

9. Sample Natural History Lesson Plans



SELECTIONS FROM:
INTERPRETING FOR CONSERVATION
A MANUAL FOR TRAINING
LOCAL NATURE GUIDES

NATURAL RESOURCES ORGANIC AND INORGANIC

- NOTE:** This lesson is designed to be one of the first natural history lessons taught. It is basic and uses simple language and examples so it may easily be taught in English.
- Objectives:** By the end of this lesson, students will be able to:
-identify and describe what a natural resource is
-tell the difference between organic and inorganic
- Materials:** some different materials from the kitchen to illustrate natural and non-natural resources as well as organic and inorganic.
- Time:** 3 hours
- Presentation:** Doña Irma is a cook. She uses several resources to cook in the kitchen. Ask students for examples. Write examples on the board in two columns: natural and non-natural. Explain the difference as you go. Then, tell the students that today you are going to discuss “natural resources”. Explain to students that:
-everything we use is a resource
-everything we take from nature is a natural resource
All animals (including humans) and plants use natural resources.
Erase the non-natural resources from the board. Now explain that all natural resources are either organic or inorganic:
-organic is everything from a plant or an animal, alive or dead
-inorganic is everything that never has life
Create two new columns on the board: Organic and Inorganic. Place the top three items on your list of natural resources into the appropriate column with the students help.
- Practice:** Have students work with a partner who is already sitting next to them. Ask them to classify the rest of the items on the list of natural resources from the kitchen as either organic or inorganic. Give them 10-15 minutes to finish, and then go through the list with the entire class, answering or explaining any items that are difficult.
- Practice:** Numbered Heads Together: Separate class into three groups, and then give examples of resources and ask groups to decide if they are organic or inorganic. Each group discusses and then the assigned person from each group must answer by WRITING on a piece of paper. Then each group holds up answer and says it. Give a point to each group for each correct answer. First group to 10 points wins.
- Presentation:** Birds use natural resources to eat, drink, and to build their nests. Birds build nests with natural resources – things they find in nature. They use both organic and inorganic materials. You can take students outside and show examples of nests if possible. Look at the materials used in each nest and discuss whether they are organic or inorganic.
- Production:** Students, individually, build their own nests. They may use organic, and/or inorganic materials. They are birds, so they must use only natural resources. Give them 30 minutes to look around outside and create their own nests.
- Wrap-Up:** Students present their nests to the class and describe the materials they used. Teacher creates a list of materials on the board and class discusses.

FORMATION OF CORAL REEFS

Coral Reefs I

- Objectives:** **By the end of this lesson, students will be able to:**
- describe, in basic terms, the process by which a coral reef is formed.
 - identify the kingdom to which coral belongs
 - describe and explain three conditions necessary for the formation of coral reefs.
 - distinguish and describe the two different kinds of coral.
 - differentiate between the three types of coral reef.
 - identify ten common types of coral in English
- New Vocab:** coral polyp, calcium carbonate, hard coral, soft coral, fungus coral, finger coral, staghorn coral, lettuce-leaf coral, rose coral, brain coral, bushy soft coral, deadman's fingers, seafan, black coral, fire coral
- Materials:** 7 sets of flashcards, 11 each with pictures of the different types of corals on one side and the names in English on the other side.
Hand-out "Life Cycle of a Coral Polyp" which has a diagram of the life cycle
- Time:** 4-6 hours
- Introduction:** NH teacher explains today's objectives and that the next three days are dedicated to coral reefs
- Presentation:**
- I. Life Cycle of a Coral Polyp, explaining how a reef is formed, pass out diagram and go over with students. Be sure to solicit as much information from students as possible so that this is not pure lecture.
 1. Solicit student information
 2. Coral Reefs form very slowly - thousands of years
 3. Grow an average of 1-2 cm. per year
 - II. Two types of Coral
 1. Does anyone know, want to guess?
 2. Can anyone give examples of different corals?
 3. Hard Coral and Soft Coral - Hard coral builds reefs
 4. Quickly explain lifecycle of soft coral, be sure to tell them that the previous example on handout was hard coral
 5. Differences between soft and hard coral
 - III. Three Necessary Conditions for Reef Formation
 1. Clarity: Sunlight, explain algae inside coral polyp
Algae uses sunlight for energy coral polyp for nutrients - Symbiosis
 2. Temperature: corals die if water colder than 20C, 70F
 3. Depth: hard corals don't grow deeper than 60-70m
Why? no sunlight, pressure, temperature
 - IV. Three types of Reef - students open binder to page 14
 1. Barrier: What do you know about barrier reefs?
 - First largest in Australia
 - Second largest, Mexico to Honduras
 - Far from shore
 - Depth 60m - between reef and shore
 2. Fringing: Who can explain fringing reef?
 - Smaller
 - Closer to shore
 - Depth 20m between reef and shore

3. Atoll: Again, solicit student info.
 - Around islands
 - Smaller/isolated
 - Examples: Chinchorro, Alacranes

Practice: I. Solicit reasons why coral reefs are important to them and their communities (fishing, lobster, tourists, beautiful, etc.) Put their responses on the white board.

II. Practice Pronunciation of 11 common corals (whole group)

III. Flashcards, in pairs have students practice learning to identify the corals using the English names. After 10-15 minutes have them switch and work with a new partner.

Production: Prepare a presentation in groups of three
Topic: How Coral Reefs are Formed.
Each pair comes up with the following product:

- A. 10-15 minute presentation about the formation of coral reefs to present to all the tour guides in their community
- B. Based on the conditions necessary for coral to grow and the amount of time coral needs to grow, students prepare a message for their presentation – why it is important to be careful not to kill the coral (anchors, fishing, standing, etc.)
- C. 5 reasons why it's important to protect the coral.
- D. At least 3 props to use during the presentation.

Students give their presentations. If you need to save time, split them into two groups with 1-2 teachers hearing the presentations of each of the two groups. You should have 2-3 groups of 3 students presenting in each of the two final presentation groups.

Wrap-Up: Ask the students who prepared the best presentation to give it once again for the whole group. Then discuss what elements made it so good and how students can improve for next time. (Be sure to point out something that each group did well, also so that they don't get discouraged.)

CORAL REEFS AS HABITAT

Coral Reefs II

Objectives: By the end of this lesson, students will be able to:

- identify at least 5 different groups of organisms that are commonly found on reefs.
- explain why different fishes have different mouth shapes and provide at least 3 examples of mouth shapes.
- explain 3 reasons why bright colors are useful for fishes that live on reefs and give one example for each reason.
- recognize that reef organisms are highly adapted to life on the reef. They are highly specialized.
- explain that coral reefs provide shelter for many organisms.

Materials: 20 - 25 illustrations of reef organisms, 4 illustrations of coral reef habitat, 4 illustrations of potential food sources for fishes that live on a reef

Time: 4-6 hours

Presentation: Coral reefs have many kinds of organisms (biodiversity).

- A. Bony fishes, cartilaginous fishes, echinoderms, reptiles, mollusks, crustaceans, mammals, jellyfish, worms, sponges.
- B. Different species have different shapes for their mouths, bodies and fins.
- C. Different species have different colors on their bodies.

Practice 1: I. Probe Students:

1. What are some kinds of organisms you would expect to see on a reef? What do you see on the reef when you are fishing, snorkeling, diving?
2. What colors are common for reef fish to be?
3. Do all reef fish have the same mouth shapes?

II. Stations:

- A. You live here: You live on the reef (provide a diagram of a coral reef). Barracuda and sharks want to eat you. Draw a picture/explain what colors you want to be. pink and yellow
- B. You live here: As in station A, but this time, you want to find a mate. You want for potential mates to see you. What color would you like to be? mate. You want
- C. You live here. As in station A, but this time, you are heavily armed with spines and you are poisonous to eat. What color would you like to be? armed with
- D. You live here. As in station A, but this time the colors are given. Sharks and barracuda hunt to eat you, and you want to hide in the coral, where they can't fit. What shape would you like to be? given. Sharks
- E. You want to eat this food (show an illustration), but it has sharp spines for protection. What kind of mouth do you want to have? What kind of teeth would you like to have? spines for
- F. You want to eat this food (show an illustration), but it has a tough shell. What kind of mouth would you like to have? What kind of teeth would you like to have? tough shell.
- G. You would like to eat coral polyps, but they can hide in their tiny holes in the rock. What kind of mouth do you want to have? What kind of teeth would you like to have? tiny holes in the
- H. Here are flashcards of different reef inhabitants. Put each card into its appropriate group. (Have labels for cartilaginous fish, bony fish, echinoderms, worms, jellyfish, reptiles, mammals, mollusks, crustaceans, and sponges) (Also have 20 - 25 index cards with illustrations of a variety of reef dwellers on them. Have at least one representative from each group listed)

Practice 2: III. Examples of reef animals / Review of objectives

Teacher solicits a real example from students, including a natural history story, for each of the stations (different groups of reef organisms – different adaptations for survival in the reef).

Production: I. Reef species presentation:

4 teams are assigned a species to review. They must try to explain why its mouth is shaped as it is (i.e.: what it eats), why it is colored the way it is, what group it is in and how it finds shelter. They prepare a 5 minute presentation and then each team presents to the class.

Comments: There is a lot of new material in this lesson. Be sure to plan a review and / or more practice for the next day. Perhaps English teachers can incorporate this new material into their English lessons for more practice.

Cards for stations:

I. You live here on the coral reef. Barracuda and sharks want to eat you.

II. Draw a picture/explain what colors you want to be.

III. You live here on the coral reef. You want to find a mate.
You want potential mates to see you. What color would you like to be?

IV. You live here on the coral reef. You have lots of spines for protection.
What color would you like to be?

V. You live here on the coral reef. You are colored like this -----
Sharks and barracuda hunt to eat you. You want to hide in the coral.
What shape would you like to be?

VI. You want to eat this food, but it has sharp spines for protection.
What kind of mouth do you want to have?
What kind of teeth would you like to have?

VII. You want to eat this food, but it has a tough shell.
What kind of mouth would you like to have?
What kind of teeth would you like to have?

VIII. You would like to eat coral polyps, but they can hide in their tiny holes in the rock.
What kind of mouth do you want to have?
What kind of teeth would you like to have?

IX. Here are several different reef inhabitants:

Put each card into its appropriate group.

Cartilaginous Fish	Bony Fish	Echinoderms	Worms
Jellyfish	Reptiles	Mammals	Mollusks
Crustaceans	Sponges		