



Hawaii's Coral Reefs

Developed by:
Bobby Hsu, Jackie Gaudioso, and Diane Duke

Grade Level: Kindergarten

Purpose: This curriculum is designed to communicate:

- I. What is coral: overview coral anatomy, distribution, physical properties, and why it is important to conserve coral reefs.
- II. Coral morphology: coral growth form and function.
- III. Coral reef as a habitat: food chain, plants and animal relationship.

Hawaii Content and Performance Standards (HCPSIII):

Standard 1: The Scientific Process: **SCIENTIFIC INVESTIGATION**: Discover, invent and investigate using the skills necessary to engage in the scientific process

Benchmarks:

SC. K. 1.1 Use the senses to make observations

SC. K. 1.2 Ask questions about the world around them

Standard 3: Life and Environmental Sciences: **ORGANISMS AND THE ENVIRONMENT**: the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment

Benchmark:

SC. K. 3.1 Identify similarities and differences between plants and animals

Standard 4: Life and Environmental Sciences: **STRUCTURE AND FUNCTION IN ORGANISMS**: Understand the structures and functions of living organisms and how organisms can be compared scientifically

Benchmark:

SC. K. 4.1 Identify differences between living and non-living things

Standard 5: Life and Environmental Sciences: **DIVERSITY, GENETICS, AND EVOLUTION**: Understand genetics and biological evolution and their impact on the unity and diversity of organisms

Benchmark:

SC. K. 5.1 Identify ways in which some offspring are very much like their parents, although not exactly



Topic and Driving Question:

What is unique about Hawai‘i’s coral reef habitat, who lives there, and why should we conserve this habitat?

Rationale:

Coral reefs in the Hawaiian archipelago comprise over 80% of U.S. coral reefs and span over 2,000km. Hawaiian reefs possess some of the highest levels of marine endemic species in the world. They shelter over 700 species of fish, 400 species of algae and over 2,000 species of invertebrates. Our coral reefs are not only important to protecting our shoreline from storms and wave damage but also provide economic benefits to our local communities through marine tourism and nearshore fisheries. Reef-building corals are the keystone framework organisms in coral reefs and a decline in coral health will have direct and immediate effect to the entire coral reef ecosystem. For this reason, it is important for our youth to understand that corals are not colorful rocks but living organisms which in itself is an ecosystem. This curriculum uses hands-on activities to promote interactive learning about Hawai‘i’s coral as organisms and the coral reef ecosystem (from PRISM Hawai‘i’s Coral Reef Ecosystem Curriculum, fourth grade).

Formative Assessment:

Throughout the unit, students’ learning is re-enforced and assessed through worksheets, data collection, and class discussions.

Summative Assessment:

Students will work cooperatively to express their knowledge of the coral reef habitat and the flora-fauna found there by constructing coral reef animal puppets and performing a food chain puppet show. Each student will be assigned a plant or animal found in the coral reef and will make a 3D realistic puppet of the organism. Each student will present his or her organism and answer questions about its foraging behavior. Students will use critical thinking, creativity, and communication skills to express what they know about coral reef.

Overview of Lessons Chart: See attached sheet

Sources:

PRISM Coral Reef Ecology unit (Grade 4) Build a Polyp Lesson is Directly taken from Coral Reef Ecology unity (Grade 4)
www.divekauai.com/seaguide.htm



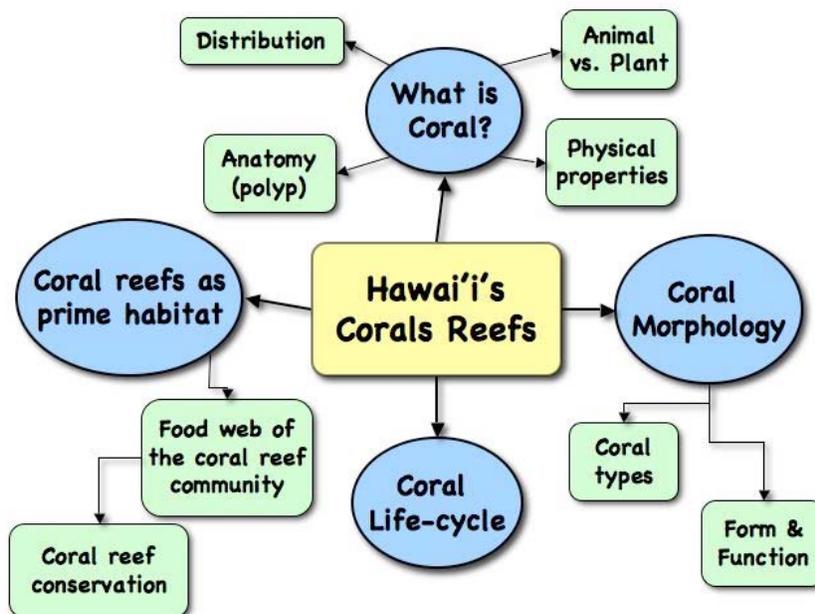
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http://www.msblog.org/album/albums/userpics/10002/normal_Green%20sea%20turtle.jpg

Coral Reefs in the South Pacific Handbook. Produced by Dr. Michael King, illustrated by S. Belew and M. King. © 1993 South Pacific Regional Environment Programme, P.O. Box 240, Apia, Western Samoa.

Concept Map for Unit:





Timeline	Lesson & Topic	Concepts	Student Objectives	Activity Description	Assessment
<i>Week 1 1-45 minute session and 1-1hour session</i>	Pre-Assessment & What is Coral? & Guess Who Coral	-Form and function -Adaptation and Divergence -Conservation of ecosystems	Students will break the misconception that coral is not living and not an animal. They will be exposed to the threats of coral reefs in Hawai'i. They will pose questions that help them categorize types of coral by their attributes.	Students will first discuss what they know and want to know about coral. Then, they will be introduced to 4 major types of coral.	Pre-assessment completed Class discussion Demonstrates knowledge of coral types and categorization process. Completed Coral ID worksheet
<i>Week 2 1-1hour session and 1-45 minute session</i>	Coral Reef Community (Part 1) & Coral Reef Community (Part 2)	-Food chain and interdependence of organisms in an ecosystem -Form and function	Students will learn what organisms make up the coral reef community and how they depend on each other. They will hypothesize about how the food chain would differ if a trophic level was removed.	Students will create puppets of organisms that live on Hawai'i's coral reefs. They will act out the food chain with these puppets through scenes of a typical day on the reef.	Completed realistic-looking puppet Plays the role of assigned organism
<i>Week 3 1-45 minute session and a 3+-hour field trip</i>	Build a Polyp & Optional Lesson (Guess Who? Coral)	Anatomy, Form and Function Adaptation, form and function	Students will express their knowledge of coral anatomy by making a model. The Guess Who coral lesson is an introduction to the many types of coral found in Hawai'i.	Students will construct an edible model of a coral polyp and talk about each part and why it is important for the coral to survive. Students will use critical thinking skills to describe and identify different types of coral.	Completed coral polyp model and expresses knowledge of coral parts Discussion at the end of the lesson and completed worksheet



<i>Week 4: 1 hour + 15 minutes for post- assessment</i>	Field Trip (West Hawai'i Explorations Academy & Post-assessment	Making connections to their local community	During the field trip students will make connections between what they learned about corals in the classroom and coral reefs in their local community.	During the field trip to either a coral reef or aquarium/ marine educational center, students will observe living coral and the organisms found on the coral reef in their local community.	Discussion during field trip Post-assessment completed
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Hawaii's Coral Reefs (Kindergarten) Glossary

What is Coral? (Lesson 1):

Animal (The 5 characteristics of animals): 1. Multicellular; 2. Consumes other organisms for food; 3. Has an internal digestive system; and 4. Embryonic development; 5. Motile, or can move independently

Coral Reef: extensive structures produced by the secretion of calcium carbonate by living corals

Living (Biotic): alive

Non-living (Abiotic): not alive

The Coral Reef Community (Lessons 2 & 3):

Carnivores: organisms that prey on animals

Community: An ecological unit composed of a group of organisms or a population of different species occupying a particular area, usually interacting with each other and their environment.

Decomposers: scavengers that eat dead material

Herbivores: organisms that eat only vegetation

Omnivores: organisms that eat both vegetation and also prey upon animals

Producers: vegetation that produces its own energy through intrinsic processes (photosynthesis)

Build a Polyp (Lesson 4):

Colony (coral): a group of coral polyps

Polyp: an anemone-like single unit of a coral animal

Tentacle: arms of the coral polyp. A polyp usually has 6-8 tentacles

Mouth: the entry point of the one-way digestive system of coral polyps

Stomach: the digestive organ of coral polyps

Stinging cells: cells on the end of tentacles that sting and paralyze prey; also called nemocysts

Skeleton (coral): a calcium carbonate material secreted by corals, which forms reefs

Guess Who? Coral (Optional Lesson):

Light: environmental solar light source which effects shallow-water coral growth. Corals that depend on zooxanthellae (algae cells) for energy can only survive in an area where zooxanthellae can receive enough light to conduct photosynthesis

Salinity: measure of dissolved salts per unit volume

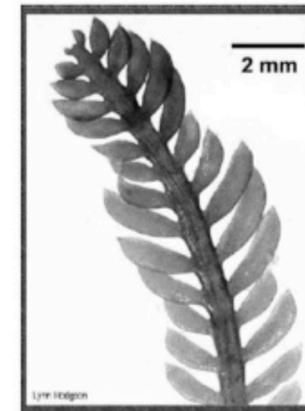
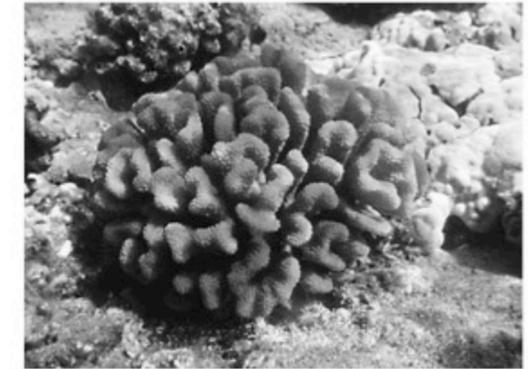
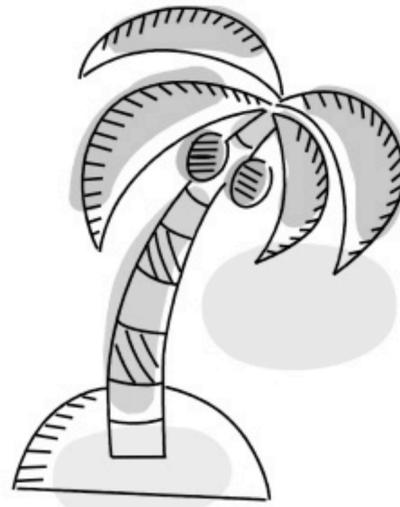
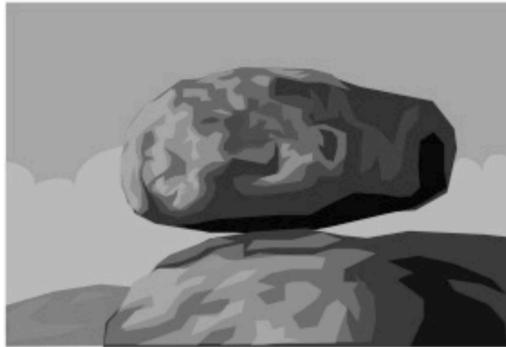
Temperature: a measure of thermal energy; corals are very sensitive to changes in temperature

Wave action: a measure of physical activity of ocean waters

Name _____

Pre-assessment: Corals for Kindergarten!

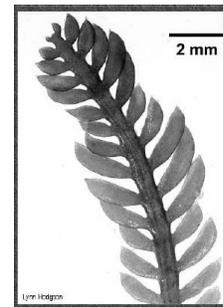
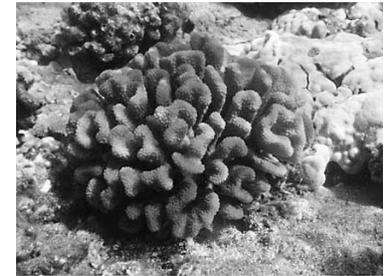
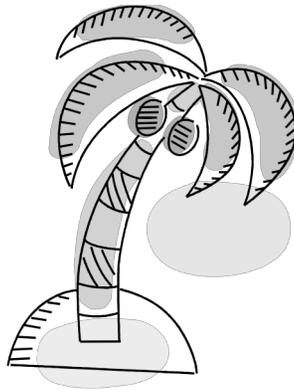
Circle all of the animals below:



Name _____

Post- assessment: Corals for Kindergarten!

Circle all of the animals below:



Draw a picture of a coral reef
and what lives there.