



Educator Resource List

Life Beyond Light: Chemosynthetic Communities of the Deep Ocean Hydrothermal Vents & Cold Seeps

Below are all of the lessons and resources covered within the Life Beyond Light educator professional development workshop. The main web page for each lesson provides links to educator guides, student worksheets, teaching slides, demonstration videos and more.

Chemosynthesis

Lessons

- **Fueling Life on Earth: Chemosynthesis vs Photosynthesis (HS Lesson)**

- <https://oceanexplorer.noaa.gov/edu/themes/vents-and-volcanoes/lessons/fueling-life.html>

- **Educator Guide:**

- <https://oceanexplorer.noaa.gov/edu/materials/educator-guide-fueling-life-on-earth.pdf>

- **Student Worksheet:**

- <https://oceanexplorer.noaa.gov/edu/materials/student-worksheet-fueling-life-on-earth.pdf>

Hydrothermal Vents

Lessons

- **Investigation: How Black Smoker Vent Chimneys Form (MS Lesson)**

- <https://oceanexplorer.noaa.gov/edu/themes/vents-and-volcanoes/lessons/black-smoker.html>

- **Educator Guide:**

- <https://oceanexplorer.noaa.gov/edu/materials/vent-chimney-formation-investigation.pdf>

- **Student Worksheet:**

- <https://oceanexplorer.noaa.gov/edu/materials/vent-chimney-formation-student-worksheet.pdf>

- **Vent Formation Demo Video:** <https://oceanexplorer.noaa.gov/edu/themes/vents-and-volcanoes/lessons/black-smoker.html>

- **Investigation: Life on a Hydrothermal Vent (HS Lesson)**

- <https://oceanexplorer.noaa.gov/edu/themes/vents-and-volcanoes/lessons/life-hydrothermal-vent.html>

- **Educator Guide:**

- <https://oceanexplorer.noaa.gov/edu/materials/life-on-hydrothermal-vent-investigation.pdf>

Fact Sheets (FS)

- **Chemosynthesis FS**

- **English:** <https://oceanexplorer.noaa.gov/edu/materials/chemosynthesis-fact-sheet.pdf>

- **Spanish:** <https://oceanexplorer.noaa.gov/edu/materials/chemosynthesis-fact-sheet-ESP.pdf>

- **Portuguese:** <https://oceanexplorer.noaa.gov/edu/materials/portugues-quimiosintese-ficha-tecnica.pdf>

- **Hydrothermal Vents FS**

- **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>

Video Overview

- **Deep-Sea Dialogues: Hydrothermal Vents**

<https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/media/hydrothermal-vents-640x360.mp4?640>

Cold Seeps

Lessons

- **Methane Hydrates of the Deep Sea (MS Lesson)**

<https://oceanexplorer.noaa.gov/edu/themes/cold-seeps/lessons/methane-hydrate-model.html>

- **Educator Guide:** <https://oceanexplorer.noaa.gov/edu/materials/activity-methane-hydrate-model.pdf>
- **Student Worksheet:** <https://oceanexplorer.noaa.gov/edu/materials/activity-methane-hydrate-model-student-worksheet.pdf>

- **Investigation: Fire Ice in the Deep Sea (MS Lesson)**

<https://oceanexplorer.noaa.gov/edu/themes/cold-seeps/lessons/fire-ice-in-deep-sea.html>

- **Educator Guide**
<https://oceanexplorer.noaa.gov/edu/materials/student-investigation-fire-ice-in-deep-sea.pdf>
- **Student Worksheet**
<https://oceanexplorer.noaa.gov/edu/materials/fire-ice-in-deep-sea-student-worksheet.pdf>

- **Investigation: Methane Ice Worms (HS Lesson)**

<https://oceanexplorer.noaa.gov/edu/themes/cold-seeps/lessons/methane-ice-worms.html>

- **Educator Guide**
<https://oceanexplorer.noaa.gov/edu/materials/student-investigation-methane-ice-worms.pdf>
- **Student Worksheet**
<https://oceanexplorer.noaa.gov/edu/materials/student-worksheet-methane-ice-worms.pdf>

Fact Sheets (FS)

- **Chemosynthesis FS**

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- **Spanish:** <https://oceanexplorer.noaa.gov/edu/materials/chemosynthesis-fact-sheet-ESP.pdf>
- **Portuguese:** <https://oceanexplorer.noaa.gov/edu/materials/portugues-quimiosintese-ficha-technica.pdf>

- **Cold Seeps FS**

- **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>

- **Cold Seep Communities FS**

- **English:** <https://oceanexplorer.noaa.gov/edu/materials/cold-seep-communities-fact-sheet.pdf>
- **Spanish:** <https://oceanexplorer.noaa.gov/edu/materials/chemosynthesis-fact-sheet-ESP.pdf>

Video Overview

- **Deep-Sea Dialogues: Cold Seeps**

<https://oceanexplorer.noaa.gov/edu/multimedia-resources/dsd/media/cold-seeps-640x360.mp4?640>

Additional Resources

- **What is the difference between hydrothermal vents and cold seeps? (Ocean Fact):**
<https://oceanexplorer.noaa.gov/facts/seeps-vents.html>
- **Making Sense of Deep-Sea Phenomena (Background):**
<https://oceanexplorer.noaa.gov/edu/materials/NOAA-NSTA-sensemaking-phenomenon.pdf>
- **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>
 - **Deep Dive into Cold Seeps (Interview with an Expert):**
<https://www.youtube.com/playlist?list=PL3MLzt5mNjuku8N8kYjRxW60VuA22EmZJ>
- **Deep Ocean Education Project (website):** <https://deepoceaneducation.org/>