

## Life Sciences Trek



**Grades:** K-2

**Time:** a pre-visit session of 30-45 minutes and a post visit session of 20-30 minutes (*Note: Time for either session can be adapted. For instance the pre-visit session can consist of a 10 minute preview of the exhibits.*)

### **Rationale and Context:**

This trek is organized around the NGSS crosscutting concepts [structure and function](#) and [patterns](#). To help maximize their ECHO experience, students will be introduced to several ECHO exhibits before their classroom visit. They will be introduced to selected animals and asked to think about them in terms of structure and processes, traits and biodiversity. At ECHO, students will find answers to questions and explore exhibits with purpose. After their visit, students will process their learning as a group and draw conclusions about structures, traits, ecosystems and related crosscutting concepts. Teachers may choose to continue to explore these concepts using additional resources provided.

### **Teacher Background Information:**

ECHO is home to numerous species of fish, reptiles and amphibians, making it an ideal place to study life sciences while also experiencing the joy of scientific discovery, wonder of nature, and care of Lake Champlain.

### **Learning/Behavioral Objective(s):**

1. Students will engage with ECHO animal exhibits with a sense of respect and purpose.
2. Students will hypothesize about the physical structures of animals.
3. Students will gain understanding of similarities and differences between and across species.
4. Students will draw conclusions about life science concepts and connect their learning to the broader crosscutting concepts of structure and function and patterns.

### **Essential Questions:**

What is the connection between structure and function?

What is the relationship between patterns and natural phenomena?

### **Focusing Questions:**

What do all animals need to survive?

How do the structures of animals help them find food, move, and survive?

How and why do animals of the same species look different from one another?

What types of animals live in our region?

### **Vermont Standard(s): Next Generation Science Standards**

Standard	Description
Crosscutting concept	Structure and Function Patterns
K LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.
1 LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
1 LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
2 LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.
Science and Engineering Practices	Planning and carrying out investigations Constructing explanations and designing solutions

**Vocabulary:** Students may gain an understanding of certain vocabulary words through active participation and explanation.

Amphibian  
Biodiversity  
Gills  
Observe  
Predator

Prey  
Reptile  
Species  
Structure  
Survive

## LEARNING PLAN

### Resources/Materials:

- Optional free admission for teacher walkthrough visit
  - Contact [ephillips@echovermont.org](mailto:ephillips@echovermont.org)
- [Slide presentation of selected exhibits](#)
- [Museum Map](#)
- [ECHO Exhibit Preview sheet](#)
- [ECHO Exhibit Exploration sheet](#)
- Links to extension activities

**Before your ECHO trip:**

## Introduction

1. *When our class visits ECHO, you will have a chance to see many animals and habitats that have been created for them. Today we're going to preview a few of them and start thinking about some of the ideas you might explore when we are there.*
2. *At many of the exhibits, you'll be able to think about structure and function or patterns. If necessary, introduce or review these crosscutting concepts.*
3. Hand out the [ECHO Exhibit Preview sheet](#).

## Exhibit Preview

1. Begin [slideshow](#). Show the first photo, then discuss:
  - a. *This is an **American eel**. What do you notice about it?* Take several responses. If no one comments on the eel's position, ask:
    - i. *Why is the eel near the bottom of the tank?* That's where it looks for food.
  - b. Show the next slide, which shows some **dace** (currently on vacation due to the construction, but used for comparison). *Where are these dace swimming? In the middle of the tank. Why aren't they near the bottom like the eel?* Different fish eat different food that they find in different locations.
  - c. *Like all animals in nature, all of the animals at ECHO need food to survive. What else do they all need to survive?* Water, shelter, air
  - d. *What are different ways animals use water?*
  - e. Allow students time to record ideas on their worksheet. Share and discuss.
  - f. *When we go to ECHO, one of your jobs will be to notice different ways animals use water.*
2. Show slide of the **poison dart frog**, then discuss:
  - a. *What do you notice?* Take several responses. If no one mentions the large eyes, ask:
    - i. *How are its eyes different from other animals?* It has large eyes that stick out from its body.
    - ii. *How would that help it survive?* Big eyes can help it see predators so they can escape or see prey so they can catch them.
  - b. Show the next slide, a close up of the frog's skin. *What do you notice about its skin?* It's very colorful.
  - c. *Poison dart frogs have colorful skin that warns predators that they are poisonous and aren't good to eat! They are lucky to have poison to protect them and big eyes to be able to see predators and hunt more easily.*
  - d. *How could humans use a structure like the frog's eyes or its bright colors to solve a human problem?*
  - e. Allow students time to record ideas on their worksheet. Share and discuss.
  - f. *When you are at ECHO, see if you can find other ways animals use their external parts to help them find food, move, and survive.*
3. Show slide of **eastern spiny softshell turtles**, then discuss:

- a. *What do you notice in this picture?* Take several responses. If no one mentions these are all the same species of turtle, introduce that idea.
  - b. *These turtles are all eastern spiny softshell turtles. What do they have in common?* Leathery shell, pointy snout.
  - c. *They are each individuals, just like you! What differences do you notice?*
  - d. Allow students time to record ideas on their worksheet. Share and discuss.
4. *As you know, many different kinds of living things can be found in one area. Most of ECHO's animals are fish, reptiles and amphibians that are native to this part of Vermont. If needed, review the differences between fish, reptiles and amphibians.*
    - a. *While you are at ECHO, what species do you think you might see?*
    - b. Allow students time to record ideas on their worksheet. Share and discuss.

### Closure and Connections

1. What are you most excited about seeing, doing or learning on our ECHO field trip?
2. During our visit, you will get to discover many other exhibits. Many relate to physical sciences and engineering, too.

### **During your ECHO trip:**

1. Students should be split up into small chaperoned groups. We will help direct your groups to different areas of the museum to begin your ECHO explore time.
2. They can complete the [ECHO Exhibit Exploration sheet](#), which includes additional ideas for exploring each display.

### **After your ECHO trip:**

1. *Now that everyone has explored the exhibits at ECHO, let's hear what you thought.*  
Allow a quick share where everyone can share one favorite exhibit/experience/etc.
2. *Let's discuss what you've learned about animals and their survival patterns.*
  - a. *What were some ways you noticed animals using water?* Drinking, moving through it, staying cool, bathing. Other ideas may include laying eggs, extracting oxygen. Encourage discussion focussed on the pattern that all animals (including humans) need have basic survival needs that include food and water.
3. *What did you learn about animal structures?*
  - a. Review chart below as appropriate.
  - b. After reviewing the chart, discuss how humans use the idea of one or more of these structures to help us. (Example: helmets protect our heads like shells protect turtles' bodies).

Structure	Animal	Function of structure
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Shell	Various turtle species	<input type="checkbox"/> Protection
Big back legs	Various frog species	<input type="checkbox"/> Move
Eyes that stick out	Various frog species	<input type="checkbox"/> See predators/prey
Sticky toe pads	Red-eyed tree frog	<input type="checkbox"/> Grab objects/surfaces
Long skinny body	American eel	<input type="checkbox"/> Move
Feathery gills	Mudpuppy	<input type="checkbox"/> Breathe

4. *Let's talk about animal traits.*
  - a. *What kinds of turtles did you observe?*
  - b. *What is the same or different about the different turtle species?* Encourage discussion that individuals of similar species are recognizable as similar but can also vary in many ways.
5. *How many different animal species did we see at ECHO?*
  - a. Allow students to name as many species as possible. Encourage a discussion of the diversity of life in various habitats in our region.
6. *How can understanding structure and function or patterns help us as scientists?*
  - a. This may also be a logical place to make connections with the current science unit under study.

### **Extensions:**

1. Survival Patterns
  - a. Learn how beetles use their wings to capture water out of the air in this [video](#).
2. Structure and Function:
  - a. Watch this [PBS Learning Media video](#) to learn about several structures of owls' bodies and how they help them function.
  - b. This longer [video about high speed train design](#) goes into more depth about biomimicry's role in engineering and design.
  - c. Think about the animal structures you observed at ECHO (Ex: sticky toe pads, bulging eyes) Draw a picture to show how one of these structures could solve a problem for people.
3. Variation of Traits:
  - a. Explore inherited traits among members of the classroom community with this [activity](#). *Note: Consider that some students may not live with biological family members.*

4. Biodiversity:

- a. [Explore a local microhabitat.](#)
- b. Consider [planting your socks!](#)