ANIMAL ADAPTATIONS UNIT
LESSON PLAN 6th – 8th grade

Topics
Introduction to Adaptations
Camouflage
Animal Locomotion
Animal Senses
Food Web

Objectives
Students will be able to:

- Provide examples of and explain how the three types of adaptations are utilized by living organisms.
- Identify the types of adaptations that animals use for protection, locomotion, and finding food.
- Describe differences in adaptations between aquatic and terrestrial animals.
- Interpret examples of natural selection and explain why it is important for a species.
- Create a food web and identify the key elements.
- Explain how energy moves through trophic levels of a food web.
- Explain and provide examples of how an animal's habitat influences its adaptations.

Instructional Materials
Topic Video
Vocabulary Flash Cards

Assessment Materials
Video Reflection Worksheet
Video Quiz
Adaptations 1st letter Worksheet
Natural Selection worksheet
Camouflage worksheet (answer sheet available)
Animal Locomotion worksheet
Animal Senses worksheet (answer sheet available)
Food Web worksheet (answer sheet available)

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

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.

Aquatic food webs
https://www.noaa.gov/education/resource-collections/marine-life-education-resources/aquatic-food-webs

Horseshoe crabs
https://www.fisheries.noaa.gov/feature-story/horseshoe-crabs-managing-resource-birds-bait-and-blood
https://oceantoday.noaa.gov/every-full-moon/full-moon-horseshoecrab.html

Invertebrate facts
https://www.fisheries.noaa.gov/national/outreach-and-education/fun-facts-about-intriguing-invertebrates

P*lankton in the arctic*
https://oceantoday.noaa.gov/animalsoftheice_krill/

Invent an animal
https://oceanexplorer.noaa.gov/edu/lessonplans/gal_gr5_6_l3.pdf

NGSS Standards
Matter and Energy in Organisms and Ecosystems: MS-LS2-2
Natural Selection and Adaptations: MS-LS4-4

TYPES OF CAMOUFLAGE

An animal's behaviors affect what type of camouflage is best for them. Select a pair of animals below and explain what type of camouflage is used by the predator/prey based on their behaviors.

Zebra and lion; seagull and spider crab; shark and seal;

Zebras travel in herds so they use disruptive coloration so a lion cannot tell the difference between them. Lions use concealing coloration to blend in and make it easier to hide from their prey

Spider crabs do not move very fast so they use both concealing and disguise to look like a rock so the seagull cannot locate them.

Sharks use concealing, which is a type of concealing coloration. This breaks up their shape for when they are hunting seals.

In the video, we discussed 3 types of camouflage. If you could have any of these types of camouflage, which would it be? Make sure to explain how your type of camouflage would affect your choice and habitat and what food you eat.

Name: _____

SoundWaters
Protecting Long Island Sound through Education

ANIMAL SENSES

In Long Island Sound, some animals live on the bottom and others actively move around in the water column

Which types of receptors would be most helpful for living in each area? Make sure to explain your answer!
Auditory receptors, Mechanoreceptors, Chemoreceptors, Photoreceptors

Bottom Dwelling Animals	Actively moving around in water column
Example Bottom is often dark - less likely to be visual for most animals Instead other senses are heightened to make up for it	*Example answers, could be others* Wide open area to observe Mechanoreceptors (lateral line), Chemoreceptors (smelling organisms around) Auditory (echolocation)

Which of your senses would be most important to you if you lived in the water? Explain your answer.

Answers vary

If an animal did not have any eyes, how could its other senses change or adapt to help it survive?

Answers vary, some examples are...
Other senses are heightened to make up for it. They may also have specialized body parts that help with smell, taste, hearing, or touch that differs from animals that can see. It may develop other defenses to protect it (sea anemone)

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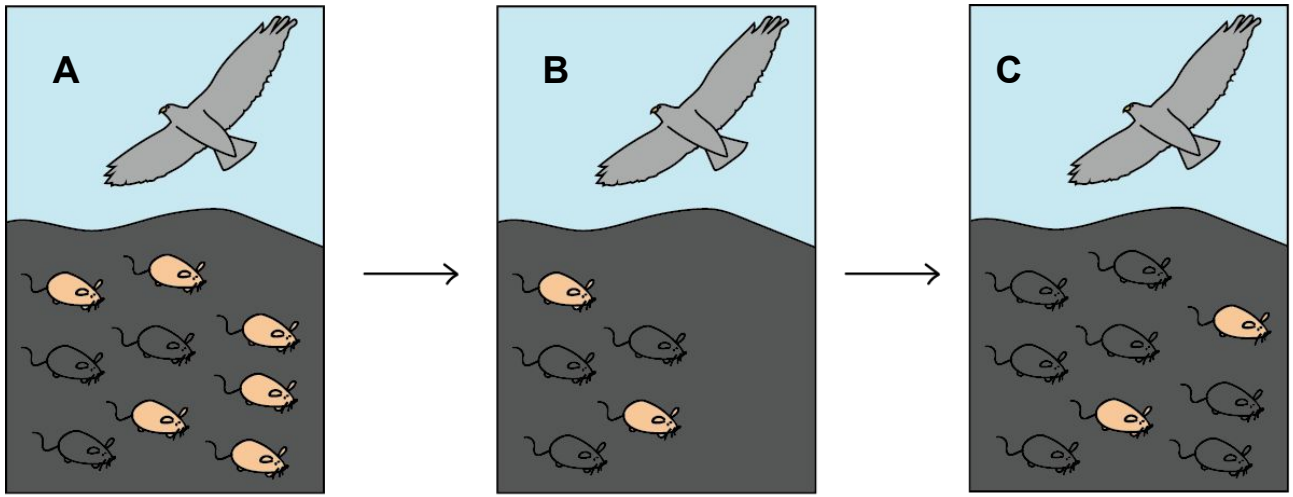
NATURAL SELECTION

What is natural selection? Give an example (not a giraffe) and explain.



The three pictures above demonstrate natural selection. Explain what is happening in pictures A, B, and C and how they relate to natural selection.

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ANIMAL LOCOMOTION

The way animals move is based on their specific body parts.

For example, humans have long jointed legs that allow us to walk and run in different directions.

Column A	Column B
Octopus	Invertebrate, can move its arms freely to change its shape
Lobster	Legs for walking surrounded by hard shell, tail to swim backwards
Flounder	Tail like a paddle, swims in up and down movement (not side to side)
Diamondback Terrapin	4 legs, nails, webbed feet

From the table, select an animal from column A and a DIFFERENT method of locomotion from column B. Explain how the animal would have to change the way it moves and where it lives (if that applies).

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FOOD WEB

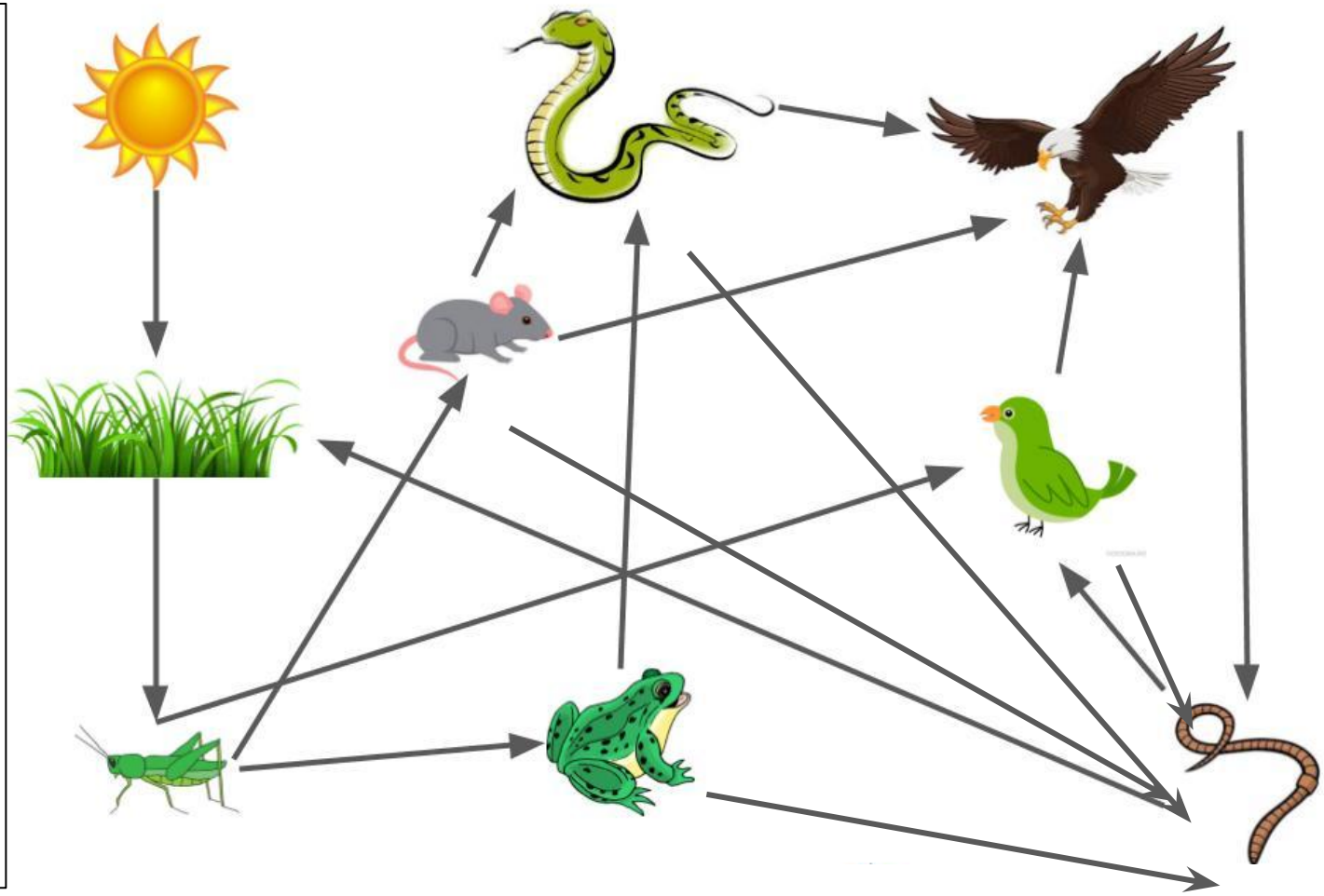
Use arrows to complete the food web

What would happen to this food web if we removed the snake?

The eagle would have one less food source, so it would eat all the small birds faster, until they were all gone.

There would be an overpopulation of frogs, which would make the number of grasshoppers decrease.

If there are less grasshoppers then the mouse will not have anything to eat and it will not survive.



Fill out the trophic levels table:

Producer/ Autotroph	Primary Consumer	Secondary Consumer	Tertiary Consumer	Apex Predator	Decomposer
grass	grasshopper	Mouse Frog Small bird	snake	Eagle (large bird)	worm

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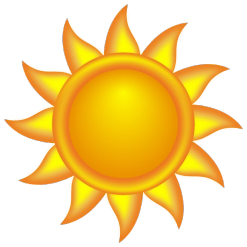

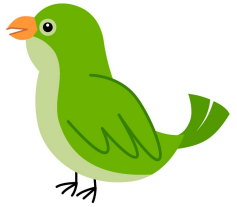

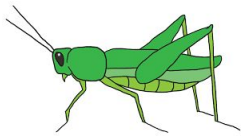

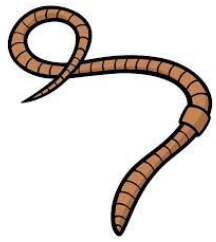

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Animal Adaptations Quiz Answers

The peppered moth population shifted to favor moths that were darker due to soot being on the trees this is an example of…

A. How the environment affects natural selection
B. Physiological adaption
C. Extinction
D. Moths changing colors

A horseshoe crab tail is an example of a…

A. Behavioral adaptation
B. Physiological adaption
C. Structural adaptation
D. Stinger

Variation in a population is important because…

A. Not everything can be the same
B. Species can adapt and survive environmental change
C. There will be more fossils
D. It causes extinction

True or False: Adaptation occurs over a small period of time.

A. True
B. False

Whales storing additional oxygen in their muscle tissue is an example of a…

A. Structural adaptation
B. Behavioral adaptation
C. Systematic adaptation
D. Physiological adaption

If an environment changes too rapidly and there is not a lot of diversity in a population they may become…

A. Mutated
B. Evolved
C. Extinct
D. Adapted

Camouflage Quiz Answers

There would be no point in an animal replicating the color of its surroundings if its main predator were which of these?

A. Not hungry
B. Larger than it is
C. Too old to hunt
D. Colorblind

What do kingfish and squid have in common?

A. Chromatophores
B. Taste in music
C. Fin markings
D. Statocysts

What does countershading mean?

A. When the top of an animal is dark in color and bottom is light in color.
B. When an animal's head is a different color than its tail.
C. When the top of an animal is light in color and the bottom is dark in color

True or false: Horseshoe crabs employ active camouflage as a form of protection.

A. True
B. False

How do oyster toadfish camouflage from other animals?

A. They have a lure that hangs near their mouth to attract smaller animals.
B. They rest on the bottom like a rock.
C. They use chromatophores to change color.

Camouflage can be beneficial to:

A. Predators
B. Prey
C. Neither
D. Both

Aquatic Locomotion Quiz Answers

What trait is common to all mollusks?

A. Webbed feet
B. Muscular foot
C. Vertebrae
D. Legs

What does it mean to be a decapod?

A. The animal can walk backwards
B. The animal lives on land
C. The animal is “ten footed”
D. The animal swims

Which animal has a mucus raft?

A. Lobster
B. Flounder
C. Clam
D. Mud Snail

Which animal has webbed feet?

A. Flounder
B. Diamondback Terrapin
C. Alligator
D. Spider Crab

Which animal is a vertebrate?

A. Oyster Toadfish
B. Mud Snail
C. Lobster
D. Spider Crab

True or False: The flounder swims up and down as opposed to side to side

A. True
B. False

Animal Senses Quiz Answers

What does a horseshoe crab use its flabellum for?

A. To test the composition of the food it found before it enters the mouth
B. To sense the light coming in from the surface of the water
C. To test the composition of the water before it enters the gills
D. To sense the movement of incoming predators

Which of the following allows a seastar to detect the smell of its prey?

A. Mechanoreceptors
B. Chemoreceptors
C. Photoreceptors
D. Auditory receptors

True or False: An auditory receptor allows an animal to have the sense of touch.

A. True
B. False

A photoreceptor on an animal allows it to have the sense of _____.

A. Touch
B. Sight
C. Hearing
D. Taste and Smell

The horseshoe crab has specially adapted bristles that allow the crab to respond to mechanical stimuli such as touch. These are an example of which of the following

A. Mechanoreceptors
B. Chemoreceptors
C. Photoreceptors
D. Auditory receptors

Sea Stars use mechanoreceptors to help them sense gravity and are involved in rheotaxis. What is rheotaxis?

A. The fleeing of the sea star away from its prey.
B. The positioning of the sea star to face into the current of the water.
C. The movement of the sea star towards its prey.
D. The positioning of the sea star to face towards the surface of the water.

Food Web Quiz Answers

What is a food web?

A. The web spun by a primary consumer.
B. A combination of all the food chains in an ecosystem.
C. The web of food an animal should eat.
D. The specific body parts an animal has for getting its food.

What is a trophic level?

A. The path that energy takes as it moves through an ecosystem.
B. The level in the water column where an animal lives.
C. The position that an organism occupies in the food web.
D. The amount of chlorophyll an animal contains in its body.

Which of the following is not a trophic level in a food web?

A. Primary consumer
B. Producer
C. Tube feet
D. Decomposer

What does the adaptation of external digestion allow the sea star to do?

A. Eat food larger than it could fit inside its body.
B. Create its own food.
C. Dissolve an oyster's shell.
D. Jump up the food web to a new trophic level.

What would happen if all the bivalves in the ecosystem were gone?

A. The sea stars would thrive because their predator is gone.
B. The horseshoe crabs would die because their food source is gone.
C. The sea stars would die because their food source is gone.
D. The horseshoe crabs would thrive because their predator is gone.

True or False: The bivalve is a filter feeder that uses little hairs on their gills to remove their food from the water.

A. True
B. False