



MARINE ECOSYSTEMS UNIT

LESSON PLAN 3rd-5th grade

Topics

Living and Non-Living Components (Biotic vs Abiotic)
Coastal Habitats
Freshwater Bioindicators
Population Dynamics
Coastal and Marine Plants

Objectives

Students will be able to:

- Differentiate between the biotic and abiotic components of an ecosystem.
- Identify the habitats of Long Island Sound and explain their importance to animals.
- Discuss how freshwater insects can be used to predict freshwater stream health.
- Give examples of factors that affect populations of animals.
- Describe the adaptations of coastal and marine plants that live in a brackish water environment.

Instructional Materials

Topic Video
Vocabulary Flash Cards

Assessment Materials

Video Reflection Worksheet
Video Quiz
Living and Non-Living Components Worksheet (answer PDF available)
Coastal Habitats Worksheet (answer PDF available)
Freshwater Bioindicators Worksheet (answer PDF available)
Population Dynamics Worksheet (answer PDF available)
Coastal and Marine Plants Worksheet (answer PDF available)

Related Materials

Links to videos and reading material that provides additional information on topics.

Topic articles (Lexile levels adjustable)

- Marine plants https://newsela.com/read/lib-kelp-forest/id/52700/?collection_id=2000000553&search_id=2eefdcf0-7052-4dc2-91f0-c619870c2d58
- Freshwater insect indicators <https://theconversation.com/how-healthy-is-your-river-ask-a-waterbug-43842>

****see page 2 for more resources****



NOAA Resources

The National Oceanic and Atmospheric Administration (NOAA) is a partner of SoundWaters. These are additional resources you may use in addition to the other materials included above.

Biotic vs Abiotic

<https://oceanservice.noaa.gov/education/pd/corals/welcome.html>

Coastal habitats

<https://www.noaa.gov/education/resource-collections/elementary/earth-science> (What's the story with sand)

<https://oceanservice.noaa.gov/facts/saltmarsh.html>

https://oceanservice.noaa.gov/education/kits/estuaries/media/supp_estuar06a_saltmarsh.html

Coastal and Marine Plants

<https://www.noaa.gov/education/resource-collections/elementary/life-science>

(Sargassum hide and seek)

<https://oceanservice.noaa.gov/facts/kelp.html>

<https://videos.fisheries.noaa.gov/detail/videos/aquaculture/video/5625015342001/cooking-kelp-with-an-ocean-farmer?autoStart=true>

Population dynamics

<https://www.fisheries.noaa.gov/southeast/ecosystems/impacts-invasive-lionfish>

https://aamboceanservice.blob.core.windows.net/oceanservice-prod/education/activity-book/pdf/NOAA_DYW_2017_26_Fish_Fetch.pdf

Freshwater bioindicators

<https://coast.noaa.gov/data/estuaries/pdf/a-biodindication-of-water-quality-resources.pdf>

(link in page 2 for macroinvertebrates)

<https://www.noaa.gov/education/resource-collections/freshwater>

NGSS Standards

Interdependent Relationships in Ecosystems: 3-LS2-1; 3-LS4-3; 3-LS4-4

Inheritance and Variation of Traits: 3-LS3-2; 3-LS4-2

Structure, Function, and Information Processing: 4-LS1-1

Earth's Systems: 4-ESS2-1

Matter and Energy in Organisms and Ecosystems: 5-LS1-1; 5-LS2-1

BIOTIC AND ABIOTIC COMPONENTS OF AN ECOSYSTEM

ANSWER KEY

Define **ABIOTIC**: Non-living factors in an ecosystem/area (wind, water, sun)

Define **BIOTIC**: Living factors in an ecosystem/area (animals, plants)

What are the abiotic and biotic factors of your home?

List them in the table below and include a picture of one abiotic and one biotic factor.

ABIOTIC	BIOTIC
<p>FACTORS</p> <p>Answers will vary</p> <ul style="list-style-type: none">● Furniture● Water● Heat● Food● Floors● Lights● Oxygen	<p>FACTORS</p> <p>Answers will vary</p> <ul style="list-style-type: none">● People● Pets● House plants
<p>PICTURE</p>	<p>PICTURE</p>

COASTAL HABITATS OF LONG ISLAND SOUND

ANSWER KEY

In the video, you learned about three coastal habitats of Long Island Sound. *Label the habitats pictured below and give specific examples of how the animals of Long Island Sound use them.*

Habitat Name Salt Marsh



How do the animals use this habitat?

Reasons include:

- Nursery habitat, fish and other animals live in between the blades of grass
- Shorebirds use the salt marsh for nesting and feeding

Habitat Name Rocky intertidal Zone



How do the animals use this habitat?

Reasons include:

- Rocks provide habitat for animals when the tide goes out
- Rocks also provide spaces for animals to attach to and grow
- Sediment is soft and allow animals to burrow into it and stay wet

Habitat Name Sandy Beach



How do the animals use this habitat?

Reasons include:

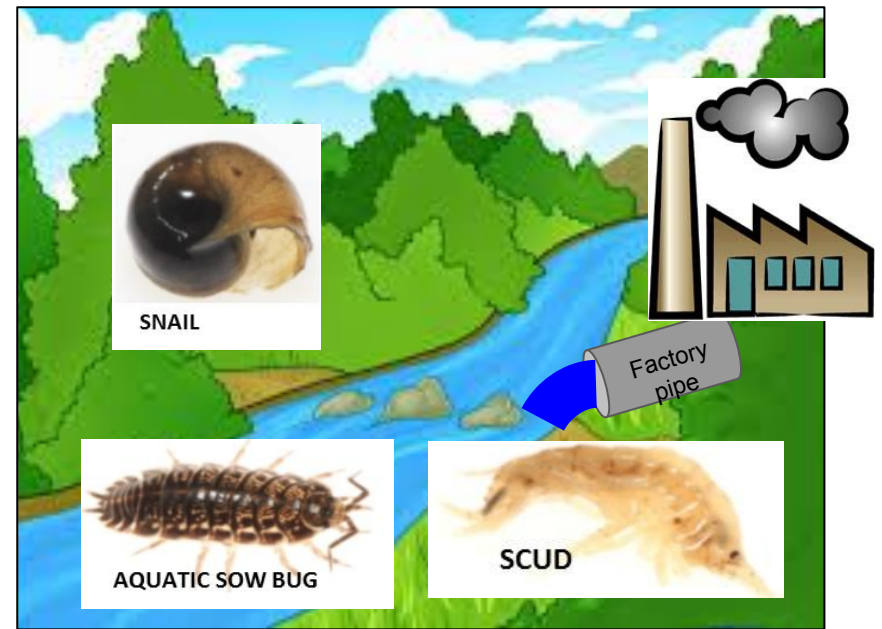
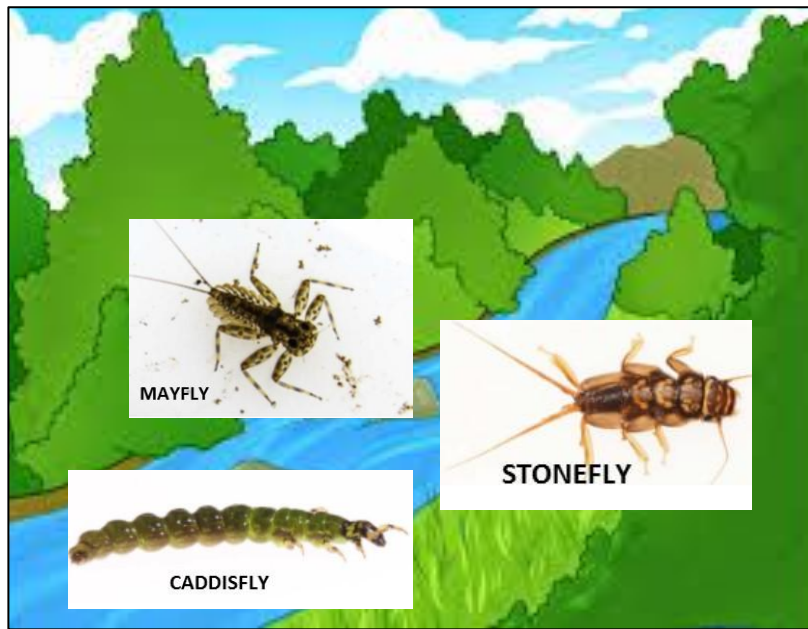
- Breeding ground for animals like turtles and horseshoe crabs
- Water can move down into sand allowing animals to live under the sand and stay wet

FRESHWATER BIOINDICATORS ANSWER KEY

Many different rivers lead to Long Island Sound. Why is the river important to animals and humans?

Rivers provide drinking water for people, a habitat for animals, breeding ground for Long Island Sound animals, and carry nutrients to different areas of the river and Long Island Sound

Insects can be used to determine if a river is healthy or polluted because some insects are more sensitive to pollution than others. Place the insects on the river they would most likely be found in.



MOST SENSITIVE TO POLLUTION

LEAST SENSITIVE TO POLLUTION

POPULATION DYNAMICS

ANSWER KEY

What is a population?

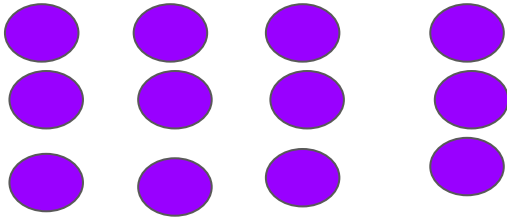
The number of one specific organism/species in an area

In the video, you learned how population size, population density, and population diversity can affect how a population can change over years.

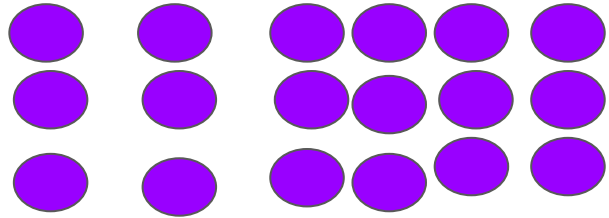
For each of these populations:

- 1) Which is changing in each example: population size, density or diversity?
- 2) What is happening from year 1 to year 2.
- 3) How will it affect the population overall?

YEAR 1

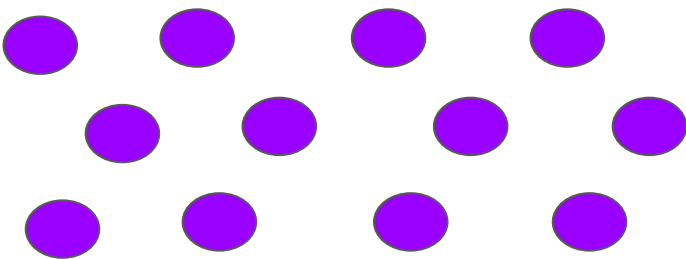


YEAR 2

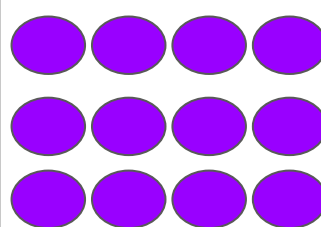


- 1) The area they live in stays the same, but the number increases so Population size
- 2) The population size is increasing
- 3) Large populations are more stable, so it is good that the population increased. Overall, if it continues to rise, the overall available resources could decrease.

YEAR 1



YEAR 2



- 1) The area they live in decreases, but the number is the same so Population density
- 2) The size of the area that the animals live in is decreasing.
- 3) As the area that the animals have decreases, more animals are located closer together, which could mean that there are less resources overall. Some animals either need to move to another area or many may not survive.

COASTAL AND MARINE PLANTS

ANSWER KEY

For each of the plants below:

- 1) Does this plant live out of the water, partially in the water, or completely in the water
- 2) List at least 1 adaptation the plant has to survive in Long Island Sound

Cordgrass



- 1) Partially in the water - when the tide rises
- 2) A salt gland to excrete the salt onto their leaves instead of keep it inside the leaves

Glasswort (sea pickle)



- 1) Out of the water, but in the salt panne where the soil is extra salty
- 2) The plant absorbs salt inside and the plant body is thickened so they can keep more water inside

Rockweed



- 1) Completely in the water
- 2) Air bladders to keep them at the surface of the water to have access to sunlight, Holdfast instead of roots to hold onto a rock and leaves that can absorb directly nutrients from the water