Exploring the Deep Ocean with NOAA Ocean Exploration
Educator Resource List

*To Boldly Go - Lesson

- **Educator Guide:** https://oceanexplorer.noaa.gov/edu/materials/to-boldly-go.pdf
- **Student Worksheet:** https://oceanexplorer.noaa.gov/edu/materials/to-boldly-go-student-worksheet.pdf

Fact Sheet

- **Why Do We Explore?** https://oceanexplorer.noaa.gov/edu/materials/why-do-we-explore-fact-sheet.pdf

*Wet Maps - Lesson

- **Educator Guide:** https://oceanexplorer.noaa.gov/edu/materials/wetmaps.pdf
- **Student Worksheet:** https://oceanexplorer.noaa.gov/edu/materials/wetmaps-student-worksheet.pdf
- **Demonstration videos:** https://oceanexplorer.noaa.gov/edu/themes/seafloor-mapping/lessons/wet-maps.html

Fact Sheets - These fact sheets can also be used with the Watching in 3D lesson below.

- **Bathymetric Maps:** https://oceanexplorer.noaa.gov/edu/materials/bathymetric-mapping-fact-sheet.pdf
- **Seeing Sonar with Sound:** https://oceanexplorer.noaa.gov/edu/materials/sonar-fact-sheet.pdf
- **Multibeam Sonar:** https://oceanexplorer.noaa.gov/edu/materials/multibeam-sonar-fact-sheet.pdf

Video

- **Using Sound to Map the Seafloor**: https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/media/2023-DSD-Mapping-v6-1920x1080.mp4

*Watching in 3D: Exploring with Multibeam Sonar - Lesson

- **Educator Guide:** https://oceanexplorer.noaa.gov/edu/materials/Watching3Dinstructions.pdf
- **Case Study 1: Exploring an Underwater Volcano (Kawio Barat)** https://oceanexplorer.noaa.gov/edu/materials/CaseStudy1_KawioBarat_Volcano.pdf
- **Introduction Video:** https://oceanexplorer.noaa.gov/edu/materials/Win3D_Fledermaus.mp4
- **Fledermaus Video: Underwater Volcano (Kawio Barat)** https://oceanexplorer.noaa.gov/edu/materials/CaseStudy1_KawioBarat_Volcano.mp4
- **All other case studies and videos** https://oceanexplorer.noaa.gov/edu/themes/seafloor-mapping/lessons/3d-multibeam-sonar.html

Fact Sheets

- **All the above listed mapping fact sheets plus the following additions:**
- **Cold Seeps:**
  - **English:** https://oceanexplorer.noaa.gov/edu/materials/what-are-cold-seeps-fact-sheet.pdf
  - **Spanish:** https://oceanexplorer.noaa.gov/edu/materials/what-are-cold-seeps-fact-sheet-ESP.pdf

- **What is a Seamount?**
    - **English:** https://oceanexplorer.noaa.gov/edu/materials/what-is-a-seamount-fact-sheet.pdf
    - **Spanish:** https://oceanexplorer.noaa.gov/edu/materials/what-is-a-seamount-fact-sheet-ESP.pdf

*Using Chemistry to Find Vents - Lesson

- **Educator Guide:** https://oceanexplorer.noaa.gov/edu/materials/investigation-using-chemistry-to-find-vents.pdf
- **Student Worksheet:** https://oceanexplorer.noaa.gov/edu/materials/investigation-using-chemistry-to-find-vents-student-worksheet.pdf

Video

- **Hydrothermal Vents:** https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/media/hydrothermal-vents-1920x1080.mp4

Fact Sheets

- **Hydrothermal Vents:**
    - **English:** https://oceanexplorer.noaa.gov/edu/materials/hydrothermal-vents-fact-sheet.pdf
    - **Spanish:** https://oceanexplorer.noaa.gov/edu/materials/hydrothermal-vents-fact-sheet-ESP.pdf
- **Chemosynthesis:**
    - **English:** https://oceanexplorer.noaa.gov/edu/materials/chemosynthesis-fact-sheet.pdf
    - **Spanish:** https://oceanexplorer.noaa.gov/edu/materials/hydrothermal-vents-fact-sheet-ESP.pdf
- **Making Sense of Deep-Sea Phenomena:** https://oceanexplorer.noaa.gov/edu/materials/NOAA-NSTA-sensemaking-phenomenon.pdf

*Simple Machines: Robot Building Blocks - Lesson

- **Educator Guide:** https://oceanexplorer.noaa.gov/edu/materials/simple-machines-activity.pdf
- **Student: Simple Machines:** https://oceanexplorer.noaa.gov/edu/materials/simple-machines-handout.pdf
- **Engineering Design Process:** https://oceanexplorer.noaa.gov/edu/materials/engineering-design-process-handout.pdf

*Which Robot When? - Lesson

- **Educator Guide:** https://oceanexplorer.noaa.gov/edu/materials/which-robot-when-activity.pdf
- **Student Worksheet:** https://oceanexplorer.noaa.gov/edu/materials/which-robot-when-student-worksheet.pdf
- **Vehicle Summary Sheets:** https://oceanexplorer.noaa.gov/edu/materials/exploration-vehicle-summary-sheets.pdf

Videos

- **Ocean Technology:** https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/media/2024-NOAA-DSD-OceanTech-1920x1080.mp4
- **Underwater Robots:** https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/media/robots-1920x1080.mp4

Fact Sheets

- **Remotely Operated Vehicles:**
  - **English:** https://oceanexplorer.noaa.gov/edu/materials/rov-fact-sheet.pdf
  - **Spanish:** https://oceanexplorer.noaa.gov/edu/materials/rov-fact-sheet-ESP.pdf
- **Autonomous Underwater Vehicles:**
  - **English:** https://oceanexplorer.noaa.gov/edu/materials/auv-fact-sheet.pdf
  - **Spanish:** https://oceanexplorer.noaa.gov/edu/materials/auv-fact-sheet-ESP.pdf

Additional Resources

- **Ocean Literacy:** https://www.marine-ed.org/ocean-literacy/overview
  - **Ocean Literacy Guide:** https://www.marine-ed.org/ocean-literacy/guide
  - **Ocean Literacy Handbook:** https://www.marine-ed.org/ocean-literacy/handbook
- **NOAA Ocean Exploration:** https://oceanexplorer.noaa.gov/edu/themes/welcome.html
  - **Ocean Exploration Education Fact Sheets:** https://oceanexplorer.noaa.gov/edu/materials/fact-sheets.html
  - **Deep-Sea Dialogues:** https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/dsd.html
  - **Seafloor Mapping with NOAA Ocean Exploration:** https://storymaps.arcgis.com/stories/0e846463c4a84c94bb0dfc594201b249
- **Deep Ocean Education Project (website):** https://deepoceaneducation.org/
- **Give Hercules a Helping Claw - OET STEM Learning Module** https://nautiluslive.org/resource/give-hercules-helping-claw
- **Robotic Arm Kit Activity - OET design challenge** https://nautiluslive.org/resource/robotic-arm-kit-activity
- ***How Little We've Seen: A Visual Coverage Estimate of the Deep Seafloor,* Science Advances, 2025.** https://www.science.org/doi/10.1126/sciadv.adp8602
- ***It All Begins with a Great Map*, Earth Scientist, pgs 53-60, Spring 2025.** https://drive.google.com/file/d/1XzFPzOTAhT3DYKbFyle3YPqLwYbntIx_/view