



BIOLOGY UNIT

LESSON PLAN 6th-8th grade

Topics

Introduction to Biology
DNA
Vascular Systems
The Digestive System
Life Cycles

Objectives

Students will be able to:

- Describe the required characteristics for all living things
- Explain the importance of DNA
- Compare and contrast the vascular systems of humans and animals
- Identify unique digestive system features of Long Island Sound animals
- Determine how life cycles vary between different types of animals

Instructional Materials

Topic Video
Vocabulary Flash Cards

Assessment Materials

Video Reflection Worksheet
Video Quiz
Introduction to Biology Worksheet (answer PDF available)
DNA Worksheet – at home experiment (answer PDF available)
Vascular Systems Worksheet (answer PDF available)
The Digestive System Worksheet (answer PDF available)
Life Cycles Worksheet (answer PDF available)

Related Materials

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

Topic articles (Lexile levels adjustable)

- *Click on article title*

["Carnivore" sharks have a stomach for greens, study says](#)

[The life cycle of a ladybug](#)

[History of the cell: Discovering the cell](#)

[DNA: An overview](#)

[Phototropism explained](#)

[Plant and animal reproduction](#)



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.

Life Cycles

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

<https://www.fisheries.noaa.gov/resource/educational-materials/salmon-survival-game>

<https://www.fisheries.noaa.gov/feature-story/map-habitat-follow-life-cycle-hawaiian-fish-across-many-habitats>

<https://coast.noaa.gov/psc/sea/national-standards/life-cycles-organisms-0.html>

Digestive System

<https://oceantoday.noaa.gov/manateeanatomy/>

<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/1973/712/chao.pdf>

DNA

https://oceantoday.noaa.gov/oceanasalab_sharkfinning/

<https://www.fisheries.noaa.gov/feature-story/tracking-marine-life-invisible-clues-edna-enhances-ecosystem-monitoring>

<https://research.noaa.gov/article/ArtMID/587/ArticleID/2454/The-DNA-found-in-sea-turtle-poop-could-be-scientists%E2%80%99-newest-monitoring-tool>

<https://www.fisheries.noaa.gov/feature-story/how-get-dna-dolphin>

Circulatory System

<https://oceantoday.noaa.gov/fullmoon-bluebloodsbattlebacteria/welcome.html>

https://oceanexplorer.noaa.gov/explorations/04alaska/logs/aug20/media/crab_lab_video.html **NGSS**

<https://nefsc.noaa.gov/publications/classics/galtsoff1964/chap11.pdf>

NGSS Standards

From Molecules to Organisms: Structures and Processes: MS-LS1-1, MS-LS1-2; MS-LS1-3; MS-LS1-4,

INTRODUCTION TO BIOLOGY

ANSWER KEY



SoundWaters
Protecting Long Island Sound through Education

Biology is the study of **LIFE/LIVING THINGS**

In the video, you learned the criteria that need to be met for something to be considered alive.

Match the following characteristics of life to the statements below

Human blood must remain at a pH of 7.4	Homeostasis/Regulation
Bacteria can copy their DNA and split into additional cells	Reproduction
Long Island Sound has a complex food web that all animals rely on for survival	Processing Energy
Without all the tissues in our body, we would not have complex organ systems	Made of a cell or cells
A plant is grown in a box with only a small opening for light. The stem was bent after 1 week.	Respond to stimuli
After going to the gym for a 3 months, my legs and arms feel stronger	Growth/Development

EXTRACT THE DNA FROM A STRAWBERRY

ANSWER KEY

In the video, you learned how to extract the DNA from a strawberry. Do your own extraction and answer the following questions.

1. First, put the strawberry in a plastic bag and mash it up. **Why does the strawberry have to be mashed up?**

Mashing up the strawberry releases all the cells, breaking them open so we can get to the DNA

2. Next, add 2 teaspoons of dish soap to the bag. **What does the dish soap break apart? Why is that important?**

The dish soap breaks down fats. There are fats on the outside of the cells keeping the DNA inside and also the soap can also break apart cells that are not already broken

3. Next, add 1 teaspoon of salt to the bag. **What does the salt get rid of?**

The salt gets rid of any proteins clinging onto the DNA

4. Now, add $\frac{1}{2}$ cup of water to the bag and mix it all up
5. Filter the mixture over a coffee filter so you only have the liquid parts. **Why won't the DNA get stuck in the filter?**

The DNA is too small, so it will go through the filter easily

6. Next, add freezing cold isopropyl alcohol on top of the DNA mixture. It will float because it is less dense. **How does the alcohol help us to see the DNA?**

The alcohol makes the DNA precipitate, or clump together and allow it to be pulled out of the mixture

7. Use a thin skewer and extract the DNA where the alcohol and DNA mixture meet. It will swirl up on the skewer.

VASCULAR SYSTEMS

ANSWER KEY

Based on what you learned in the video, fill in the table below comparing the cardiovascular system to the haemal system

	<u>CARDIOVASCULAR</u>	<u>HAEMAL</u>
What types of organisms have this system?	humans	seastars
What liquid moves around in this system? What are the components (cells) in that liquid?	Blood containing red blood cells, white blood cells, and platelets	Water - no types of cells since it is water and not blood
What are the important structures/anatomy for this system? What do they do?	Heart - pumps blood Vein - return blood to heart Artery - carry blood w/ oxygen from heart to body	Madreporite - brings water into animal Canals - tubes that carry water out to arms
What is carried around in the liquid for this system?	Nutrients and gases	Nutrients and gases
Why is this system ideal for the types of organisms that have it?	Humans have a complex body system that requires blood be pumped far from the heart, so strong muscular heart makes that possible plus pushing it through lots of small tubes	Seastars do not have a heart or need water to be pumped really far from the center of its body so the madreporite can easily bring in water and push it through like a hydraulic system

THE DIGESTIVE SYSTEM ANSWER KEY

In the video you learned that animals have specialized structures that help them break down their food so they can get the nutrients they need to stay alive. **Seastars and brittle stars eat different types of food. Explain how their digestive system is designed to help them do this.....**



The seastar eats live food, but it has a very small mouth so it....

Uses 2 different stomachs, the cardiac goes outside of the body and starts to digest because they cannot pull the clam into the seastar.

Then the pyloric stomach pulls in the partially digested food and then digestive glands in each arm break it down further



The brittle star is a scavenger that has to crawl on top of its food and.....

Uses its 5 teeth to pull material off of the dead body of the animal it is eating. They use their arms to anchor onto the food.

Their stomach takes up most of the inside of their body cavity and has specialized pouches with a lot of surface area to digest and absorb the food

In the video, you learned that animals have different reproductive strategies based on how they care for their young and how long they live

Sort the qualities for R-selected species and K-selected species

R-Selected	K-Selected
Produce many offspring	Produce few offspring
Mature quickly	Mature slowly
Short life span	long life span

Harbor seals remain with their mothers for several years. How does this affect the number of offspring produced? Is this R- or K- selected reproduction?

Since harbor seals remain with their mother and get milk from them, there is a limited number of offspring produced so the mother can dedicate all her time to feeding them. She also teaches her offspring to hunt so the less offspring, the more she can ensure they learn all they need to before they leave to live on their own. This is a K-selected strategy

Asian shore crabs spend some of their juvenile life stage as a plankton. In order to become an adult crab, what process must happen? How is their growth process different than a diamondback terrapin?

When the fiddler crab is a juvenile plankton, they have swimming appendages so they must go through a metamorphosis to become a crab that can walk on the ground. They lose their tail and grow legs. Since they have a shell covering their whole body, they also molt so their exoskeleton can grow larger. The terrapin only has a shell on part of it's body, so it's body just grows larger without having to molt