

The background is a solid teal color. It features several illustrations: a large, faint butterfly in the upper left, a smaller faint bee in the lower right, and several clusters of green leaves with black outlines scattered around the page. The title 'Inquiries in Nature' is written in a white, rounded, handwritten-style font in the center.

Inquiries in Nature

GRADE 3 & 4

Curriculum Connections

Grade 3 Science

- Living things are diverse, can be grouped, and interact in their ecosystems
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Grade 4 Science

- All living things sense and respond to their environment
 - The motions of Earth and the moon cause observable patterns that affect living and non-living systems
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Grade 3-4 Science Competencies

- Demonstrate curiosity about the natural world
- Observe objects and events in familiar contexts
- Make observations about living and non-living things in the local environment
- Collect simple data
- Experience and interpret the local environment
- Identify First Peoples perspectives and knowledge as sources of information.

Interactions in Nature

It's All Connected 1

Students discover the variety of elements found in nature and learn that some are living and some are not. They are all important in nature and there are vital connections between living and non-living things.

Bio Toss and Seek 2

Students will discover biodiversity in their backyard by playing a game where they toss a pebble onto a treasure-hunt grid and search for corresponding objects in the natural world.

Energy Web 3

Students draw a food web diagram of their neighbourhood, including themselves.

Interdependence + Relationships in Nature

Biome in a Baggie 4

Students create self-contained 'biomes' by planting seeds in a baggie. By placing their baggies in locations where temperature and light are different, students observe how non-living factors affect plant growth and how this connects to biomes around the world.

Sensing and Responding 6

In this activity students will discover that just like humans and other animals, plants also use senses.

Seasons and Sit Spots 8

Students use nature journals and a regular sit spot to observe seasonal changes and relate that to their own lives.

It's All Connected

Students discover the variety of elements found in nature and learn that some are living and some are not. They are all important in nature and there are vital connections between living and non-living things.

Inquire

What are living things in nature? What are non-living things in nature (excluding human-made things like houses or cars)? How are living and non-living things different from each other? How are they interconnected in an ecosystem? What do living things need or receive from non-living ones?

Teaching Ideas

Have students work together to create a living and non-living walking tour map by adding photos or drawings of living and non-living things found around the schoolyard or in their own neighbourhood.

In Nature

Many different things are needed for life to exist and flourish. The wind, rain, water, the sun, rocks and minerals, plants, fungi, and animals, big and tiny, all have a role to play so that the natural world can thrive. All these elements make up an ecosystem. Some elements, such as the sun, water, and wind, are non-living, whereas plants, animals and fungi are living. Whether living or non-living, each has an essential role to play. The living elements are called "biotic" and the non-living ones, "abiotic".

Get Outdoors!

Go outdoors to find two different places with natural features and spend time observing what you see, hear, smell, and feel. Write and draw your observations. At each site, record the different living things, such as plants, animals, and fungi, that you see. Also record the different non-living things in nature, such as rocks, sun, rain, and wind. Notice the similarities and differences between the two sites.

Try This

- Compare and contrast a gummy worm to an earth worm! Living and non-living worms are fascinating!
- Draw one ecosystem found close to where you live. Include all the different elements, living and non-living.
- Pair up one living and one non-living thing and explain how they relate to each other. For instance, wind and seed: the wind helps disperse the seeds. Come up with several examples.
- Do some research to find cool facts about biotic and abiotic things. Those two words come from the ancient Greek language. Find out what they mean.

Materials

- Notebook, pencils
- Optional: magnifier, camera, thermometer

More Ideas and Resources

- Adapted from Project Learning Tree, Activity 48, [*Field, Forest and Stream*](#)
- [*Biotic or Abiotic?*](#) Provide the students with a list of some abiotic and biotic factors in a forest ecosystem. Have the students discuss the items on the list and sort them as abiotic or biotic. Take students outside to the schoolyard or walk around the street to see if students can find examples of biotic and abiotic things.
- [*Poster of living and non-living things*](#)

Bio Toss and Seek

Students will discover biodiversity in their backyard by playing a game where they toss a pebble onto a treasure-hunt grid and search for corresponding objects in the natural world.

Inquire

Why are plants and animals different shapes and colours? How do scientists classify life? Why is biodiversity important? Are there any colours or shapes (or combinations) that are not found in nature? Why or why not?

Teaching Ideas

Discuss the variety of shapes, colours, textures, and sizes of common plants and animals found in your area. Then on a piece of paper construct a Bio Toss and Seek Chart with a list of colours in the row headings and textures in the columns. Set boundaries as to where children are allowed to search and which areas are off limits for exploration. Emphasize searching is done with eyes and touching lightly; no picking.

In Nature

Biodiversity - or biological diversity - is the variety of life on Earth. Biodiversity exists at the level of the ecosystem, species, and gene. Biodiversity makes ecosystems and habitats resilient and adaptive to change. One way to explore the concept of biodiversity even in one's own backyard is to notice the variety of colours, shapes, and textures that are found in nature.

Get Outdoors!

Bring your Bio Toss and Seek chart outdoors and weigh the corners down on a flat surface. Toss a pebble or coin on to the grid. Read the coordinates (such as Orange and Fuzzy), then go forth and seek!

Give a maximum amount of time to go searching for any combination, then toss the pebble and try again. Label or sketch what you found in the chart. Put a '?' in cells where you were unable to find anything that fit those criteria. Discuss which combinations were hardest to find and which were easiest.

Try This

Make up your own chart and play again! Play it as a race with a buddy. Or give yourself lots of time and see how many different objects with a particular combination you can find. Try making charts with different combinations of column and row headings, such as shapes, colours, smells, textures, or ways that things move (flutter, jump, crawl, etc.).

Try to identify some of the life that you found using field guides or iNaturalist app.

Consider the combination/s that you weren't able to find. Can you think of anything that has those combinations that exists in nature? Try making up an imaginary species that has that combination of traits!

Materials

- Paper to make your Bio Toss and Seek chart
- Small coins or rocks for tossing onto chart

More Ideas and Resources

- [*Be a Biodiversity Detective!*](#)

Energy Web

Students draw a food web diagram of their neighbourhood, including themselves.

Inquire

Where does food come from? How do plants eat sunshine?
How does energy flow through your neighbourhood?
What is a herbivore?

Teaching Ideas

Enable free play and observations by setting boundaries for activities around your house or in the neighbourhood. Have a signal for when it is time to return, a sound or a text message.

In Nature

We all need energy to live and grow. Plants get energy from the sun and make food sugars through photosynthesis. Animals must get food energy by eating plants or by eating animals that eat plants.

We are all connected.

A food chain is a way to represent this flow of energy, for example; sun → grass → deer → person.

A food web combines and integrates food chains.

Get Outdoors!

Go outdoors and look for signs of food chains. It could be insects that would eat an apple, and birds that would eat those insects. It could be fungus that is using the dead wood from an old tree. Perhaps there is a mosquito that is eating part of you!

Try This

Use a piece of poster paper and draw the story of where an apple comes from, starting with a tree (growing in soil and using water and sunshine), and ending up with you. Draw arrows pointing to where the energy flows. This is a food chain, part of a food web that connects you to the environment outdoors. Leave space on your poster for more drawings as you think of more ideas.

Try to draw the food chains that you saw when you were outdoors. See how many different food chains you came up with and how they are connected to each other, and to you.

Materials

- Poster paper, crayons or markers

More Ideas and Resources

- [*Show me the Energy!*](#) Energy Flow, Plants, and Food Chains: An Outdoor Learning Curriculum for Grade 3
- [*Food Chain Game*](#)
- Children's book: *Pass the Energy Please* by Barbara Shaw McKinney. Dawn Publications, 2000.

Biome in a Baggie

Students create self-contained 'biomes' by planting seeds in a baggie. By placing their baggies in locations where temperature and light are different, students observe how non-living factors affect plant growth and how this connects to biomes around the world.

Inquire

Why do different types of plants grow in different regions of the world? How do plants grow in different environments? If you were a plant, which biome would you want to live in and why?

Teaching Ideas

Consider creating a shared space such as Padlet, where students can share photos of their baggie biomes, their observations, and questions.

In Nature

A biome is a large area of the planet that can be classified based on the plants and animals that live there. The life that exists in a biome is largely determined by temperature, soil, and the amount of light and water. There are terrestrial biomes (on land) and aquatic biomes (in freshwater and marine environments). Biomes may be classified coarsely or more precisely. The main types of terrestrial biomes include Tundra, Forests, Grasslands, and Desert. Forests may be subdivided into Coniferous Forests (Taiga or Boreal Forests), Deciduous Forests, and Rainforests (Temperate or Tropical). A rainforest is a hot, wet climate but doesn't have a lot of light. A desert is hot and dry and doesn't have much water. A grassland or prairie has medium amounts of light and water.

British Columbia has the following biome subcategories: semi-arid desert, temperate rainforest, boreal forest, and alpine tundra.

Get Outdoors!

Go outdoors to make a biome in a baggie!

1. Cut a 2L plastic soda bottle in half. You will only use the bottom part of the bottle.
2. Pour pebbles into bottom half of the bottle. The pebbles should be about a centimeter deep.
3. Pour some potting soil over the pebbles so that there is about twice the depth of soil as pebbles.

4. Plant the seeds by making a narrow trench down the centre of the soil, as deep as your fingernail.
5. Sprinkle a pinch of seeds into the trench, then cover it up with the soil.
6. Water the soil until you see the water collect at the bottom of the pebbles.
7. Put the biome in a ziplock bag and seal it. Put your biome in a sunny place and in about three to four days your plants should start growing.

The cool thing about a biome in a baggie is that everything your plants need is there. It has water, nutrients from the soil, air from the bag, and it makes food from the sun. You won't need to water your seeds again because the water will cycle within the biome. The water travels from the roots through the plant up to the leaves, where it evaporates. Some water will evaporate from the soil. Some of the evaporated water will condense on the surface of the bag and "rain" back down onto your plants, to be absorbed again by the soil and roots.

Try This

Make a few different biomes and choose different locations outdoors to place them where the conditions (temperature and light) will be different. Such as a shady place under a tree and out in the open or a south-facing, sunny spot. This way you can see how your plants grow in different environments.

You could also plant the same seed outdoors (not in a baggie) as a comparison and to look at how differences in water affect plant growth.

Eventually your plants are going to run out of carbon dioxide. Do some research and find out what you would need to keep your biome in a baggie going for a long time.

Materials

- 2 Liter soda bottle, cut in half
- Extra large zip-lock/resealable storage bag
- Pebbles
- Potting soil
- Seeds (grass, beans, or whatever you have available)
- Water

More Ideas and Resources

- Discover more about the biome in which you live in BC. Use the [Sierra Club EcoProvince Map](#) to identify your location in the province, the name of your EcoProvince and some animals and plants that are found there. How are animals and plants adapted to living in their region?

Sensing and Responding

In this activity students will discover that just like humans and other animals, plants also use senses.

Inquire

Can you think of senses that plants might have? How would they compare to our own: seeing, hearing, touching, tasting and feeling? If you were a plant, what senses would you like to have?

Teaching Ideas

Assign students into “sensory” groups, where each group learns about a different way that plants sense their environment. Have the groups focus on observing and researching how plants use that sense and how it compares to ours. Then have the sensory groups share what they learned with the other groups.

In Nature

Plants have the ability to sense and respond to their environment just like animals do. They have developed an extensive way to communicate with other plants and to respond to changes in their habitat. Although they don't have eyes, noses, ears, mouths or skin, plants have ways to sense what happens where they live, which is essential for their survival since they can't move. For instance, some are able to bend towards the sun to enhance their ability to photosynthesize. They can release toxic substances when they sense that an insect is attacking them. Healthy plants nearby can sense the chemical cues being released by the plants that are being munched and increase their chemical defenses to protect them from herbivores. It is really a fascinating world, worth exploring. And there is still much that we don't know about the secret lives of plants!

Get Outdoors!

These activities will help you discover some of the senses that plants use in order to survive.

- Go for a walk in the neighbourhood and observe different plants. Imagine that you are a plant. What senses would you use? From what you observe looking at different plants, make a list of what you think the plants use for senses. Look not only at the plants but also its surroundings, where the light comes from, the wind, the presence of water and animals. Look for insects feeding on the plants or other threats. Smell the leaves or flowers of the plants. What do you think its smell might communicate?
- If you have plants at home, observe how they grow on a windowsill. Are they straight or are they bending towards or away from the light? What happens if you turn the pot around? Does the plant bend differently or remain straight? Remember that plants move slowly so you will need to make and record your observations over several days or longer. What are your conclusions?

Try This

Plants need to sense in which direction the roots and the stems will grow. For the stem and leaves to develop, the plants must defy gravity! Do the following carrot experiment. Take a carrot that still has its foliage and stem. Cut the carrot, leaving about 6 cm of the orange part and about 3 cm of the green part. Figure out a way to hang the carrot upside down (such as with toothpicks and string), so that the green leaves face down. Dig a small hole into the orange part of the carrot and keep it filled with water. Remember, all plants- even upside down ones- need water to grow! Put the carrot in a sunny area and watch what happens after a few weeks.

Research carnivorous plants such as the Venus flytrap or B.C.'s native sundew. Find out about its sense of touch and how it catches insects!

Research how plants sense danger and react to them. For instance, learn about how stinging nettles protect themselves. What other defense mechanisms do plants have to protect themselves from herbivores or diseases and how do they work?

Materials

For the carrot experiment:

- Fresh carrot with leaves
- String
- Toothpicks
- Knife (to dig a water well in the core of the carrot)
- Water

More Ideas and Resources

- [*The Secret Senses of Plants*](#), a Tumble Science Podcast for kids, with videos and other links:
- [*Plant Neurobiology*](#): a video with time lapse photography that reveals the hidden life of plants. (3:11 min).

Seasons and Sit Spots

Students use nature journals and a regular sit spot to observe seasonal changes and relate that to their own lives.

Inquire

What changes around me in the seasons?
What do animals do in different seasons?

- Is it alive? How do you know?
- How do you affect this thing? How does it affect you?

Teaching Ideas

Make a 'sit spot collage' (could be hard copy or electronic) where every student shares a photo, drawing, or experience of something that was special to them that they noticed at their sit spot. Make a collage for each season and notice the differences and patterns.

- Notice the shadows around you. How does the position of the sun affect your thing?
- Observe and record any sign of animals that you see. What is/was the animal doing? Why, do you think?
- Record the time and date that you made your observations.

In Nature

Seasons occur on earth because the axis of our rotation is tilted in one direction as we go around the sun. During summer, the northern hemisphere is tilted toward the sun, resulting in longer days, shorter nights, and warming of the ground and sea. The opposite occurs in the winter months.

Visit your sit spot again and again. Each time you visit your sit-spot:

Seasons are divisions of a year marked by changes in weather, hours of daylight, and hours of darkness. Seasonal changes influence natural cycles, such as birth, growth, mating, and behaviour.

- Make yourself comfortable and begin with three breaths. Smell the air. Identify sounds. Feel the air on your skin.
- What is different today? Write about the differences: a new smell, sound, or temperature.
- Notice your small thing (if it is still there), and one more thing. It can be a large thing, a moving thing, anything that attracts your attention. Write about or draw any changes to your things.
 - Describe the changes with adjectives.
 - Why is it different? (Time of day? Time of season? Weather?)
- Notice the shadows around you. How does the position of the sun affect your thing? Are they different each time you visit?

Seasons have nothing to do with the distance between Earth and the sun. In fact, Earth is closest to the sun in January, not June.

Get Outdoors!

During your first visit, make yourself comfortable at your sit-spot and begin:

Record the time and date that you made your observations.

- Close your eyes and breath deeply for three breaths. Smell the air. Identify sounds. Feel the air on your skin.
- In your journal, draw something small that you can see. Examine it closely.
 - How is your small thing affected by the season?
 - Is it wet today?
 - Is it growing?
 - Is it warmer or colder than before? Why?

Try This

Make your own sit spot cushion (sit-upon). Cover a piece of cardboard or old school binder with newspaper and then with a plastic garbage bag. Secure with duct tape.

Look for First Nations seasonal wheels online. Can you find one for the First Nation nearest you? What animals and plants do you see on the wheel and how do they change and cycle with the seasons?

Create a seasonal wheel for yourself and name your seasons. Include:

- More than four seasons
- Things that you have noticed at your sit spot
- Observations on the changes in the living things around you during the seasons

Materials

- Outdoor sit spot, blank notebook or paper, coloured pencils, pencil and/or pen
- Optional: cushion or sit-upon

More Ideas and Resources

- [*What Causes Winter?*](#) Build a model of the solar system
- [*Signs of Spring Scavenger Hunt*](#)
- [*My Seasonal Round: An Integrated Unit for Elementary Social Studies and Science.*](#) Province of BC, 2013.
- [*Seasonal Sit Spots.*](#) Resources from Wildsight.