

## **Ecosystems (Biological Communities and Habitat)**

" The survival and health of individuals and groups of organisms are intimately coupled to their environment."

### **My Habitat Address**

**Appropriate for 6<sup>th</sup> Grade**

*after "Models and Design" kit and in the "Weather and Water" kit or "Human Body Systems*

### **Framework(s) that can be included:**

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#### **Massachusetts Science and Technology/Engineering Curriculum Framework (pg. 97-98)**

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Physical Science:

- Explain how mass is conserved in a closed system.
- Graph and interpret distance vs. time graphs (for constant speed).

Technology /Engineering

- Identify and explain the steps (of the engineering) design process, identify the need or problem, research the problem, develop possible solutions, select the best possible solutions(s), construct a prototype, test and evaluate, communicate the solutions(s), and redesign.

Life Science:

- Relate the extinction of species to a mismatch of adaptation and the environment.
- Give examples of ways in which organisms interact and have different functions with-in an ecosystem that enable the ecosystem to survive.
- Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
- Explain how dead plants and animals are broken down by other living organism and how this process contributes to the system as a whole.
- Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms.

#### **National Science Education Standards.**

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Life Science: Populations and Ecosystems (pg.158-159)

- A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.
- Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some micro-organisms are producers- they make their own food. All animals, including humans, are consumers, which obtain food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.

The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.

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### Concept Map: Systems

#### -Emergent Properties (6-8)...

Inspect, disassemble, and reassemble simple mechanical devices and describe what the various parts are for; estimate the effect that making a change in one part of the system is likely to have the system as a whole.

#### -Complexity (9-12)....

Even in some very simple systems, it may not always be possible to predict accurately the result of changing some part or connection

#### -Boundaries (6-8) .....

The output of one system (materials, energy, information) can become the input to another system.

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### Concept Map: Flow of Matter in Ecosystems

#### -Plants making food (6-8).....

One of the most general distinctions among organisms is between plants, which use sunlight to make their own food, and animals, which consume energy-rich foods.

No matter how substances within a closed system interact... the total mass of the system remains the same.

#### -Food web (6-8)....

All organisms, including the human species, are part of and depend on two main interconnected global food webs. One includes microscopic ocean plants, the animals that feed them, and finally the animals that feed on those animals. The other web includes land plants, the animals that feed on them, and so forth.

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### Concept Map: Interdependence of Life

#### -Interactions with the environment.....

Changes in an organism's habitat are sometimes beneficial to it and sometimes harmful. (3-5)

Although weathered rock is the basic component of soil, the composition and texture of soil and its fertility and resistance to erosion are greatly influenced by plant roots and debris, bacteria, fungi, worms, insects, rodents, and other organisms. (6-8)

Changes in environmental conditions can affect the survival of individual organisms and entire species. (6-8)

In all environments - freshwater, marine, forest, desert, grassland, mountain, and others- organisms with similar needs may compete with one another for resources including food, space, water, air, and shelter. In any particular environment, the growth and survival of organisms depend on the physical conditions. (6-8)

Human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and intensive farming, have changed the earth's land, oceans, and atmosphere. Some of these changes have decreased the capacity of the environment to support some life forms. (6-8)

#### -Interactions among organisms.....

Two types of organisms may interact with one another in several ways: They may be in a producer/consumer, predator/prey or parasite/host relationship. Or one organism may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other. (6-8)

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# My Habitat Address

### Pre-Assessment (First define Habitat):

**10 minutes:** Draw your "Habitat", and describe what you would need in it to survive.

**5 minutes:** Now add where things (like materials, energy, and information) come into (also defined as "input") and go out of (also defined as "output") of your habitat.

### Grade Level:

6<sup>th</sup> grade

### Duration:

Activity 1: 50 minutes

Activity 2: 50 minutes

### Objectives:

Species adapt to their environment.

### Vocabulary:

Habitat (Food, Space,  
Water, Air, Shelter)

Ecosystem

Watershed

Survival

Zoo

Adaptation

### Materials:

#### Activity 1:

Habitat Address Cards  
(1 set/group of 4 students)

#### Activity 2:

Shoe Box, glue scissors,  
computer w/internet,  
Habitat Address Cards,  
magazines, and other  
references materials

### Activity 1:

#### Introduction (after pre-assessment):

Make connection from the "Models and Designs" section

The simplest models that you created are still complex (black box).

Changing one part of the model (black box, go-cart) could effect the "system" as a whole (paper clip in the wrong place).

Changes in "your" habitat are sometimes beneficial/ harmful (new TV/ water leak in bathroom). Ecosystems in general have changed over time, to cause those effects on habitats. How? (volcanoes, ect.) Human activities have changed earth's land... in both beneficial/ harmful ways. How? (watershed pollution)

- How does this affect your habitat?
- Could this effect your survival?
- How would this affect other animals in the watershed?

#### Play the "Habitat Address" game

#### Refer to the Water Address game

Groups of 3 or 4, each group gets a set of the Habitat Address Cards

#### Rules:

Do not look at cards until game starts.

One student in each group is the "reader".

Each card lists 4 adaptations to water of a certain plant or animal.

Based on clues, students will try to guess the name of the plant or animal and the habitat in which it is usually found. The students that picks the correct organism and habitat address receives points based on the number of clues that were read before guessing (one clue read = 4 pts, two clues = 3 pts, 3 clues = 2 pts, and 4 clues = 1 pt). The students that correctly guessed is the next "reader".

#### Wrap up:

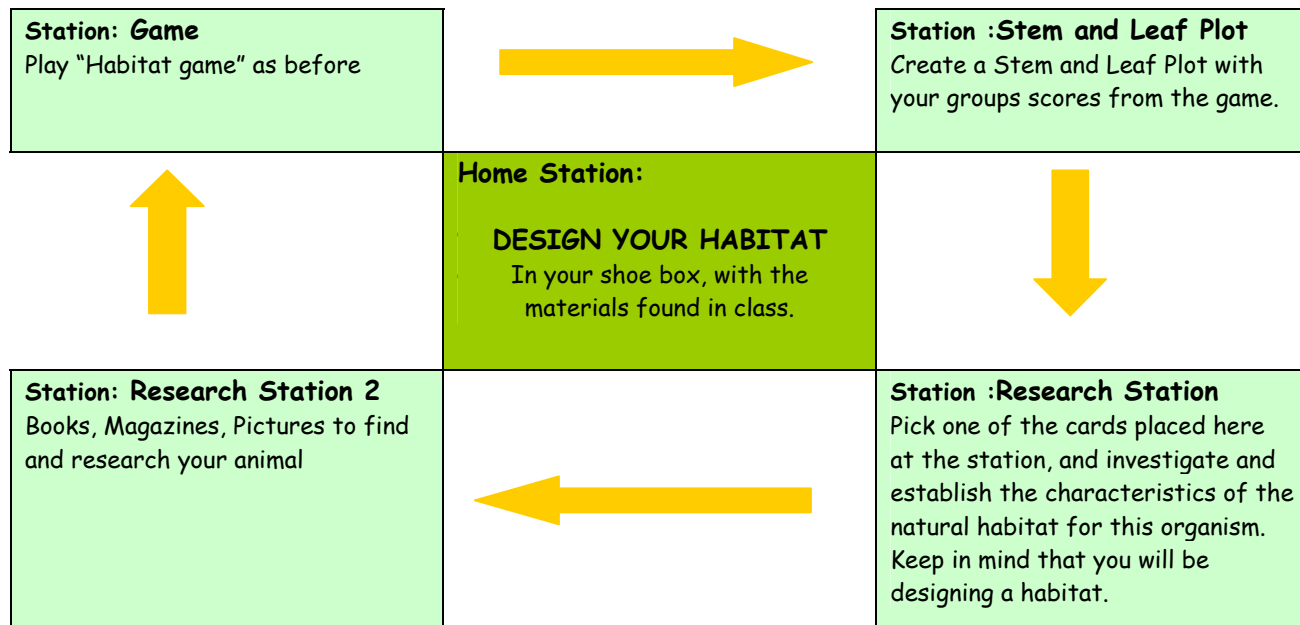
Discuss how different adaptations enable an organism to live in their habitat. Relate the extinction of species to not being able to adapt to their altered environment, and give local Massachusetts examples of endangered species like the Plymouth Redbelly Turtle (*Psuedemys rubriventris*).

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### Activity 2:

Remind the class of the game played the day before. Have the following stations set up for the students to research their local watershed species to design their habitat or zoo exhibit.



### Wrap up:

Have each group of students do a 5 minute presentation on their project for the class, including a question and answer session.

### Post-Assessment:

**10 minutes:** Draw the "Habitat" you created, and describe what your organism needs for survival.

**5 minutes:** Now add where things (like materials, energy, and information) come into (also defined as "input") and go out of (also defined as "output") of your habitat.

### Compare the two....

**4-WOW!** Habit is created accurately (w/ detail), and input and output information is present(w/ detail).

**3-Got it!** Habit created and complete (w/ detail), and some input and output information missing.

**2-Not yet:** Habit created complete and not a lot of detail, and some input and output information missing.

**1- Just getting there:** Habit created not complete, and input and output information missing.

### Possible Extension:

Go to the local zoo, breaking up the class into groups of 4

### Resources:

- "Water Address." Project Wet Curriculum and Activity Guide (pg 122-124)
- "Designing a Habitat" Project WILD Aquatic Education Activity Guide ([www.projectwild.org/materials/sampleaquatic.htm](http://www.projectwild.org/materials/sampleaquatic.htm))