



Dive into STEM! Exploring Our Classroom Aquarium

Pet: fish	Class: PK-2
Brief Overview: This lesson explores aquatic animals and their adaptations. Students observe real animals, identify needs, and then get creative by designing their own aquatic creature with a special adaptation.	Lesson Breakdown Lesson 1: Aquatic Explorers Lesson 2: Adaptations
Essential Question How are aquatic animals' bodies adapted to live underwater?	
Subjects <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> ELA <input checked="" type="checkbox"/> Math <input checked="" type="checkbox"/> STEM <input checked="" type="checkbox"/> Art <input type="checkbox"/> Other	Stem Connections Science: animal adaptations Technology: online aquariums Engineering: creation of an aquatic animal Math: counting the fish

Performance Expectations/ Standards

K-LS1-1. From Molecules to Organisms: Structures and Processes. Use observations to describe patterns in the natural world in order to answer scientific questions about the characteristics of living things.

K-LS4-1. Interdependent Relationships. Use observations to describe patterns in the relationships among plants, animals, and their environments.

K-ETS1-1. Engineering Design: Defining and Delimiting Engineering Problems. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be safe and appropriate for kindergarteners to address.

CCSS

K.L.S.1.A: Use observations to describe living things.

K.ESS3.C.1: Observe and describe how plants and animals depend on their surroundings.

K.CC.4.A: Count to answer "how many?" questions about as many as 20 things arranged in a line, or in a rectangular array.

K.VA.A: Use drawing to represent objects and construct simple scenes

I CAN statements

- identify different living things in the aquarium.
- describe what the fish need to survive (water, food, shelter).
- count the different types of fish in the aquarium
- explain how aquatic animals adapt to their environment
- create my own aquatic animal and explain an adaptation that that animal has.

Materials

- Pictures of various aquatic animals (fish, whales, dolphins, octopus, etc.)
- Magnifying glasses
- Construction paper, cardboard, or recycled materials
- Glue, scissors, tape
- Crayons, markers, paint (optional)

Teacher Background

Fish exhibit a remarkable array of adaptations that have allowed them to colonize virtually every aquatic niche imaginable.

Their streamlined bodies minimize drag and propel them through diverse watery realms.

Gills extract dissolved oxygen, transforming fish into efficient underwater breathers.

Specialized fins orchestrate intricate maneuvers, enabling precise navigation and even aerial acrobatics in some species.

Beyond the physical realm, adaptations extend to bioluminescence for communication and camouflage, electrosensory perception for navigation, and venom production for defense.

These adaptations, honed over millions of years, stand as testaments to the ingenuity of evolution and the astonishing diversity of life on Earth.

Lesson 1: Aquatic Explorers

Time	Materials	Activity
15 mins	Magnifying glasses	<p>Tell the students that you will be learning about fish and trying to answer the question, “What do the living things in the aquarium need to survive?”</p> <p>Distribute magnifying glasses to each student. Ask students what they see in the aquarium. Encourage them to use their senses to observe the fish and other living things and to use descriptive language.</p> <p>Include prompts like:</p> <ol style="list-style-type: none">1. What color are the fish?2. What do their body shapes look like?3. How do they move?4. Do they swim alone or with others?5. What do they seem to be interested in?
10 mins		<p>Share one of the live cam aquariums with the students. Some suggestions are:</p> <ul style="list-style-type: none">• https://aqua.org/explore/livestreams

		<ul style="list-style-type: none"> • https://explore.org/livecams/aquarium-of-the-pacific/pacific-aquarium-tropical-reef-habitat-cam • https://tnaqua.org/live/secret-reef/ • https://www.seattleaquarium.org/animals/live-cams/ <p>Have the students discuss the different things they have seen- types of fish, the environment, other sea animals, etc.</p>
10 mins		Have the students count the number of fish that they see in the aquarium. Ask them what they think might happen if more fish were added to the aquarium - would they have to change anything? Would there be enough space for more fish?
10 mins		<p>As a class, discuss the importance of feeding the fish the correct amount of food.</p> <p>Introduce the concept of estimating by showing students different amounts of fish food and asking them to guess which amount is appropriate for the number of fish in the aquarium.</p> <p>Under teacher supervision, have a student carefully measure out the estimated amount of food using a spoon or measuring tool.</p> <p>Observe the fish as they eat and discuss any adjustments needed for future feedings.</p>

Lesson 2: Adaptations		
Time	Materials	Activity
5 mins		Gather students in a circle and discuss the basic needs of aquatic animals (e.g., water, food, shelter)) in its aquatic environment
10 mins		Explain that aquatic animals sometimes have special features called adaptations that help them survive in their

		environment. Share examples like a fish's camouflage scales or a dolphin's blowhole. Ask the students to identify any adaptations of the fish in our aquarium.
20 mins		<p>Tell students they will be creating their own imaginary aquatic animal with a cool adaptation! Provide them with art materials and encourage them to use their creativity.</p> <p>As they work, circulate and ask questions like: "What kind of environment does your animal live in?" "What is its special adaptation?" "How does this adaptation help it survive?"</p> <p>Encourage students to decorate their animal using crayons or colored pencils.</p>
10 mins		<p>Gather students back together and give each group a chance to share their imaginary aquatic animal and its adaptation. Encourage them to use descriptive language and explain the purpose of their adaptation.</p> <p>Have students clap for each creation and celebrate their imagination!</p> <p>Briefly discuss the different adaptations they came up with and how they help the animals survive.</p>

Differentiation

For students who need additional support:

- provide them with sentence starters or picture cues to help them identify the living things in the aquarium and describe their needs
- For students with limited language skills, encourage them to express their ideas using short sentences or drawings.
- Provide additional support for students with special needs by pairing them with a buddy or providing visual aids.

For students who need additional challenges:

- Challenge them to research different types of fish or aquatic plants and share their findings with the class.
- Challenge them to work on this interactive activity from Shedd Aquarium

where they will design a fish that has the right adaptations, or traits, to help it survive in a reef environment.

<https://wisconsin.pbslearningmedia.org/resource/lsp07.sci.life.evo.buildafish/build-a-fish/>

Assessment				
Criteria	Emerging (1 pt.)	Developing (2 pts.)	Proficient (3 pts.)	Exemplary (4 pts.)
Observing & Describing	Can identify some characteristics of fish.	Can identify most characteristics of fish (fins, scales, etc.).	Can identify and describe a variety of characteristics of fish.	Can provide detailed descriptions of fish characteristics and explain their purpose.
Identifying Needs	Recognizes water is needed but may struggle with other needs.	Can identify two needs (water, food) of fish.	Can identify all three basic needs (water, food, shelter) of fish.	Can explain why each basic need is important for fish survival.
Understanding Adaptations	Limited understanding of adaptations.	Can identify adaptations as special features but may struggle to explain them.	Can explain some adaptations and how they help fish survive.	Can explain multiple adaptations and how they uniquely benefit different fish species.
Creating & Explaining	Imaginary animal lacks clear features or adaptation explanation is unclear.	Imaginary animal has some features but adaptation explanation is incomplete.	Imaginary animal has clear features and adaptation has a basic explanation.	Imaginary animal is detailed and creative with a specific adaptation and clear explanation of its benefit.
Participation & Sharing	Participates minimally in discussions and shares little during sharing time.	Participates somewhat in discussions and shares basic information during sharing time.	Participates actively in discussions and shares relevant information during sharing time.	Actively participates in discussions, asks questions, and shares detailed information with enthusiasm during sharing time.

Extension

- Have students create a food chain to show how the different living things in the aquarium depend on each other.
- Take a virtual field trip to a real aquarium or fish hatchery.
- Have students write a short story about the adventures of a fish in the classroom aquarium.
- Create a food chart to track how much food the fish eat each day.
- Observe the aquarium at different times of day to see how the fish's behavior changes.