BIOLOGY UNIT
LESSON PLAN 3rd-5th grade

Topics
Introduction to Biology
DNA
The Circulatory System
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 circulatory 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)
The Circulatory System 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/

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 Standards

Inheritance and Variation of Traits: 3-LS1-1, 3-LS3-1
Unity and Diversity: 3-LS4-2
Structure, Function, and Information Processing: 4-LS1-1
Matter and Energy in Organisms and Ecosystems: 5-LS1-1

INTRODUCTION TO BIOLOGY
ANSWER KEY

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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

Jamie forgot to check the weather so she was shivering outside without a coat	**Homeostasis/Regulation**
Susie's cat had a litter of 9 new kittens	**Reproduction**
Tommy made sure to eat breakfast so that he could run fast at his track meet	**Processing Energy**
Laura's biology class was counting the cells in an algae sample they found in the pond behind school	**Made of a cell or cells**
During a thunderstorm, my dog hides under the couch	**Respond to stimuli**
Our class was keeping tadpoles and in three weeks, we had full grown frogs	**Growth/Development**

EXTRACT THE DNA FROM A STRAWBERRY ANSWER KEY

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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. **What does mashing it up do to the cells of the strawberry?**

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 ½ 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.

THE CIRCULATORY SYSTEM
ANSWER KEY

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Compare and contrast the circulatory system of a human and a horseshoe crab by dragging the phrases into the correct box

JUST HUMANS	BOTH	JUST HORSESHOE CRABS
Closed circulatory system	Heart	Open circulatory system
Artery	Blood that clots	Amoebocyte
Red blood	Oxygen	Blue blood
Iron based blood		Copper based blood

What does the circulatory system help to transport throughout an organism's body?

Nutrients and gases (oxygen and carbon dioxide)

THE DIGESTIVE SYSTEM
ANSWER KEY

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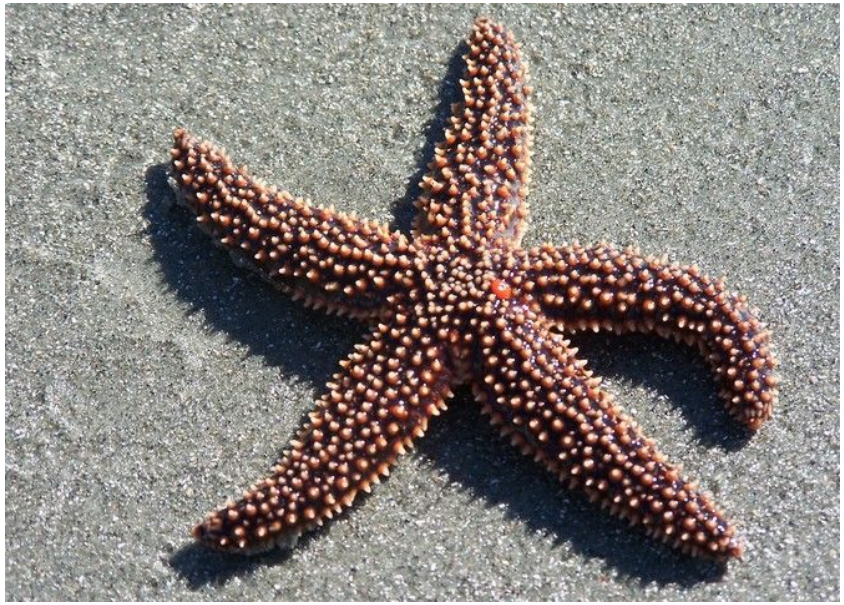
In the video you learned that animals have specialized structures that help them break down their food so they can get the nutrients they need to stay alive. **Fill in the boxes below about the seastar and horseshoe crab.**



The seastar has a very small mouth, so to help it get food, it has…….

2 different stomachs, the cardiac goes outside of the body and starts to digest. The pyloric stomach pulls in the partially digested food and then digestive glands in each arm break it down further

The horseshoe crab does not have any teeth on the outside, so to break down its food……..

It has a crop, which is like a grinding section, that is found before the stomach. It smashes up the food into a pulp and then goes to the stomach.

LIFE CYCLES
ANSWER KEY

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In the video, you learned about the life cycle of several Long Island Sound animals. Sort the life cycle characteristics into table below

	Egg	Juvenile	Adult
Spider Crab	Have a lot of eggs in pouch on stomach.	Microscopic plankton.	Many molting stages from juvenile to adult stage
Diamondback Terrapin	Lays eggs in the sand that remain covered until they hatch	Hatchling looks like a smaller version of the adult. Hides in grass	Females are always larger than males
Harbor Seal	Born alive and only one per year	Stays with its mother for 4-6 weeks of life	Females and males are pretty close in size.