

## 4<sup>th</sup> grade Lesson Plan

### Ecosystem Comparison

#### Standards:

2.a. *Students know* plants are the primary source of matter and energy entering most food chains.

3.a. *Students know* ecosystems can be characterized by their living and nonliving components.

b. *Students know* that in a particular environment some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

**Suggested Time Allotment:** 30 minutes

**Pressed for Time:** 15 minutes

#### Objective:

Students will compare and contrast a coral reef and a kelp forest ecosystem and identify the abiotic and biotic factors within each.

#### Materials:

Blank Coral Reef Ecosystem Board (1 per group)

Blank Kelp Forest Ecosystem Board (1 per group)

Environmental Factors to place on Ecosystem Boards-

*Abiotic* – warm water, cold water, trash, boats, nutrients, clear water

*Producers* – phytoplankton, zooxanthelle, giant kelp,

*Primary Consumers* – zooplankton, brain coral, urchin, butterflyfish

*Secondary Consumers* – otter, kelpfish, sea turtles, parrotfish

*Tertiary consumers* – sea lions, reef sharks,

Pictures of coral reefs

Pictures of kelp forests

Ecosystem Observation Sheets – *provided* (p.14-17 in 4<sup>th</sup> grade journal)

Ecosystem worksheet – *provided* (p. 18 in 4<sup>th</sup> grade journal)

#### Set or Engage:

Would you survive if I flew you to Alaska and plopped you down on the ice? What about a bear in the desert? What are some other habitats animals can live in besides the desert? (If students say ocean, have them be more specific) Are these habitats different? These two habitats (show pictures of a kelp forest and coral reef) are both in the ocean but have some very specific differences. For example, a kelp forest has a giant producer

called kelp. In the coral reef, the primary producer is very small. It is a type of algae, just like the kelp, but it is microscopic and lives inside the coral. When this small algae does photosynthesis, it produces sugars that it then gives to the coral for food. The algae provides the coral with its well-known bright colors. (show pictures of coral reefs.)

### Background:

An ecosystem is a system of relationships in a local environment, including the relationships between organisms and between the organisms and the environment. This complex system includes predator-prey relationships, photosynthesis, adaptations, survival, and more. Every ecosystem has primary producers. These are the plants that produce their own food. In most cases, other than parts of the deep sea, these primary producers make their own food through the process of photosynthesis. Producers are eaten by primary consumers. Secondary and tertiary consumers are animals that eat higher up on the food chain, and rely on other animals for food.

An ecosystem not only includes individual organisms, and populations of species, but also nonliving factors that impact the living components. Depending on the ecosystem, abiotic, or nonliving factors might include the following: temperature, sunlight, surface type, wave action, water, nutrients, wind, and weather.

### Vocab:

- |           |             |                 |
|-----------|-------------|-----------------|
| • abiotic | • secondary | • environmental |
| • biotic  | consumer    | factor          |
| • primary | • tertiary  | • kelp forest   |
| consumer  | consumer    | • coral reef    |
|           | • producer  |                 |

### Modeling:

1. Explain that we will look at two ocean habitats and investigate how they are different. Introduce the term environmental factor.
2. Using the “Ecosystem Observation Sheets”, brainstorm what things can impact animals that live in each habitat. Once a long list of factors is on the board, identify which are nonliving and which are living (or abiotic and biotic)
3. Show the student an empty kelp forest ecosystem and coral reef ecosystem (*or some simple way for the students to sort the piece.*). These are the two habitats we will focus on today. While they are both ocean habitats, they have very different factors that allow animals to live there.
4. Starting with the abiotic factors, then producer, primary consumers, and so on, students will place the pieces in the proper ecosystem.

### Guided Practice:

1. Give each group a kelp forest habitat and a coral reef habitat board.

2. Pass out the *abiotic* options. Students will decide where each belongs.
3. Pass out the bag of producers, followed by consumers.
4. Provide time for students to discuss what answers are correct.

**Check for understanding:**

1. Have a kelp forest “box” and a coral reef “box” on the board. Ask the students to help you fill in the blanks for abiotic factors, producer and primary, secondary and tertiary consumers.
2. Briefly discuss why phytoplankton and zooplankton can be found in all habitats.
3. Ask engaging questions such as:
  - a. Why would the otter not be able to live in the coral reef?
  - b. What would happen to the coral if the algae inside died?
  - c. What would happen to the kelp forest if all of the kelp disappeared?

**Independent Practice:**

Complete “Ecosystem Worksheet” to summarize the difference between kelp forests and coral reef habitats.

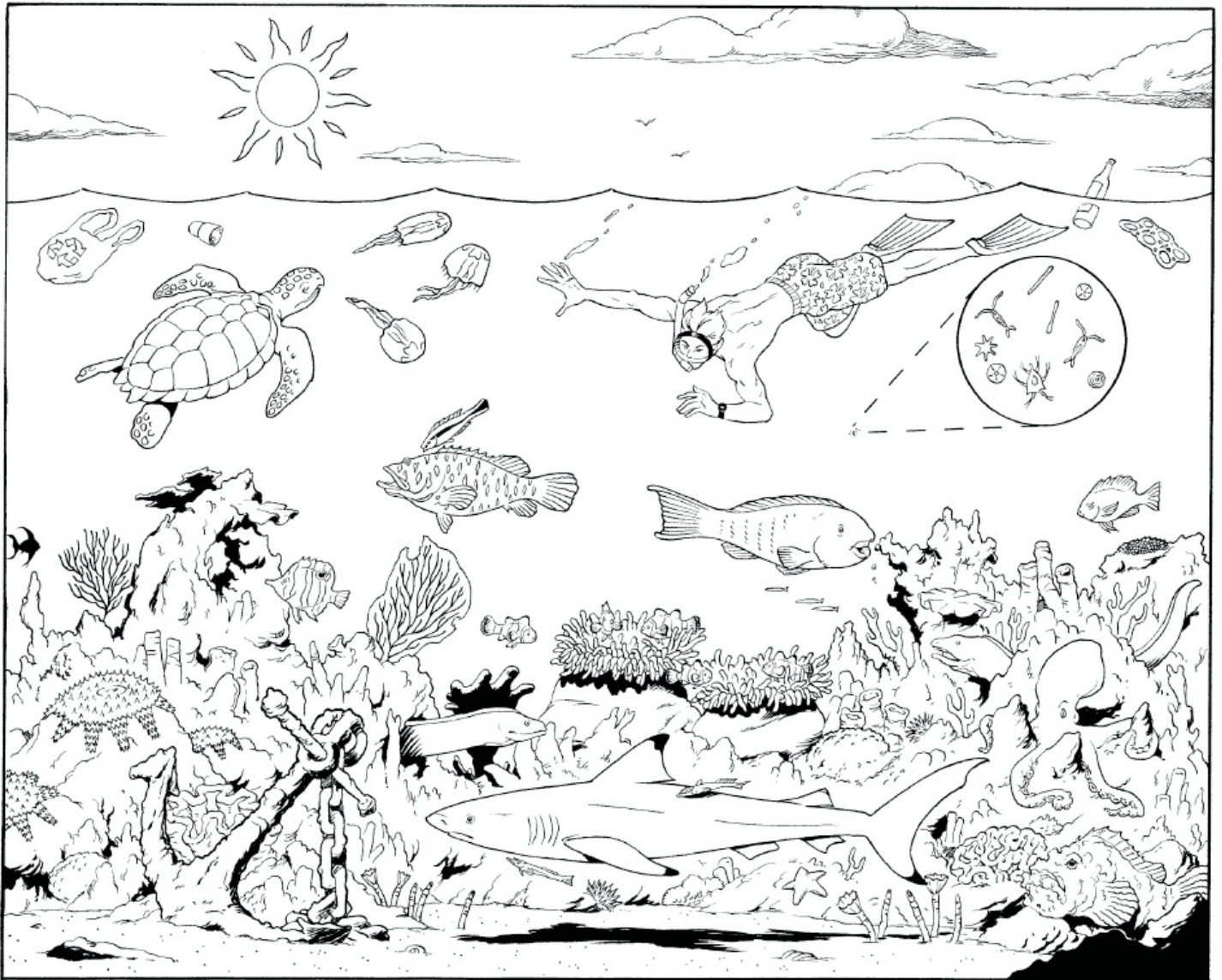
**Learning Extension:**

*Plan a visit to the Aquarium of the Pacific. Focus your visit on the Tropical Pacific and Southern California galleries.*

*Use “The Great Plant Race” to have students practice with manipulation the living and nonliving environmental factors that influence the success of the plant’s growth. Have students record their plant’s growth on the worksheet provided. Students can be creative with the following factors that can hurt or help the plant’s growth:*

- *How often the plant is watered*
- *Where the plant is kept*
- *How much sun the plant receives*
- *What interactions it has with living things (cats, dogs, little brothers)*

Make observations about the abiotic and biotic factors in this coral reef habitat and record your answers on the next page.



# ECOSYSTEMS WORKSHEET

## CORAL REEF ECOSYSTEM

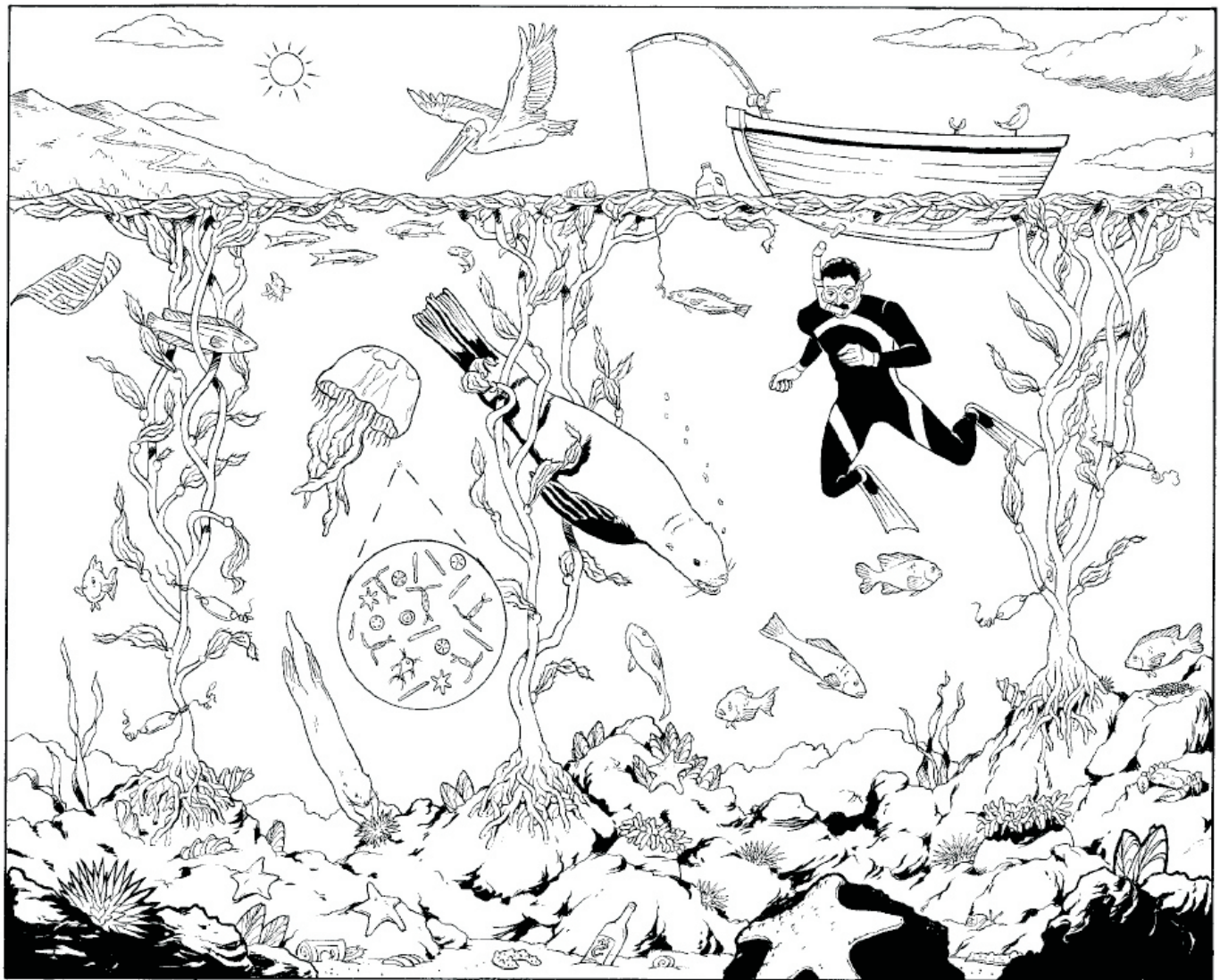
Environmental Factors

Biotic

Abiotic



Make observations about the abiotic and biotic factors in this kelp forest habitat and record your answers on the next page.



# ECOSYSTEMS WORKSHEET

## KELP FOREST ECOSYSTEM

## Environmental Factors

## Biotic

## Abiotic

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.[illegible]

# ECOSYSTEMS WORKSHEET

## CORAL REEF ECOSYSTEM

### Environmental Factors

#### Biotic

Turtles eating jellies  
Parrotfish eating coral  
Snorkeler  
Eels in caves  
Soft coral  
Butterflyfish  
Zooplankton  
Octopus  
Anemones  
Clownfish  
Sharks

#### Abiotic

Anchor  
Warm water  
Hot sun  
Trash  
Low nutrients  
Clear water  
Waves



# ECOSYSTEMS WORKSHEET

## KELP FOREST ECOSYSTEM

### Environmental Factors

#### Biotic

Lots of plankton  
Shark egg on kelp  
Snorkeler  
Otter eating urchins  
Pelican diving for food  
Sea star eating mussels  
Sea lion in kelp  
Garibaldi

#### Abiotic

Cold water  
Lots of nutrients  
Pollution  
Fishing line  
Runoff from land  
Rocky bottom  
Boat  
Sunlight