans?

5. Evaluate

- As a group, TLW place various classroom materials in the shoeboxes, making mounds of various heights; close the shoeboxes using the lid with holes.
- As a SG, TLW use the “sonar skewers” to check the various holes in the lid. The “sonar skewer” will display the varying “sea levels” in the shoe box. As each hole is analyzed—the paint on the skewer will be used to determine the “sea level”; this will be the color displayed where the skewer meets the lid—TLW place a pink (shallow), orange, or green (deepest sea levels) blank round dot approximately on the topographic map for each hole analyzed.
- TTW the *supporting essential questions (in evaluate)* to guide the instruction of this lesson and analyze the completed map(s).

4. Extend

Animal Showcase:

Inspire your young explorers by showcasing a new ocean animal each class/club meeting.

For this lesson, showcase **dolphins** or **whales** using the link below. These animals use echolocation which uses similar principals to sonar technology.

<https://www.youtube.com/watch?v=5GuaNA-5qWw&t=2s>

Additional Resources and Links

- Find more resources about seafloor mapping here: <https://nautiluslive.org/search/node?keys=mapping> including a career profile for seafloor mappers.
- Seafloor mapping is the first step of exploration before ROVs go into the water. For more videos of discoveries from the seafloor visit: www.nautiluslive.org/gallery.