Pond Water Web – Lesson Plan

Purpose: As a result of this lesson, students will become familiar with common organisms found in a pond and discover their importance in a balanced aquatic habitat as they create food webs. Students will also investigate how an environmental change (pollution, disease, introduction of exotic species, etc.) affects a pond habitat.

Lesson Objectives

As a result of this lesson, students will be able to:
(1) Identify common plants and animals living in an aquatic environment.
(2) Create a food web illustrating the relationship of organisms in an aquatic habitat.
(3) Determine the impact of environmental changes on a pond habitat.

Materials

Copies of **Life in a Pond** cards for each group
Scissors & glue
Large sheets of construction paper
Copies of student worksheets

Additional Resources

If you have a SmartBoard or other interactive board, a PowerPoint presentation is available on my website for use with this lesson. If you have a subscription to United Streaming, download the *Food Webs and Chains* video, which provides a good overview of the concepts discussed in this lesson.

Lesson Procedures

1. Complete questions #1-3 on the student worksheet using the image of the food web provided.
2. Provide copies of the *Life in a Pond cards* for each group. Have each group cut apart the cards.
3. Discuss the different organisms found in a food web – producers, consumers, and decomposers. Have the groups separate their cards into the different categories and record the organisms on the student worksheet.
4. Create four food chains of varying length using the cards provided. Students should write the food chains on their worksheet. If you have time available, challenge the students to make longer food chains to see how many organisms can be connected.
5. Instruct the students to lay out two of their food chains from #4 starting with producers on the left with the consumers spread across the page to the right. They should glue them onto the large piece of paper and draw arrows to show the direction of energy flow.
6. Ask them if they can connect the two chains by drawing arrows to other organisms and allow time for them to add new connections
7. Remind students that the food webs must use at least 10 of the critter cards, including the three with stars. They will need to work together to figure a way to add additional cards to their food webs to meet this requirement.
8. When finished, allow time for the groups to compare their food webs and record their answers on the student worksheet.

Note on blank cards: Students may think of other organisms that would work in their food webs, such as humans. Allow them to use the blank cards to add these additional organisms.

Discussion Questions *Refer to #6 on the student worksheet for detailed questions.*

1. What would happen to the food web if a specific organism was removed due to disease or pollution?
2. What would happen to the food web if the population of one of the organisms was to double?
3. How would the introduction of an exotic (invasive) species affect the food web?

Assessment

Students can be assessed through a variety of methods throughout the project. During the introduction, evaluation of the student responses to gain insight into their knowledge of the various life forms found in an aquatic habitat. Evaluating the food webs will determine if the students were able to organize the plants and animals to create an accurate food web. Evaluating student responses during follow-up discussions will identify misconceptions. Additional activities to address misconceptions should be provided.

Extension Ideas

1. Invite an aquatic biologist to visit the class and discuss his/her work. Allow time for the students to ask any questions they may have.
2. Take a field trip to a pond or lake in your community. Take the water samples back to the classroom and use microscopes to find other organisms. If you are not able to take a field trip, ask students to bring in water samples from other ponds in the community and allow time for students to analyze samples using microscopes.
3. Provide access to Internet sites or printed resources to allow students to learn more about aquatic habitats and find answers to any questions they may have. Challenge students to create a "Did you know ...?" display to share the things they learned about pond life.

Resources

Microscope Mania – This unit is available at http://sciencespot.net/Pages/classbio.html#micro and introduces students to microscopes and the microscopic world.

Pond Water Sites – A collection of pond water websites for students is available at the Science Spot in the *Kid Zone* area at http://sciencespot.net/Pages/kdzbiopond.html.

Identification Guides – There are several good identification guides available online. *Golden Guide: Pond Life* book (ISBN# 1-58238-130-5) is a good resource for students. A brief guide for determining water quality based on macroinvertebrates is available at the *Discover Carolina* website at http://www.discovercarolina.com/html/s05nature09a02b.html.

Life in a Pond Cards - Image Credits:

Largemouth Bass – http://www.cannondam.com/lynnsguideservice/images/largemouthbass.jpg
Bluegill – http://www.wildlifedepartment.com/bluegill.htm
Crayfish - http://www.mackers.com/crayfish/pics.htm
Phytoplankton/Zooplankton - http://sherpaguides.com/georgia/barrier_islands/natural_history/index.html
Mosquito larvae - http://ag.arizona.edu/pubs/insects/az1320/oc_camp_larvae_groupalt.jpg
Pond frog - http://www.wigry.win.pl/plazy2/zabz6.jpg
Pond snail – http://lilyblooms.com/images/products/pondsnail.jpg
Aquatic plants - http://naturalaquariums.com/plantedtank/0509.html
Salamander – http://www.netstate.com/states/symb/amphibians/images/eastern_tiger_salamander.jpg
Leeches - http://www.upfishing.com//images/leeches_idiobdella.jpg
Great Blue Heron – http://www.islandnet.com/beaconhillpark/graphics/216_heron13K400.jpg
Aquatic worm - http://www.state.ky.us/nrepc/water/aquawo03.gif
Bullhead Catfish - http://www.upfishing.com/catfish.html
Aquatic nymphs - http://www.fishguideme.net/FlyFishing/Images/bugs.jpg
Mallard - http://www.nhptv.org/Natureworks/mallard.htm
Snapping Turtle - http://www.fcps.k12.va.us/StratfordLandingES/Ecology/Reptiles/snapping%20turtle/snapping%20turtle.jpg
Raccoon - http://www.hsus.org/wildlife/a_closer_look_at_wildlife/raccoons.html

Life in a Pond –Page 1

Largemouth Bass
Young - Zooplankton & insects
Adult -Fish, crayfish, & frogs

Bluegill
Young – Zooplankton
Adult – Insect larvae, crayfish, leeches, snails, small fish

Crayfish
Young - Zooplankton
Adult - Fish, plants, worms, insects, snails, & plankton

Phytoplankton
(Includes algae, diatoms, & other microscopic plant life)

Aquatic Plants

Mosquito Larvae
Algae, plankton, & bacteria

Zooplankton
(Microscopic animals)
Detritus& phytoplankton

Raccoon
Plants, earthworms, fish, amphibians, & crayfish

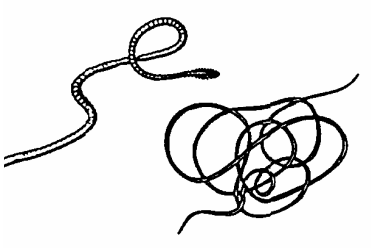
Eastern Tiger Salamander
Worms, insects, & other salamanders

Pond Frog
Young – Algae & detritus
Adult – Insects, spiders, small fish, & worms

Leeches
Detritus, insect larvae, snails & worms

Snail
Phytoplankton, detritus, & aquatic plants

Life in a Pond –Page 2



Aquatic Worms
Detritus & bacteria

Bullheads (Catfish)
Aquatic plants, algae, insects, worms, fish eggs, & small fish

Great Blue Heron
Small fish, reptiles, & insects

Snapping Turtle
Invertebrates, fish, reptiles, birds, mammals, & plants

Aquatic Insect Nymphs
Other aquatic insects, small crustaceans, & worms

Mallard
Seeds & plants; may also eat insects, mollusks, crustaceans

Make your own cards by adding a picture of the organism, its name, and its diet (if it is a consumer.)

Name _____
Diet:

Name _____
Diet:

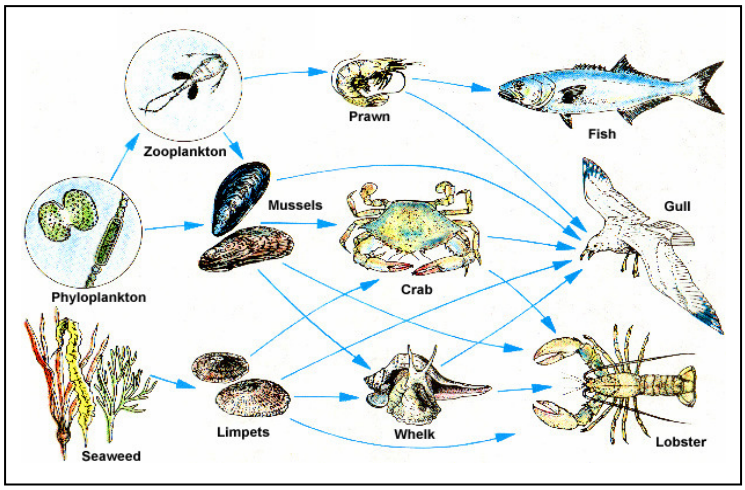
Name _____
Diet:

Pond Water Webs

Name _____

Student Worksheet

<u>Use the food web to complete #1-3.</u>



1. Which organisms are the producers?

_____ _____

2. Identify the <u>consumers</u> using these letters...

C – Carnivore
O – Omnivore
H – Herbivore

3. Answer these questions about the food web above.

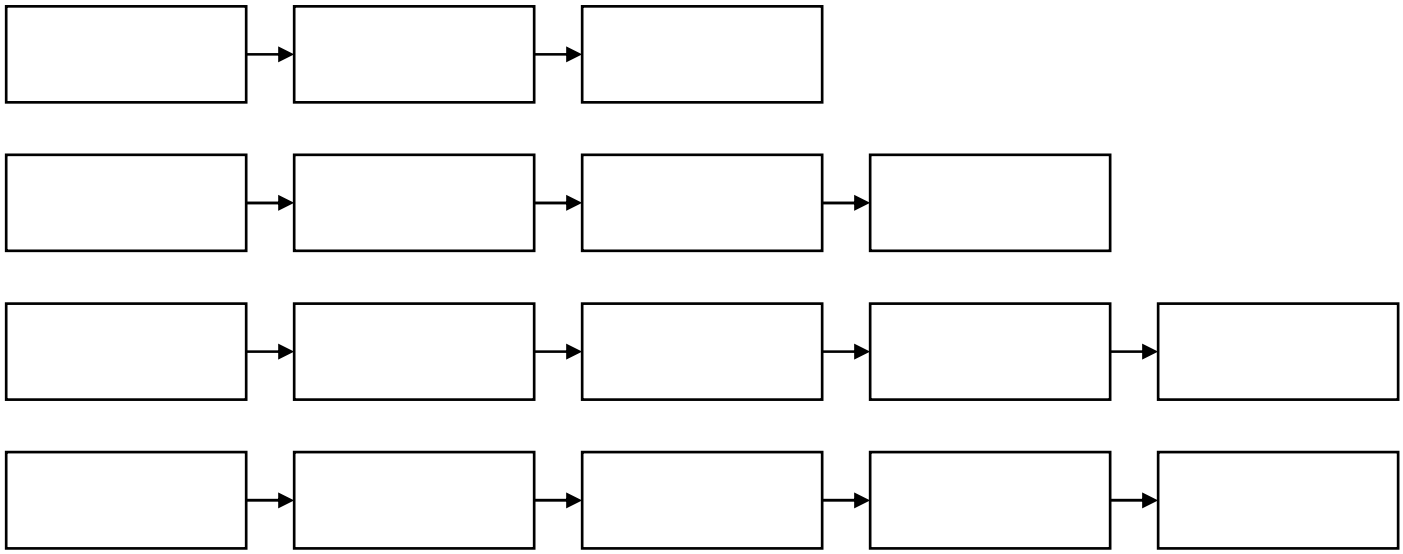
What would happen to the limpet population if the mussels were to die out due to a disease?

How would the zooplankton be affected if the fish population were to increase?

How would the whelk population be affected if crabs were removed?

<u>Pond Water Web</u>

4. Cut apart the Life in a Pond cards and sort them into three categories: producers, consumers, and decomposers. Create four food chains in the space below. Remember, each food chain must start with a <u>producer</u>!



5. Use at least 10 of the cards to create a food web to show the relationship between the organisms in a pond habitat. <u>You must use the three cards with stars</u>! After you have created the food web, glue the pieces onto a large sheet of construction paper and add arrows to show the feeding relationships.

6. After you have finished your web, answer these questions.

What would happen to <u>your</u> food web if the aquatic plants died out because of pollution?

What would happen to <u>your</u> food web if the population of great blue heron was to double?

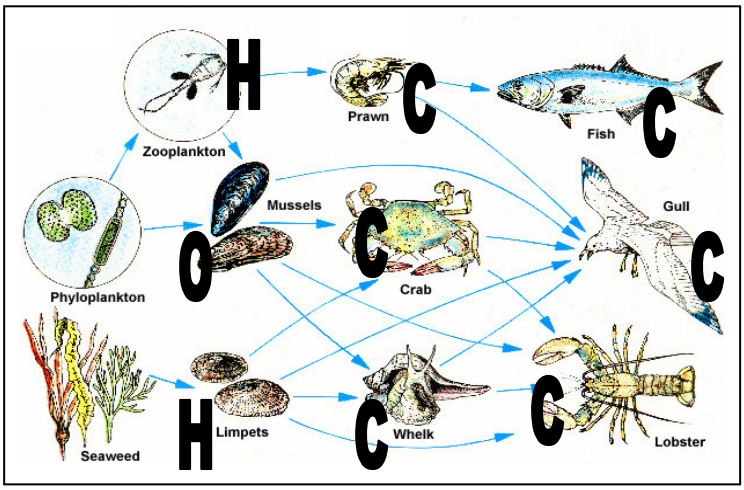
Asian carp consume zooplankton, which many fishes typically feed on in their juvenile stages, and have no known predators. How would the introduction of an Asian carp affect <u>your</u> food web?

Pond Water Webs

ANSWER KEY

Student Worksheet

<u>Use the food web to complete #1-3.</u>



1. Which organisms are the producers?

Seaweed *Phytoplankton*

2. Identify the <u>consumers</u> using these letters...

C – Carnivore
O – Omnivore
H – Herbivore

See food web diagram for answers

3. Answer these questions about the food web above.

What would happen to the limpet population if the mussels were to die out due to a disease?
We would expect the limpet population to decrease since the organisms that eat mussels would have to eat more limpets.

How would the zooplankton be affected if the fish population were to increase?
We would expect the zooplankton population to increase, since the increased fish population would cause a decrease in the prawn population.

How would the whelk population be affected if crabs were removed?
The whelk population would likely increase since there would be more mussels and limpets available due to the decrease in crabs. However, the gulls and lobster may eat more whelk than before with the decrease in crabs resulting in a decrease of the whelk population.

<u>Pond Water Web</u>

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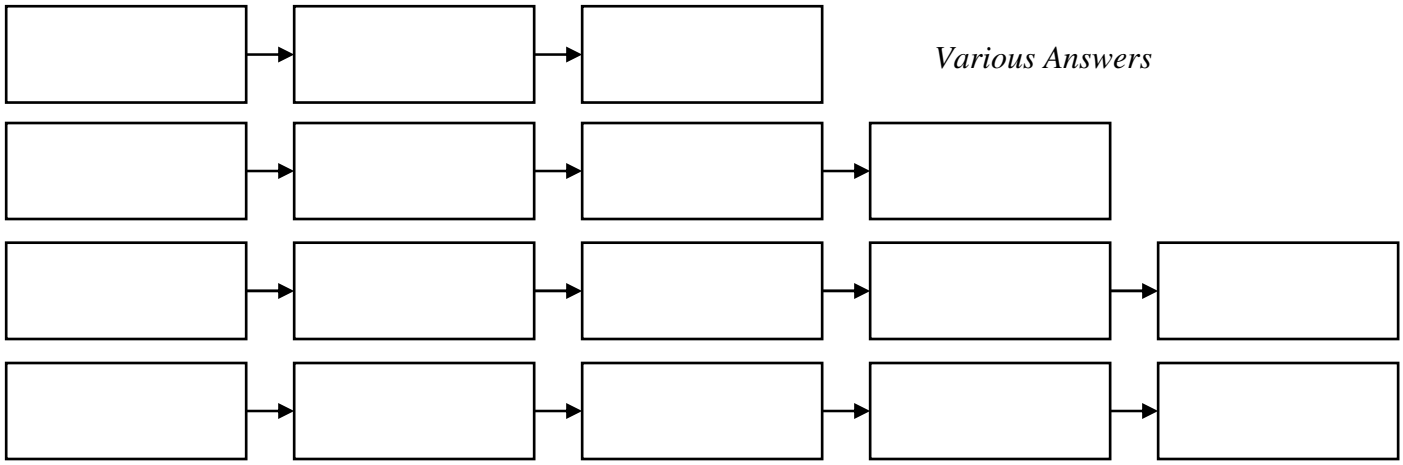

Various Answers

5. Use at least 10 of the cards to create a food web to show the relationship between the organisms in a pond habitat. <u>You must use the three cards with stars</u>! After you have created the food web, glue the pieces onto a large sheet of construction paper and add arrows to show the feeding relationships.

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Various Answers

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Various Answers

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Various Answers