EXHIBIT EXPLORATION GUIDE

Grade 3

Teachers, parents, guardians and other adult supervisors: Please use this worksheet to guide students as you explore our exhibit halls together.

The questions below help connect the exhibit content with the Grade 3 curriculum. Students will explore these concepts in their classrooms throughout the school year.

We have provided curriculum-connected answers to some questions, while answers to others will be open-ended based on each student's experience with the exhibit. These questions are intended to promote discussion among the group.

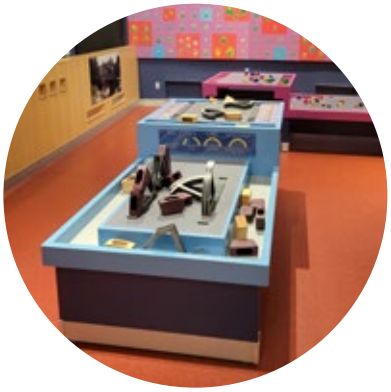
Have fun!

LEVEL 4

KidSpark

Be a Builder

Topic: Strong and Stable Structures



Prompt:
Build an arch using the supports and blocks provided, and then carefully remove the supports. How many weights can you place on your arch before it falls?

Q. What force is keeping the arch from collapsing?

A. Compression (a pushing force).

LEVEL 6

Forest Lane

Tree Roots

Topic: Growth and Changes in Plants

Prompt:
Look up to the ceiling. Can you see the roots of a tree? These are the roots of an eastern white pine (*Pinus strobus*).

Q. How long can the roots from an eastern white pine get?

A. The length of tree roots depends on the size of the tree. An eastern white pine can grow to be up to 40 m tall. The longest roots of this tree were over 12 m in length. That's longer than a school bus!

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Tree Roots (cont.)

Q. Why would a tree need such long roots?

A. A tree benefits from having long roots because:

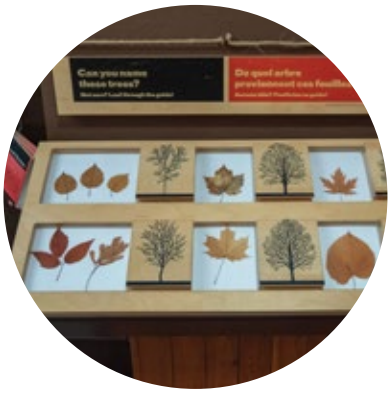
- The roots provide stability to keep the tree from falling over as it gets taller.
- The tree uses its roots to gather nutrients and water from the soil. If the roots are too short, they will stay under the canopy of the tree's branches and leaves, which act as an umbrella to keep the tree dry. Longer roots help the tree access more water.

Q. What type of environment do you think this tree lived in?

A. White pines are the provincial tree of Ontario. They grow in many environments across the province, except for in the far north. These trees tend to grow in the shade of other trees when they are young, but in time, they become the tallest trees in the forest.

Can You Name These Trees?

Topic: Growth and Changes in Plants



Prompt:
Look at the leaves on display from various tree species. Observe what they have in common and what their differences are.

Q. What makes leaves change colour and fall off?

A. In Canada, cooling temperatures make leaves fall off trees. In other parts of the world, a dry season can have the same effect.

As the temperature cools and the days become shorter, trees stop using their leaves to collect energy from the Sun; instead, they start storing energy in their trunks and roots to prepare for winter and survive until spring. As a result, the leaves stop producing chlorophyll: an important chemical key for photosynthesis that gives leaves their green colour. Without chlorophyll, the leaves lose their green, revealing another colour usually overpowered by chlorophyll. Because the leaves are no longer producing energy, they are shed by the tree.

Open-ended Questions:

Q. Have you seen any of these leaves before? Which trees do they come from?

Q. Are there any trees near your home or school? Do you know which species of tree they are?

Q. Leaves have beautiful, interesting shapes. Which is your favourite?

Note:
Answers will vary. Some examples of trees students may recognize include maple, oak, birch, cedar and pine trees.

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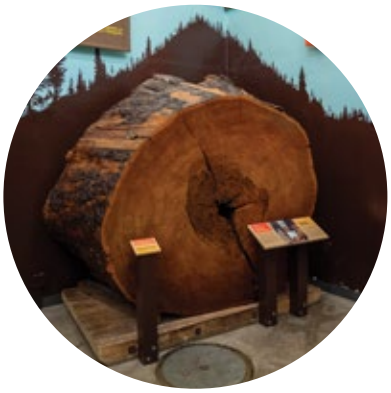
Grade 3

This Was a Real Giant

Topic: Growth and Changes in Plants



Prompt:
Look at the large trunk section of the Sitka tree. Is the tree's cross section longer than both your arms stretched out?

Q. How many years did this tree live? How can you tell?

A. This tree lived for 500 years. Each year it was alive, the tree produced a light-coloured ring of wood in the spring and a darker ring in fall. Therefore, each set of rings represents one year of growth for the tree.

Q. Look at the trunk section of the Douglas fir tree. It is also very large. How many years did this tree live?

A. This tree lived for 464 years.

LEVEL 6

Cohon Family Nature Escape

Outdoor area, open seasonally

Decomposing Tree

Topic: Growth and Changes in Plants & Soils in the Environment

Q. What type of organism would use a tree log as a home or for food?

A. Many organisms would use a tree log, including insects such as carpenter ants, termites and beetles; fungi (mushrooms); protists; and birds.

Q. What will happen to this tree log over time?

A. It will decompose into nutrients for the soil. If this did not happen, the nutrient cycle would be broken. There would be a build-up of dead leaves, trees and plants covering the soil.

Decomposing Tree (cont.)

Q. How does the act of composting contribute to the process of decomposition?

A. Composting is a method for speeding up the natural process of decomposition. Specific microorganisms, such as bacteria, accelerate the breakdown of waste under specific environmental conditions.

Urban Forest Ecosystem

Topic: Growth and Changes in Plants & Soils in the Environment

Q. You are standing in an urban forest ecosystem. What makes it an urban forest?

A. An urban forest has trees, plants and animals just like any forest. It also has roads, buildings, bicycles, cars and an abundance of one type of animal: humans!

Q. What challenges are faced by trees and animals living in an urban setting?

A. Answers will vary. Challenges include many people walking, picking flowers and leaving their garbage; pollution from cars, factories and people; buildings blocking the Sun; water being diverted into sewers; and a lack of forest habitat for animals.

Q. Can you see any effects caused by forces of nature? Why did this happen?

A. Answers will vary. One example is visible erosion of the soil. This is caused by weather (wind and precipitation) and by people walking on the soil and killing the plant life.

EXHIBIT EXPLORATION GUIDE

Grade 3

LEVEL 6

The Bruce Poon Tip Living Earth Hall

The TELUS Rain Forest

Topic: Growth and Changes in Plants

Prompt:
Trek through the Rain Forest. Pay attention to how the environment looks and feels.

Open-ended Questions:

Q. How many different plants and animals do you notice living in this ecosystem?

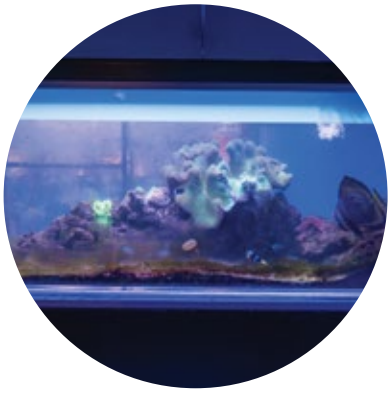
Q. What are some of the adaptations you can see in the living things in this ecosystem? How would these adaptations help plants or animals to survive?

Note:
Answers will vary. Here are some examples of adaptations:

- The poison dart frogs are brightly coloured as a warning to predators.
- The Kapok tree has spikes on its trunk to keep some animals from climbing, scratching or chewing on it.

Rainforest vs. Ocean Ecosystems

Topic: Growth and Changes in Plants



Prompt:
Go into the TELUS Rain Forest and look at the soil the plants are growing in. What colour is it? Does it look dry or wet? Next, head to The Bruce Poon Tip Living Earth Hall and find the aquariums. Have a seat and observe.

Q. Can plants grow in an underwater environment?

A. Yes. Some plants grow in aquatic environments.

Q. Can the same plants grow in both environments? Why or why not?

A. Most plants cannot grow in both environments because they have adaptations suited to one or the other. For example, land plants often have long roots to find water deep underground, while underwater plants may not have any roots. However, there are some exceptions. For example, the peace lily can grow in both environments.

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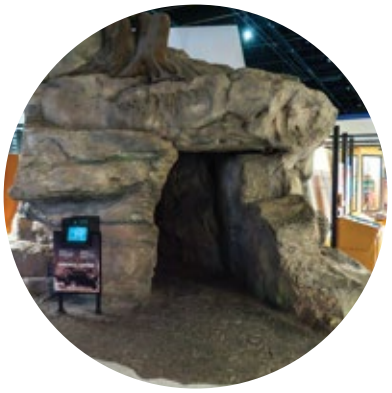
EXHIBIT EXPLORATION GUIDE

Grade 3

Natural Structures

Topic: Strong and Stable Structures



Q. What are some examples of natural structures in this exhibit hall?

A. Answers will vary. Examples include trees, the coral reef, the bat cave and the whale skeleton.

Open-ended Questions:

Q. For each structure you find, think about what makes that structure strong and stable.

Q. Choose one structure and describe why it is important to its ecosystem.

Note:

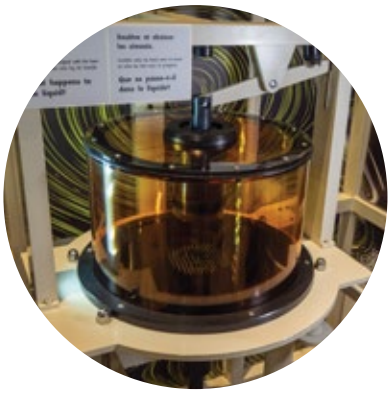
- When thinking about what makes a structure strong and stable, students may discuss the properties of the materials the structure is made of, the shapes they see making up the structure or the forces acting on the structure.
- Structures can be important for a variety of reasons. For example, a coral reef is an important part of an ecosystem because it provides food and shelter for many organisms.

LEVEL 6

Weston Family Innovation Centre

Magnetic Materials

Topic: Forces and Motion



Prompt:

Move the lever up and down. Observe what happens to the liquid.

Q. Why do you think the liquid moves like that? (Hint: Where are the magnets?)

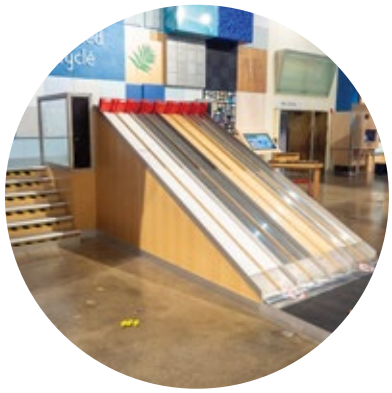
A. The black fluid is called ferrofluid, a mix of microscopic iron particles in water. The iron particles in the ferrofluid are attracted to the magnets located above and below the fluid. They move towards the magnets and pull the water along with them. Individual spikes take shape as the particles crowd together along the invisible magnetic field lines.

EXHIBIT EXPLORATION GUIDE

Grade 3

Race Against Resistance

Topic: Forces and Motion



Prompt:
With a friend or two, choose a racing block and race it down one of the slides.

Open-ended Questions:

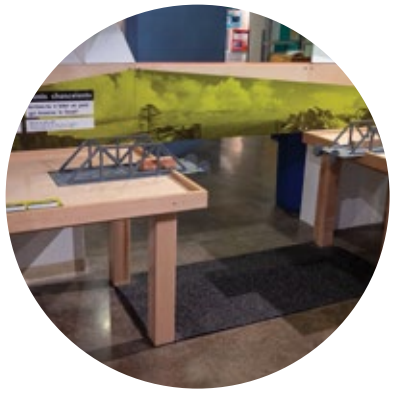
- **Q.** Which racing block is the fastest? The slowest? Why do you think this is?
- **Q.** Which materials prevent some blocks from sliding easily? What are these materials often used for, and why is it important for these items not to be slippery?
- **Q.** Choose your favourite racing block. Based on its properties, what would this material be used for?

Note:
Answers to these questions will vary. Here are a few things students might observe:

- Some materials create more friction when they are rubbed together or against other materials. Friction is a force between two surfaces that prevents the surfaces from sliding over one another. If the force between the two materials is strong or more "grippy" or "sticky," the block will slide more slowly. If there is less force, the block will be more "slippery" and will move more quickly.
- Rubber does not make a good racing block because it is not slippery. However, it is waterproof, which makes it a good material for rain boots.

Tippy Bridges

Topic: Strong and Stable Structures



Prompt:
Build a bridge that spans the gap using the materials provided, then test the ability of your bridge to support a load. How much weight can it hold? (Test it with your water bottle, shoe or anything you have on hand!)

Open-ended Questions:

- **Q.** What changes can you make to increase the strength or stability of your bridge?
- **Q.** If you were building a real bridge, what materials would you use? Why?

Note:
Students may identify arches and triangles as strong shapes used in structures.

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