

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 7, Day 1

Outcomes for Today

Standards Focus: 6bde

PREPARE

1. Background knowledge necessary for today's reading

When we first think of the ocean, it seems as if it is a limitless resource. In this lesson, it is important to emphasize that most of the productivity of the ocean is limited to relatively small areas of the surface and along the bays and coastlines. Therefore, these areas are also subject to negative human influences such as pollution. As an introductory background activity, ask students about their personal experience with the ocean. Going to the beach is always a memorable experience for people. Try to use any of these collective experiences as a lead in to this lesson.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

salinity clarity diatoms phytoplankton upwelling

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

In simple terms, aquatic refers to water while the hydrosphere refers to the collective total of all water sources on earth.

The oceans contain all but a mere three percent of all water on earth.

Land water (aquatic) environments (ecosystems) range in size and form from ponds and lakes (still waters) to streams and rivers (moving waters).

A select few rivers are unique in nature in that they are spring fed and therefore, constant in temperature and flow.

These ecosystems make good outdoor research laboratories to study aquatic ecosystem productivity.

4. Read directions for investigation

5. Read text. Chapter 23, Aquatic Ecosystems, Section 23.5-23.6, Text, pp. 670 – 672.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
the open ocean	sharks, whales, ocean birds such as albatrosses	672

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

Salinity is all of the chemicals which are dissolved in a body of water, not just the salt.

Oceans would be much different chemically if there were no life.

The ocean does not undergo changes in temperature like the land.

Light wavelengths disappear by color as we go deeper into the sea.

This is the order of light absorption in water: red, yellow, blue, violet.

Violet light penetrates furthest into the depths of the sea/water.

Most fish caught in the ocean come from limited areas.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity: Are There Really Seven Seas?

Introduction

With over 70% of our planet covered with water, some historians have pondered why it was named "Earth" when in fact the name "Ocean" seems more fitting! Over the years, there have been various descriptors given to our watery surface: The "Seven Seas," conventional ocean divisions, and most recently, the Five Basins. In this lesson, through an exploration of the [From Sea to Shining Sea map](#) (PDF, [Adobe Reader](#) required), students will learn about these ocean descriptors, as well as come to understand that, although we have labels that separate names of different regions, the earth ultimately has just one big ocean. They will explore how the currents of this one big ocean carry people, animals, and even debris around the globe. Students will study water movement and how tracking marine debris can be a way to learn more about currents and their impact on human activity.

Materials Required

- [From Sea to Shining Sea map](#) (PDF, [Adobe Reader](#) required)
- Large wall map of the world
- Computer with Internet access
- Small-size Post-It notes to mark locations on map
- Student handouts or overhead transparencies of the Museum of Science [Oceans Alive!: Looking at the Sea](#) map
- Student copies of [The Ocean: Our Global Connector—Key Vocabulary](#) (PDF)
- Student copies of an [outline map of the world](#) with longitude and latitude labeled

Objectives

Students will

- identify the Seven Seas and the Five Basins;
- describe how ocean currents affect how and where marine debris moves;
- identify Pacific Ocean currents;
- map the starting location where cargo was originally dumped into the ocean and track the movement of the debris; and
- describe the significance of ocean currents and how they affect humans.

Activity - Getting to Know the Ocean

Ask the students if they have ever heard the expression "to sail the Seven Seas." Select seven students to stand before a large wall map of the world. Explain that many years ago the "Seven Seas" may have been used to label the following (have each student locate one of the seas and stick a post-it note to mark it on the map):

- The Red Sea
- The Mediterranean Sea
- The Persian Gulf
- The Black Sea
- The Adriatic Sea
- The Caspian Sea
- The Indian Ocean

Have the students step back to allow the class to see where the original "Seven Seas" fell. Ask the students if the Seven Seas are geographically far apart or relatively close together and why. (Answer: They are relatively close together, clustered around the Mediterranean, most likely because ancient mariners had not ventured far from that area.)

Remove the sticky notes. Explain that in ancient times, "seven" also often meant "many," thus the expression "to sail the Seven Seas" may have simply meant to sail all over the world.

Later, the world's water was often divided into the following seven oceans: North Atlantic, South Atlantic, North Pacific, South Pacific, Indian, Arctic, and Antarctic. Today our "water planet" is commonly broken down into four main oceans. (Note: Following the International Hydrographic Organization, National Geographic recognizes only four oceans: Arctic, Atlantic, Indian, and Pacific. Though the waters surrounding Antarctica are sometimes called the Antarctic Ocean or Southern Ocean, they are only the southernmost parts of the Indian, Pacific, and Atlantic Oceans. There is no Antarctic Ocean.)

Ask five students to come up to the wall map to identify each ocean and mark it on the map as you read the following clues:

- This ocean is the largest ocean. It covers one-third of our planet's surface and is larger than the earth's entire landmass. When Magellan sailed this ocean, he found it calmer than others he'd sailed and gave it a name which means "peaceful." (Answer: Pacific)
- This ocean is the third largest and includes the Red Sea and the Persian Gulf. (Answer: Indian)
- This ocean is the smallest and the shallowest. Much of it is ice most of the year. (Answer: Arctic)
- This ocean is the second largest and is the most heavily traveled. (Answer: Atlantic)
- Find the ocean that is closest to you.

No matter how the oceans are labeled, they are all interconnected with water circulating all over the earth. The vastness of the ocean can be illustrated by showing what our planet would look like if all the continents were shoved together, such as illustrated on this Museum of Science map: [Oceans Alive!: Looking at the Sea](#).

(Note: This map may remind students of maps they have seen of Pangea—the map of our world millions of years back. Point out that obviously the continents have moved over the years. Are they still moving? How does this slow movement affect our oceans?)

Discussion

Follow up a review of the Seven Seas with the writing prompt at the end of this lesson.

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

What is salinity?

How is the ocean different from the land environment when it comes to temperature fluctuations?

Why do you suppose the ocean appears blue in color after you get several miles away from the shore?

Explain ocean productivity.

Make a diagram of ocean upwelling.

Remember to ask literal structural idea craft author literature life evaluate and inference questions every day.

Key Paragraph

The chief producers of the ocean are diatoms, other microscopic algae, and certain dinoflagellates. The zooplankton depend directly on these phytoplankton. Many food chains are based on these producers and include large consumers such as tuna, sharks, whales and ocean birds such as albatrosses.

EXTEND

11. Prompt every student to write a short product tied to today's reading

The Seven Seas

Ask students to make up a little saying designed to assist them in memorizing the names of the seven seas.

12. Close with a short summary

Extend the reading to the students' lives or to the world.

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 7, Day 2

Outcomes for Today

Standards Focus: 6bde

PREPARE

1. Background knowledge necessary for today's reading

This lesson is designed to introduce students to the concept of salinity as it impacts living organisms. It will be carried out through several phases of lab activities. In order to build student interest, try this simple demonstration several days before you begin this activity. Prepare two solutions of water in separate beakers or clear glass containers. One solution should be ordinary tap water while the other one should consist of salt water created by simply dissolving several tablespoons of table salt in several ounces of water. Place several small (cherry-sized) tomatoes in each solution. Tell your students one mixture is salt water and ask them to predict what will happen in 24 and 48 hours. Observe the results over several days time and use the results as a lead-in to the lab session.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

migrate **tolerance** **hypothesis** **Elodea** **NaCl**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Diffusion is the process in which a substance moves from the area of greatest concentration to an area of less concentration.

Osmosis is diffusion through a semi-permeable membrane.

Plants and/or animals adapted to either fresh or salt water ecosystems often die when immediately placed into an aquatic environment which is very different.

On the other hand, there are animals which can migrate between these environments.

4. Read directions for investigation

5. Read text. Chapter 23, Aquatic Ecosystems, Investigation 23.2, pp. 689 – 691.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
fresh water environment	Elodea	690

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

Fish can't always survive in any water (fresh or salt).

The same is true of plants.

We have used Elodea in other experiments.

Tolerance is the ability to withstand conditions different from what the organism is used to.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

Character Education at the Markkula Center for Applied Ethics

www.scu.edu/character

©SCU 2013

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity: Effects of Salinity of Living Aquatic Organisms.

Organisms have generally evolved for survival in one particular environment. When it comes to aquatic environments, this is particularly true of salinity. In other words, we have salt water aquariums and fresh water aquariums. We can't just drop a fish from one into the other. In this activity, students will be asked to observe the effects of salinity on plants and animals. You will need microscopes to complete this exercise.

Materials

Microscope slides and cover slips
Medicine dropper
Salt water solution (5%)
Elodea leaf samples (aquarium plant)
Animal specimens (brine shrimp work well)

Procedure

Instruct students to place an Elodea leaf tip upside down on a microscope slide. Add a drop of fresh water. Ask students to then focus on the cells near the tip. Have them record their findings in their notebook.

Next ask them to add a few drops of salt water to the slide. If they place a small amount of paper towel on the opposite side of the slip, they will draw the fresh water out one side while at the same time wicking the salt water into the other side of the specimen under the cover slip with the Elodea. Ask them to observe the Elodea cells now and record their findings.

Follow the same procedure with the brine shrimp, but in reverse. In other words, begin with the brine shrimp in their natural salty environment.

Note: Brine shrimp are easily acquired and can be hatched quite simply. Many pet stores are good sources of both brine shrimp and Elodea.

Activity

Ask students to record their observations and share their findings.

Discussion

Follow up with students drawing conclusions from these experiments. If you have more time, you may choose to follow Investigation 23.2 in detail.

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

Ask students to create several questions before their experiments and then supply the answers upon the conclusion of their experiments.

List three typical freshwater animals.

List three typical saltwater animals.

List three animals that live in both fresh water and salt water.

Do the same for plants.

List several conclusions from your experiments with the Elodea and brine shrimp.

Remember to ask literal structural idea craft author literature life

evaluate and inference questions every day.

Key Paragraph

If you were to move freshwater organisms into the ocean or ocean organisms into fresh water, they probably would die very quickly. Salmon migrate from the open ocean into freshwater rivers in order to reproduce, but they first spend several days in water with decreasing salinity.

EXTEND

11. Prompt every student to write a short product tied to today's reading

My Journey To and From the Sea

Review with students the life cycle of the salmon. Instruct them to write a little "salmon journal" from the perspective of a salmon dodging all kinds of peril in order to return to the same spawning grounds far upriver.

If you can rent or borrow the video *Miracle of the Scarlet Salmon*, this is a great resource.

<http://ftvdb.bfi.org.uk/sift/title/425638?view=synopsis>

12. Close with a short summary

Extend the reading to the students' lives or to the world.

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 7, Day 3

Outcomes for Today

Standards Focus: 6bde

PREPARE

1. Background knowledge necessary for today's reading

A basic biological/ecological principle is that life is more abundant and diverse where different ecosystems meet. This is certainly the situation with the ocean shoreline which is rich in life in both diversity and sheer numbers. On the other hand, the deep and dark parts of the ocean are rather devoid of life compared to the shorelines. One exception as we will see are the deep water vents along with an entire associated ecosystem which has only recently been discovered.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

marine snow bioluminescent chemosynthesis reef symbiotic

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

The earth contains many aquatic ecosystems, each with a characteristic population of plants and animals.

There are the freshwater bodies known as ponds (shallow) and lakes (deep) which contain non-moving fresh water.

Moving freshwater systems consist of brooks, streams, and rivers.

The oceans of the world make up over 97% of the available water on earth.

The salinity of the ocean is a rather constant factor as is ocean temperature.

4. Read directions for investigation

5. Read text. Chapter 23, Aquatic Ecosystems, Sections 23.7 - 23.8 Text, pp. 672 – 677.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
deepest parts of the ocean	bioluminescent fish	674
deep ocean vents (hot springs)	giant clams, tube worms	674
muddy/sandy ocean bottom	crustaceans, mollusks, annelid worms	675
coral reefs	coral polyps, symbiotic green algae	675

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

There are real differences in life (numbers and diversity) between the deep ocean and the coral reef ecosystems.

Fish that live in the very deepest parts of the ocean can create their own light.

Marine snow is the slow drifting down of substances from the upper lighted layers of the ocean waters.

Those coral reefs look like they would be exciting places to study biology.

Tidepools are another very diverse marine ecosystem.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity: The Rainforest of the Sea

Coral reefs have been referred to as the rainforests of the sea because of both their fragile nature (many are threatened) and rich abundance of life. In this exercise, students are to work in teams to research and report on one aspect of the coral reef.

Procedure

Divide students into two-person teams to research and report on the rich diversity of life found in coral reefs. Here are two excellent sites that can be starting points for the research.

<http://www.coralrealm.com/>

http://www.oneworldjourneys.com/palmyra/expedition/d1/exped_d1_a.html

Discussion

Follow up with student reports and postings of findings.

Alternate Activity

This site contains many Coral Reef activities:

<http://42explore.com/reef.htm>

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

So what is it like in the deep ocean? Create a picture for the reader using descriptive language.

Why do you think that the deep water fish have developed bioluminescent capabilities?

Explain why coral reefs have been referred to as the tropical rainforest of the sea?

Why is the intertidal zone such a difficult place for organisms to live?

Remember to ask literal structural idea craft author literature life
evaluate and inference questions every day.

Key Paragraph

With few exceptions, oceans are relatively shallow near the continents. These bands of shallow water average less than 200 meters in depth. Shallow waters give rise to a new array of communities that are very different from those in the open ocean. The mouths of large rivers form wide shallow areas, while in mountainous coastlines, as in California, shallow waters may be almost absent.

EXTEND

11. Prompt every student to write a short product tied to today's reading

Here is the picture. You supply the caption.



This beautiful reef fish would like to tell the world about the future of his home. Instruct your students to be the voice of the fish.

12. Close with a short summary

Extend the reading to the students' lives or to the world.

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 7, Day 4

Outcomes for Today

Standards Focus: 6bde

PREPARE

1. Background knowledge necessary for today's reading

These next several lessons cluster around a theme of human impacts on aquatic environments. As might be expected, most of these impacts are negative. Wetlands are extremely important to life on earth for a variety of reasons. For example, the recent Hurricane Katrina disaster in the Gulf Coast was at least partly intensified because of the destruction of coastal wetlands. Healthy wetlands provide a buffer against the massive storm surges that pushed inland over relatively unobstructed ground. As we will see, wetlands are more than just a nice place for fish and birds to live. They are very important components in the complex web of life on earth.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

estuary nursery aerobic anaerobic eutrophic

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
 - Point to the concept chart as you quickly review it.
- Fresh and salt water environments make up the majority of ecosystems (in terms of area) on earth.

Freshwater and saltwater ecosystems differ primarily in their chemical composition.

The oceans cover vast areas of the earth but only a small percentage of the total ocean is considered productive.

Life does occur in the deepest parts of the ocean near vents in which heated water flows forth.

4. Read directions for investigation

5. Read text. Chapter 23, Aquatic Ecosystems, Sections 23.10-23. 11,Text, pp. 677-681

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
coastal wetland	shellfish, salmon, oysters, clams, haddock	678

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

I really did not know how important wetlands are to the web of life on earth.

There are many types of wetlands. They include marshes, swamps, ponds, and coastal wetlands.

Wetlands are easily disrupted, damaged, and destroyed by human activity.

Wetlands are safe places for many organisms.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

Character Education at the Markkula Center for Applied Ethics

www.scu.edu/character

©SCU 2013

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity: Create a Wetland Scene

Introduction/Overview

In this lesson, students will learn about the importance of wetlands. They will learn about the different types of freshwater wetlands, and the things that threaten their health. Finally, they will study specific examples of wetland areas of the U.S., and what is being done to protect them.

Materials Required

- Computer with Internet access
- Crayons, markers, colored pencils, etc.
- Pens/pencils and paper
- Materials for creating board games (cardboard, construction paper, etc.)

Objectives:

Students will

- learn basic information about wetlands
- identify some of the plants and animals that live in a wetland, and how they have adapted to their wetland habitat
- study a specific type of wetland

Procedure

A wetland is an area in which water is present at least part of the time, generally for at least a portion of the plant growing season. In addition, the soils of a wetland differ considerably from nearby or surrounding uplands. Hydric soils, found in wetlands, are wet, low in oxygen, and often black with muck. Finally, wetlands support plants, called hydrophytes, which have adapted to living in wet, oxygen-poor soils. Together, these water, soil, and vegetation characteristics make up a broad definition for wetlands that is used by most scientists.

Wetlands support a vast number of plant and animal species adapted to live in a soggy and oxygen-poor environment year round, as well as some wildlife species that spend part of their time there, seeking food, water, cover, or places to raise young—crucial elements of habitat.

While scientists classify wetlands in a number of ways, two major divisions of wetlands are saltwater and freshwater wetlands. Plants and animals in saltwater wetlands must deal with the constant movement of tides and the associated fluctuations in salinity, or level of suspended salt in the water. Examples of saltwater wetlands are salt marshes, tidal flats, and mangrove swamps.

In this lesson, students will be learning about freshwater wetlands. There are many types of freshwater wetlands. The most widespread of all wetlands are the freshwater marshes, which can be found throughout the United States. There are different types of freshwater marshes, determined by the depth of their waters. Many scientists believe freshwater marshes are the most productive ecosystems on earth; they provide food, water, and shelter, and act as nurseries for young fish, birds, insects, amphibians, and so on.

Three more types of freshwater wetlands are bogs, swamps, and vernal pools. Bogs are full of peat, which is a thick layer of organic material that forms when plants and other organisms die and fall into the water. Sphagnum mosses often cover the top layer of bogs, and cranberries can be found growing in bogs. Pitcher plants and sundews compensate for the difficulty in absorbing nutrients and acidic, slowly decomposing bog soils by capturing and digesting insects. Moose, bear, deer, and many other animals visit bogs at different times of year for food, water and cover. Swamps are either forested or shrubby areas whose soils are covered with standing water during the winter, but may dry out during parts of the growing season. Bald cypress and tupelo trees are often found in southern swamps. The plants in shrubby swamps may vary, but include willows and buttonbush. Alligators and cottonmouth snakes live in southern swamps, and panthers, foxes, deer, and raccoons find many habitat elements in swamps.

Finally, vernal pools are temporary wetlands that appear with snowmelt or rainfall in the spring and fall, but often vanish as the summer months arrive. Their vegetation varies greatly, and they are a crucial habitat for many amphibians.

Development

Ask students what they think of when they hear the word "wetland." Ask them if they have ever visited a marsh, swamp, or bog, or have ever watched tadpoles swim in small puddles. Ask them what they think some of the things are that make a wetland a true wetland? (Wetlands are covered in water at least part of the year, they have special soils, and they support certain kinds of plants that can live in these conditions.) Write some of their answers on a chalk or dry-erase board. Discuss their answers as a class.

Show photographs or drawings of different kinds of wetlands from the following Web sites:

[eNature: Wetlands Life Zone](#)

[MBGNet: Biomes—Wetlands](#)

[U.S. Environmental Protection Agency: Wetlands](#)

[U.S. Fish and Wildlife Service: National Image Library](#) (search for "wetlands")

Ask if students recognize any of the plants or animals in any of the pictures. Help students identify the plants and animals in different scenes. Ask what differences they see between these wetlands. What are some similarities? Explain that saltwater wetlands are near the ocean, and so are saltier and experience tides, while freshwater wetlands are inland and contain water that many plants and animals can use easily. Have students break into small groups. Have each group choose a different type of wetland (it can be a freshwater marsh like the one in the story, but they shouldn't use all the same organisms described) and research on different plants and animals found there, including adaptations the animals have for dealing with wetland conditions (talk about adaptations ahead of time if students are unfamiliar with the concept). Students may use regional field guides or the following Web resources to help in their research:

[eNature: Wetlands Life Zone](#)

[Enchanted Learning: Freshwater Marsh Animal Printouts](#)

[New Hampshire Public Television: Freshwater Marshes](#)

[U.S. Environmental Protection Agency: Wetlands](#)

[USGS: Florida Ecosystems](#)

Each group should create visual displays for a presentation of a trip through the wetland they are discussing. They will then lead the class on an imaginary trip through their wetland, stopping to explain how at least five plants and/or animals have adapted to the different conditions of the wetland.

Discussion

Follow up with a student discussion. Ask students what they have learned about wetlands. Why are they important? Why should we work hard to save them? What kinds of things might threaten wetlands?

Suggested Student Assessment

Working in groups, have students continue their research and create a board game that would teach other students about wetlands. Students can create their own format, but it should display their knowledge of wetlands and the animals and plants that live in wetlands. It could cover topics such animal or plant adaptation, the distribution of wetlands in the U.S. or the world, threats to wetlands, the benefits of healthy wetlands, etc. When the games are complete, have the groups play each other's games.

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

What is meant by the statement that water is a renewable resource?

Why do you suppose wetlands are the most productive of all ecosystems?

Why are wetlands so easily subject to human disruption?

How can coastal wetlands help protect coastal residents?

Remember to ask literal structural idea craft author literature life
evaluate and inference questions every day.

Key Paragraph

Wetlands include marshes, swamps, shallow ponds, and coastal areas near estuaries.

Wetlands are flooded with freshwater or saltwater all or part of the year. They are among the most productive of all the ecosystems. Wetlands form the base of many aquatic and freshwater and terrestrial food chains.

EXTEND

11. Prompt every student to write a short product tied to today's reading

We Need a Hero

So we have Smokey the Bear to help us remember to prevent forest fires. We need a "hero animal" to help us preserve wetlands. Ask students to find (or create) such an animal and write a short introduction of that animal.

12. Close with a short summary

Extend the reading to the students' lives or to the world.

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 7, Day 5

Outcomes for Today

Standards Focus: 6bde

PREPARE

1. Background knowledge necessary for today's reading

Water pollution continues to be a major threat to aquatic ecosystems and ultimately human health. Water pollution comes in a variety of forms. There are many reasons for water pollution, but it is primarily a matter of economics. Put another way, it is less costly in the short run to get rid of wastes by simply dumping them into nearby watercourses. This has sometimes been referred to as the dilution solution. In this lesson, students are introduced to the basic components of water pollution.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

dilute disperse degrade groundwater eutrophication

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Over the course of human evolution, water sources have always played an important part in humankind's development and survival.

Aquatic ecosystems consist of both fresh and saltwater habitats.

The freshwater ecosystems originate and flow through parts of the land.

Freshwater ecosystems include ponds and lakes, and streams and rivers.

Saltwater ecosystems include such ocean habitats as estuaries, tidal marshes, coastal wetlands, coral reefs, the deep oceans and the open ocean.

The most productive areas are generally shallow parts, the upper layers, or those waters close to land.

Wetlands are the most productive ecosystems in the hydrosphere.

Wetlands are important nurseries for many life forms.

4. Read directions for investigation

5. Read text. Chapter 23, Aquatic Ecosystems, Sections 23.12-23.13, Text, pp. 681-685.

Shared Reading RRP: Read, React, Predict every 2-3 pages

Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
polluted freshwater river	eutrophic bacteria, dead fish, many decomposers	682
recovering freshwater river	higher dissolved oxygen content, healthy fish	683

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

All of the stuff that humans dump into the ocean eventually ends up in the oceans.

The oceans of the world can disperse and dilute a great deal of harmful materials, but there is a limit.

Oil spills are a constant threat to the oceans.

Sometimes spilled oil creates tarballs which sink to the bottom of the ocean harming marine life there.

Humans can take steps to limit water pollution with these practices:

biological pest control

contour plowing for crops

effective and efficient waste and sewage control plants

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity:

The Arcata Marsh: A Solution to Water Pollution

Arcata, California is a very progressive and environmentally conscious community. Many years ago, they implemented a unique wastewater treatment process known simply as the Arcata Marsh.

Procedure

Instruct students to research this process. Here are several sites to get them started:

http://www.humboldt.edu/~ere_dept/marsh/history.html

<http://www.ecotippingpoints.org/indepth/usaarcata.html>

Discussion

Follow up with student reports on their findings to these essential questions:

How did Arcata design a very efficient sewage treatment process?

What are the components?

What other benefits have evolved from this system?

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

Why is the ocean referred to as the ultimate dump?

Give examples of biological pest control.

Explain with examples the three levels of sewage treatment.

List some ways in which individuals can take steps personally to reduce or stop water pollution.

Remember to ask literal structural idea craft author literature life
 evaluate and inference questions every day.

Key Paragraph

Oceans are the ultimate dump for much of the wastes produced by humans. In addition to natural runoff, oceans receive agricultural and urban runoff, atmospheric fallout, garbage and untreated sewage from ships, and accidental oil spills from tankers and offshore drilling platforms. Barges and ships also dump industrial wastes, sludge from sewage plants, and other wastes.

EXTEND

11. Prompt every student to write a short product tied to today's reading

You are the Solution

Ask students to write a rap or poem beginning with the words, "You are the solution to water pollution."

12. Close with a short summary

Extend the reading to the students' lives or to the world.