

Endeavour Hydrothermal Vents: Canada's First Marine Protected Area.

Marine Conservation
Unique Environments
Adaptations
Biomes
Grades 4 – 8
Grade 11

Materials

Activity I, II, and III
Backgrounder pages
Colouring Page
Curriculum connections page
Diversity page
Glossary
Chemosynthesis vs. photosynthesis page
Interesting Facts
Visualization pages #1 and #2

Overview

Through class discussions, research, and activities, students in Grades 4 to 8, as well as grade 11, will learn about the ocean biome, hydrothermal vents, and more specifically about Canada's Endeavour Hydrothermal vent site and its designation as a Marine Protected Area. Students will become acquainted with the Endeavour hydrothermal vents area and its residents and their adaptations for existence in this harsh environment.

A basic understanding of the Earth's tectonic plates is necessary prior to this lesson; a basic definition is given in the glossary.

Grade 11 students can take this lesson plan to the next level, using planning and investigation to look at theory of evolution and adaptation, photosynthesis versus chemosynthesis, speciation, and cause and effect relationships.

Objectives

Going through the three activities and class discussions students will –

- Meet grade appropriate curriculum connections (see separate curriculum connections page)
- Learn what a Marine Protected Area is and why we need them. (see backgrounder pages)
- Understand terminology (see glossary)

- Discover the residents of the hydrothermal vents and the challenges of exploring the marine abyss biome.

Activities

There are three activities for students on Marine Protected Areas and the Endeavour Hydrothermal Vents.

Activity I– Becoming a Researcher introduces students to features of hydrothermal vents, terms and names, and the vent ecosystem.

Students research and present within groups and then to whole class so that all the class is introduced to terminology and gains an understanding of Hydrothermal Vents and Marine Protected Areas.

Activity II – Special Places is designed to encourage students to analyze what makes a place special to them. Leading from this discussion, they will then look at the Endeavour Hydrothermal Vents, and discuss the reasons why this area was chosen (is it unique, threatened, vulnerable to human activity?) for a Marine Protected Area.

Activity III – A Product of My Environment (may be split into 2 lessons)

Beginning with an introduction to zones of the earth, then of the ocean, students are taken to the zone of the Endeavour Hydrothermal vents, the abyss, and look at adaptations that the local residents have made to survive in this environment. Using guided imagery, (visualization #1) student’s imagination is challenged to create a creature that could survive well in the described fantasy habitat.

The next step is a guided imagery of what the hydrothermal vents habitat would be like, (visualization #2) and the students are then challenged to create or describe a creature that would be well adapted to survive there.

Estimate of time required

- Number of lessons: 3 or 4
- Time required for each lesson: 30-90 minutes
- Can be done: anytime
- Natural Area Required: None. An open area or outdoor area where students can form a circle to present is recommended.

Adaptations

As these are complex topics, with much information and many concepts for students to grasp, the materials have been divided into segments that can be presented to students in a sequence that the teacher feels will work best for the grade level they are working with. Part or all of the materials can be used.

The backgrounder has a short answer, followed by a more detailed explanation.

Evaluation

Evaluation suggestions have been given with each of the three activities.

Key questions that students should be able to answer at the end of this unit:

1. What is a Marine Protected Area?
2. What are Hydrothermal vents?
3. What makes the Endeavour Site unique?
4. For older grades, the following terms can be defined (or acted out)
 - what is endemism?
 - what is gigantism?
 - what is photosynthesis?
 - what is chemosynthesis?
 - what is symbiosis?

Other Resources

Web page links are provided when relevant to subject matter.

Key words are listed in the Becoming a Researcher activity to enable students to do their own web search.

Related lesson plans and Resources:

Video highlights – vents playlist -

<https://www.youtube.com/playlist?list=PL84B4C76ABEFABB07>

<http://oceanexplorer.noaa.gov>

<http://education.nationalgeographic.org/activity/resources-in-the-deep-sea/>