

Teaching the 4 Elements



by Shelagh Pyper



Wind
Pages 5-10



Water
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Earth
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Fire
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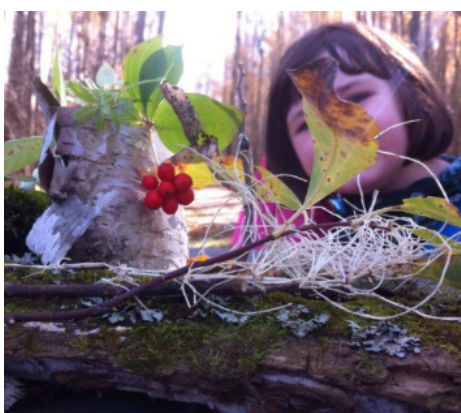
Developed thanks to support from





Playful Nature Education

The way we interact with nature has changed. Children spend less and less time playing outside and have very few opportunities to connect with nature (Clements 2004, Hofferth & Sandberg 2001, Kimbro et al. 2011). Yet research shows that children need a connection to nature (Berman et al. 2008, Hoffman, 1992). Not just the sunny side of nature, but all of nature's elements. In *Last Child in the Woods; Saving Our Children from Nature Deficit Disorder*, Richard Louv writes, "Healing the broken bond between our young and nature is in our self-interest, not only because aesthetics or justice demand it, but also because our mental, physical, and spiritual health depend upon it."



Children lead with their hands, not their minds. In order for them to develop a relationship with the natural elements of Wind, Water, Earth and Fire (i.e. a connection to Nature) they need to explore the magic and wonder of these things with all their senses. Then, and only then, can we begin to teach them terminology and help them understand the complex interactions and delicate balance upon which all living things—including humans—depend. When their head begins to understand the interdependence of all life, then we can implore their hearts. And if, as a young person, they formed foundational memories outdoors, with trees and birds and fresh water, then their hearts will respond.

As with all forms of education, and even recreation, nature education needs to be age appropriate. Since we know that young children learn best through play, we should introduce them to ecology, gardening, seasonal change, the diversity of life, the needs of plants and animals and all the important topics in the life sciences, **through play**.

Playful nature education will help children make observations and learn how to move their observations into questions, questions to ideas and then how to test these ideas and learn about the world around them.

Acknowledgements

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We are indebted to the Alberta Council for Environmental Education for their support of our work - and for permission to use the 'four elements' portion of their logo to support the graphic organization of this document.



ACEE Alberta Council for
Environmental Education
ADVANCING ENVIRONMENTAL EDUCATION IN ALBERTA





Early Learning and Childcare Curricular Framework

The activities and provocations in this guide will promote the development of important fundamental movement skills, cognitive skills, communication and executive function. They align with the Play, Participation and Possibilities curriculum for Early Learning and Childcare as well as child-led, inquiry based approaches like Reggio Emilia and play-based, experiential learning methods like Waldorf.

This guide encompasses the Play, Participation and Possibilities Values for Early Learning Processes:

- Active engagement and participation
- Meaning making and co-constructing knowledge
- Play and playfulness
- Creativity and imagination
- Multimodal literacies
- Interconnectedness of ideas
- Reciprocity of relationships
- Diverse perspectives for learning
- Inclusiveness

Throughout the guide we will use these icons to highlight the developmental domains students are working on.

DEVELOPMENTAL DOMAINS:

Physical Health & Well-Being:

Encouraging physical growth and independence, gross and fine motor skills and coordination.



Social Competence:

Encouraging playing well with others, curiosity about the world, respect for adults and other children, behavior and following rules / instructions, independence, self-confidence and eagerness to explore new things.



Emotional Maturity:

Encouraging age-appropriate emotional understanding, empathy, reflection, controlled actions (thinking before doing).



Language & Thinking:

Encouraging reading, writing, classification of shapes, numbers, colours, size and concepts.



Communication Skills & General Knowledge:

Encouraging open communication of needs and wants in a socially appropriate way, storytelling and an appropriate awareness of the outside world.



Here are just a few examples of connections to Kindergarten Learning Outcomes:

- explores and investigates objects and events in the environment
- shows awareness of similarities and differences in living things, objects and materials
- manipulates or uses material for a purpose and to explore different concepts
- becomes aware of the relationship between cause and effect
- identifies familiar animals and their characteristics and surroundings
- identifies familiar sounds in the environment and community
- recognizes changes in the weather and some ways people and animals adapt to the seasons
- use organizational process and tools to manage inquiry
- demonstrates awareness of the properties of objects and events in the environment
- demonstrate respect for the diverse ways individuals cooperate, work and play together





Curriculum Connections

Nature Play and the activities in this resource are the ideal way to achieve the Early Learning and Childcare guidelines and the Kindergarten Learning Outcomes! These activities connect to many subjects in the older grades as well, but we will specifically highlight the curricular connections to Gr. 1-6 Science.

		Wind	Water	Earth	Fire
Grade 1	A. Creating colour		X		
	B. Seasonal Changes	X	X	X	
	C. Building Things	X			
	D. Senses	X	X	X	X
	E. Needs of Animals and Plants		X	X	
Grade 2	B Buoyancy and Boats		X		
	C Exploring Liquids		X	X	
	D. Hot and Cold Temperature	X	X	X	X
	E. Small Crawling and Flying Animals	X	X	X	
Grade 3	A Rocks and Minerals		X	X	
	C. Testing Materials and Designs	X	X		
	D. Hearing and Sound	X			
	E Animal Life Cycles		X		
Grade 4	A.Waste in our World		X		
	D Light and Shadows				X
	E Plant Growth and Change			X	
Grade 5	C Classroom Chemistry		X	X	X
	D. Weather Watch	X	X		
	E Wetland Ecosystems		X		
Grade 6	A. Air and Aerodynamics	X			
	B. Flight	X			
	C. Sky Science	X			
	E Trees and Forests			X	X

“Deeply connecting with/in our physical world begins with being responsibly playful in nature. In early childhood communities, this means spending time outdoors, planting gardens, and creating imaginary worlds in nature through play. In Alberta, it may mean taking opportunities to appreciate the uniqueness of the seasons and changes in weather and daylight at different times. Valuing environmental sustainability means developing a stewardship of nature and living things through learning and watching and acting and caring about the world, on the ground, in the water, and through the air.”

- Play, Participation, and Possibilities: An Early Learning and Child Care Curriculum Framework for Alberta





The Benefits of Wind Play

Have you ever played in the wind? Stood with your body leaning into this powerful force? Watched the wind whip a flag in the air? Yelled joyfully to be heard over a strong wind at the beach?

Wind can be fun, and if we don't encourage young children to marvel at the wind, enjoy the feeling of wind on their face and embrace the power and playfulness of wind they will miss out on hours and hours of outdoor play on those numerous windy days.

Children all have some experience with wind (moving air) and the play provocations on the following pages will help them crystalize their experiences into ideas about how wind works and its effects on the world we live in. For example, wind can speed things up or slow things down (think of cycling a bike with the wind behind you or against you). Sailboats use wind to drive them and we use wind to turn turbines, fly kites and blow away smoke and other air pollution. The prevailing wind direction in your community determines where your weather comes from. These important uses and effects of wind are obvious to people connected to nature and its elements, but not everyone is aware of these natural phenomena or in tune with nature enough to make and understand these observations.

Wind is an important alternative energy source and educating and inspiring early learners about wind will encourage them to be the wind power innovators of the future.



Provocations with your Wind Kit



Great story books about windy days:

1. **Like a Windy Day** by Frank & Devin Asch
2. **Flora's Very Windy Day** by Jeanne Birdsall
3. **The Listening Walk** by Paul Showers
4. **Feel the Wind** by Arthur Dorros
5. **The Wind Blew** by Pat Hutchins

Helpful Hints:

This wind kit can be used without advance preparation, so plan to let nature be your guide and take your class out for **wind exploration on a day that is windy**.





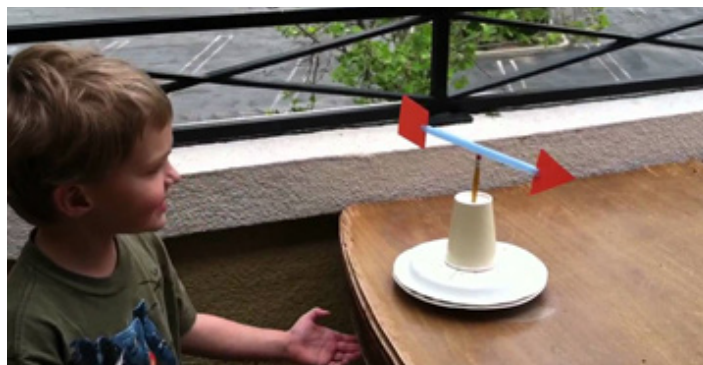
Curiosity Trigger:

I wonder what direction the wind is blowing?



Materials: Grocery bags, Wind Sock

Give each child a grocery bag and have them collect a stick. Show them the wind sock and encourage them to tie their grocery bags to their sticks to catch the wind and see what direction it is blowing in.



Make your own wind vane activity at <http://bit.ly/EvergreenWindVaneProject>

Curiosity Trigger: *I wonder what the wind can tell us?*



Materials: None

First take time to listen to the wind.

Smell the wind.

Taste the wind.

Feel the wind on your face.

What gets carried on the wind? Smells, sound, weather (clouds)...

Let the children lead you, perhaps to a grove of trees where the wind would be telling them different things, or up onto a hilltop where different sounds would be carried farther, or into a tunnel where the wind would sound or smell different.

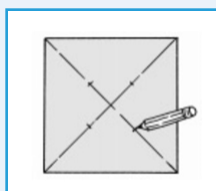
Wonder-full Questions:

- Can you see air?
- Can you hear air?
- Can you smell air?
- Can you feel air?
- Do we need air?
- Can air move things?
- What sort of things can it move? How can you move air?
- What is a bubble?

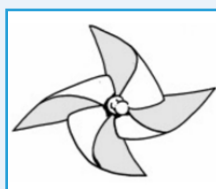
Pinwheel Activity

Make Pinwheels in class and take them outside to trigger your students' curiosity about the wind. Use an online template like this one from <http://www.leslietryon.com>.

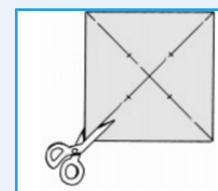
1. Fold a square piece of paper in half on a diagonal. Unfold and repeat with the other corner. Trace along the fold until 1/3 away from the centre.



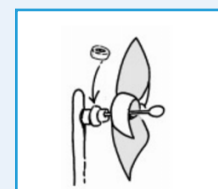
4. Make sure the pin points through in the exact centre and roll the pin around to enlarge the hole so your pinwheel spins freely.



2. Cut along the fold lines, stopping at the pencil mark.
3. Bring every other point into the centre and stick a pin through all four points.



5. Stick the pin into a dowel. Separate the pinwheel from the dowel with two or three beads.





Curiosity Trigger: *Can you hear the wind?*



Materials: Glass jars, bottles and cups with different amount of water, natural materials like dry reeds, tall grasses and thin branches and hollow tubes and other things that will catch the wind and vibrate.

Set up a Wind Symphony with your wind catching devices. Create your own wind by blowing on the edge of the bottles. Experiment with changing the angle of the lip of the jars and bottles and the amount of water in them. Hang branches, reeds and tubes along a chain link fence to catch the wind and rustle against one another.



Curiosity Trigger: *I wonder how fast the wind blows?*



Materials: Colored Scarfs, Ping Pong Balls, Beach Balls, Anemometer (see box below)

Let things blow away and see if you can run fast enough to catch them.



What's an Anemometer?

An anemometer is an instrument used to measure the speed of the wind. Simply hold it up above your head and away from other objects or buildings that could obstruct the wind and then read the digital screen.





Curiosity Trigger: *Bubbles in the wind*



Materials: Bubble solution in pans with large bubble wands or small individual bubble containers with wands.

Children will enjoy blowing, catching and chasing bubbles in the wind.



Curiosity Trigger: *The wind can lift us*



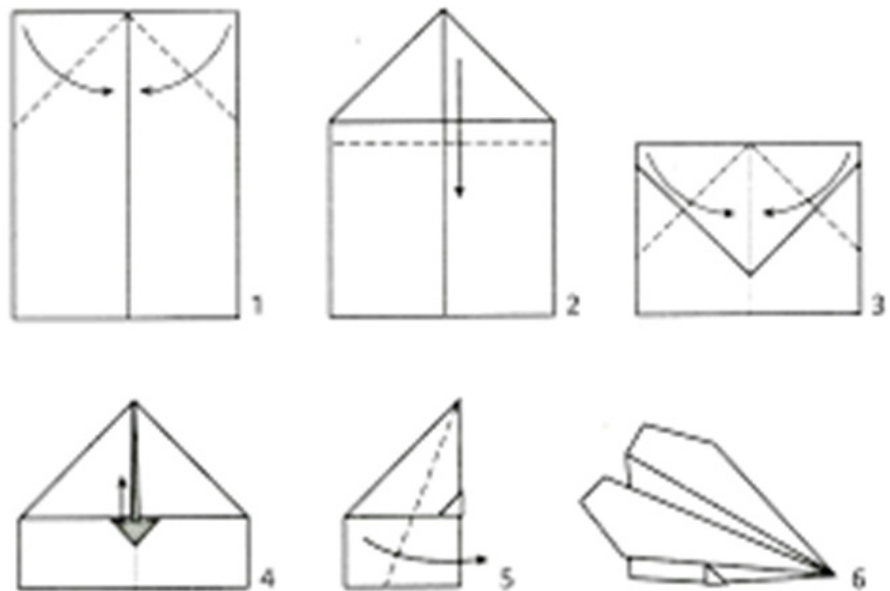
Materials: Paper and one or two paper airplane designs

Let the children lead you to an area where they can build airplanes, in pairs or with adult help. Then watch and wonder and learn as the wind lifts and carries the planes around.



Paper Airplanes!

Search the internet for dozens of great paper airplane templates like this one from www.onlykidsonly.com.





Additional Resources for Wind

Learn more about wind and weather at:

<http://www.weatherwizkids.com>

Science Project: In the Air and All Around

Using index cards and petroleum jelly discover the particulates blowing in the wind.

<https://www.education.com/science-fair/article/air-quality/>

Learn about wind turbines and how to build your own at Alliant Energy Kids

<http://www.alliantenergykids.com/EnergyandTheEnvironment/RenewableEnergy/022397>

Evergreen Weather Study Resource

This pdf shows you how to build a wind vane, wind sock and your own anemometer!

<https://www.evergreen.ca/downloads/pdfs/Design-Ideas-14-Weather-Study.pdf>

Extension Ideas:

- Cardinal Directions
- Coming from (the NW) and Going to (the SE)
- Upwind and Downwind – How Predators and Prey use the wind to their advantage and how sources of pollution travel

Whistling Wind

Sung to: "If you're happy and you know it"

If you hear the whistling wind,
Cup your ears.

If you hear the whistling wind,
Cup your ears.

If you hear it in the trees
Making music with the leaves,
If you hear the whistling wind,
Cup your ears.

If you feel the Blustery wind,
Whirl around.

If you feel the blustery wind,
Whirl around.

If you feel it lift your hair
Like a kite up in the air,
If you feel the blustery wind,
Whirl around.

(Find this and other wind songs at www.preschooleducation.com)



Human cultures throughout the ages have had a sacred connection to water. Whether used for travel, purification, ceremony or simple sustenance, water is and will always be central to human civilization. The importance of water for life, trade, and natural beauty means that nearly all our schools, neighborhoods and cities are built close to water. From where you sit now, what is the closest body of water? Is it a river, stream, small pond or large lake? Could you walk there?

Water play is also a soothing activity that supports children's sensory development, exploration and sense of adventure. Students will naturally explore scientific and mathematical concepts like volume, evaporation, sinking and floating, heavy and light and cause and effect through water play. They can also develop communication and social skills as they collaborate with open ended water play and experience splashing, emptying and make-believe play like cooking, serving and cleaning.

1. **Life in the Ocean: The Story of Oceanographer Sylvia Earle** by Claire A. Nivola
2. **Rachel Carson: Preserving a Sense of Wonder** by Thomas Locker and Joseph Bruchac
3. **The Water Hole** by Graeme Base
4. **I Am Water** by Jean Marzollo
5. **In the Small, Small Pond** by Denise Fleming

David Orr

Canada is home to 7% of the worlds renewable fresh water supply. But most of this drains to the north where a very small percentage of our population lives. Many areas of Canada have restricted water supplies and have very polluted water that costs a lot to treat for human consumption.



Curiosity Trigger: *I wonder if this floats?*



Materials: Clear storage bin from your water kit filled with clean water

Go on a nature walk or let children explore the yard collecting natural and non-natural objects that they can test.

Wonder-full Questions: Why do some things sink and others float?



Curiosity Trigger: *What's for lunch?*



Materials: Fill a large water container or watering can with clean water. Use containers, sieves, scoops, measuring spoons, platters and loose natural elements.

Provide containers, sieves, scoops, measuring spoons, platters AND loose natural elements like dandelions, flower petals, leaves, pine needles, clover, spruce cones, pebbles, twigs and grass for children to mix, sort and serve.

Helpful Hint:

Call this your Nature Kitchen—NOT your Mud Kitchen—and encourage lots of water but less mud to keep this activity cleaner. If you provide the materials listed above children will be happy to spend hours separating just the yellow petals of dandelions or just the freshest new shoots and will leave the dirt out of it!



Did You Know?

Some things float because they are less dense than water (their weight for a given volume is less). For example, wood that is dry and not waterlogged, styrofoam, a bubble of air, oil, ice. Other things float because they displace, or push out of the way, a certain volume of water. For example, a heavy ship with a water tight hull, a plastic container set on top of water, a piece of tinfoil folded into a shape.

Demonstration or Extension Activity:

For older children, provide tin foil and challenge them to fold and crease their tin foil into a boat shape that can support the weight of small rocks. Foil is an example of something that floats because it displaces water, not because of its density. So, if you fold foil over and over into a small square (that has not trapped air inside the folds) it will sink, but if you crumple it into a loose ball or crease the edges to make a container or boat it will float.





Curiosity Trigger: *What lives in the water?*



Materials: Water table, rocks, shells, moss, plants, plastic insects and animals.

Place smooth and rough rocks, shells, some moss or aquarium plants and some plastic insects or animals in your water table. If possible provide aquarium nets and some pictures of pond life. Floating ducks or diving dolphins make for exciting story telling and help children imagine the connections between water bodies and the animal life they support.

Encourage students to build habitats for the creatures in the water table. Play pretend, have adventures with the aquatic creatures and let children connect on many levels with their animal allies who live in the water. If possible extend this play time activity into a walking field trip to a nearby pond, creek or flooded ditch.



Helpful Hint:

Put paint shirts or aprons on, or have students bring an extra-large shirt to wear over their coat while playing in the water table to keep them drier and cleaner.

Curiosity Trigger: *What is dirty water?*



Materials: Food coloring, fine sand and gravel, dark olive oil and/or finger paint AND cotton swabs, pipettes or turkey basters, scoops and measuring spoons, Q-tips, thick yarn, sieves and strainers, or paper towel

Children are curious about cause and effect, and their natural curiosity cycle, if given the time, will lead them to experiment, test, make predictions and repeat testing to confirm their ideas. Allow them to play with the mixing of different things that make water dirty. Now provide things they can use to clean up the water such as scoops, cotton balls and strainers. For older children consider discussing what happens when all the water in the table is dirty or colored. A spray bottle of dish soap can also show the action of a cleaning agent.

Wonder-full Questions:

Is it always possible to take out what you added (reverse the change)? Or are some changes irreversible? What happens when lakes and rivers get dirty?





Additional Resources for Water

March 22nd is World Water Day!

Participate in a **Love your Lake** campaign! There is lots we can do to prevent the degradation of streams, rivers and lakes in our area.

To learn more about our **water resources** visit

<https://www.canada.ca/en/services/environment/natural-resources/water.html>

Do you know what watershed you live in? Find your local watershed here: <http://caringforourwatersheds.com/canada/southern-alberta/watershed-information/>. Each watershed has a Watershed Planning and Advisory Council and they often have resources to support water literacy and education in your area.

Check out the amazing **Educator Resources from Ducks Unlimited Canada**: <http://www.ducks.ca/resources/educators/>

Why Does it Rain?

Water cycles from land to sea to sky and back to the land again in a process called The Water Cycle. The water cycle is powered by the sun, which heats water in oceans, lakes and seas so it evaporates into the sky. There, it condenses and forms clouds, and when the clouds become heavy with lots of condensed water drops those drops fall as rain, or as snow when it is cold. This is called precipitation.

Raindrop Pop

by Bobs and Lolo

Why does the rain fall from the sky-y?
Where does the water go when the puddle runs dry?
Why does the stream leave in the middle of the heat?

Where does the river flow when the sun starts to beat?

Raindrop, Raindrop-op, Raindrop POP
Raindrop, Raindrop-op, Raindrop POP

Also check out Bobs and Lolo's *Ocean Blue*, *Recycle with Me* and *Cindy Seahorse* songs on Youtube!





The Benefits of Playing with Earth

All life on Earth depends on the productive and regenerative qualities of our soil. Soil is alive and a precious natural resource. If children have a negative association with “being dirty”—a negative association with dirt and therefore lack an appreciation for soil—our society will suffer a lack of soil stewards interested in preserving top soil, preventing soil pollution and erosion and understanding the dynamic balance that makes soil produce the food we depend on.

Dirt, mud and sand are open-ended materials that trigger adventurous, collaborative sensory play. Through experimenting with Earth in all its fun forms, children learn about their environment and how the natural properties of dirt can change in response to their own actions. Mud play not only teaches scientific principles like mass, volume and the nature of change, but also encourages fine and gross motor development and offers children a sensory satisfaction.

The State of the World book, EarthEd highlights the Core Principles of Earth Education, with Earth-dependence at the very foundation of the pyramid. Let's give children the connection to the Earth they need for their own wellbeing and that of our future generations and fellow Earth inhabitants. We can do this by giving them time and opportunities to explore Earth (dirt, soil, and the plant-soil interaction that supports all consumers) with their bare hands, their inquisitive minds and the tools that make it all fun!

Provocations with your Earth Kit



Great story books about earth:

1. **Mary Mcguire Digs Worms**
by Kate Messner and Brian Floca
2. **Anywhere Farm** by Phyllis Root
3. **On Meadowview Street** by Henry Cole
4. **Little Seeds** by Charles Ghigna
5. **City Green** by Dyanne DiSalvo-Ryan

Did You Know?

In the last 40 years we have lost one-third of the world's arable land (soil good for growing food) due to erosion and pollution.

[FEW Resources.org](http://FEW.Resources.org)





Playing and Learning with your Garden Beds

Enrich your schoolyard with Earth play by adding garden beds for sensory play, edible plantings and/or growing hardy perennials that add green, seasonal change, earth and wildlife habitat. Consider a garden bed like the one shown here.

These can be built by a community member or your High School wood working class or purchased from a Home and Garden store. We recommend portable boxes that can be bolted to the side of the school. These can be very multi-purpose, serving as sensory bins filled with sand, planters for shrubs, or vegetable gardens. This design allows students to stand around on all sides, provides storage or play space underneath, and because it is not a permanent garden bed it does not reduce the overall square footage in your play space.



Helpful Hints:

- It would take 6 bags of potting soil to fill the planter shown in the picture above.
- Plain potting soil will be too dense. Create a soil mix by combining one part potting soil with two parts organic matter, such as compost, peat moss, or composted manure.
- Weeds in your container garden could mean the end of the project so use purchased 'clean' soil and DO NOT accept donated plants.
- Start small and simple with your container garden.
- Consider how they will tie to curriculum and the projects undertaken by specific grades so the gardens have a guardian grade and continue to be used year-to-year.

Visit <https://www.evergreen.ca/tools-publications/> for lots of resources to help you plan, build, plant and care for your container garden.



Building Your Container Garden

To build a basic timber block or reused container garden, follow these few steps:

- Line the inside of recycled containers with landscape filter fabric or thick plastic sheeting with drainage holes (not needed for timber containers).
- If drainage holes are placed at the bottom of the container, make sure there is space under your container for proper drainage. Otherwise, place drainage holes an inch or two from the bottom on the side of the container so there is a supply of water at the bottom of the container, allowing for less frequent watering cycles.
- Fill the bottom with a coarse aggregate like gravel, broken clay or pieces of concrete to help with water drainage.
- If the containers are going to remain outside year-round, use styrofoam lining to avoid repeated freezing and thawing.
- Fill with soil and plants and watch them grow!





Curiosity Trigger: *What is soil?*



Materials: Potting soil, peat moss, leaves, compost, worms, manure and other natural ingredients in healthy soil. You'll also need shovels, cups or containers and other garden tools for breaking up and mixing the soil. You could also bring sand and fine silt or clay to compare to your highly organic potting soil mix.

Provide children with all the elements of healthy soil. Allow them to open the bags, pour things into the container garden and experiment with different tools for scooping, spreading and mixing. Consider setting up a second area with four varieties or "dirt". Some full of organic matter like potting soil that absorb water and provide a good substrate for plants to grow in and other non-organic soils like clay, play sand, fine silt or gravel.

Wonder-full Questions:

Is all dirt the same?
What happens when you add water to different kinds of dirt?
If plants need water to grow, which kind of dirt would they grow best in?



Did You Know?

Soil is alive! It is full of bacteria, fungi, algae and other tiny organisms. Without these organisms the soil would not be fertile AND these organisms are critical to nutrient cycles. Near the roots of plants this community of organisms is incredibly diverse and there can be as many as hundreds of millions of microbes in one gram of soil. Changes in pH, soil compaction, humidity, temperature and other factors can kill the important microbes in soil.

Ref: David Zuberer, *Soil Microbiology*, Texas A& M,
<http://organiclifestyles.tamu.edu/soil/microbeindex.html>

Curiosity Trigger: *Who lives in the dirt?*



Materials: Stones and rotten logs you can turn over, containers for collecting critters, magnifying glasses, garden trowels for turning up the earth.

Find a sidewalk block, rotten log, big stone or any object that has been left in a shady, forgotten place and move it to discover the critters living underneath. Consider adding habitat for these important creatures to your schoolyard. Planting tall grasses, shrubs and flowering bushes in your container garden gives pollinators, decomposers and other wildlife habitat during the summer and winter months.

Wonder-full Questions:

What do worms and ground beetles eat?
Where do fallen leaves and dead grasses go? (Hint: they decompose thanks to the ground beetles, grubs and worms that eat them and produce new soil.)
Is soil alive? Can it die?





Curiosity Trigger: *All about mud!*



Materials: Natural mud pit or mud puddles, OR provide a mud kitchen set up with a table top surface, pots and pans, a water source, and measuring, scooping, mixing, pouring, and serving tools.

Prepare students and families in advance so children can dress appropriately in clothes they don't mind getting dirty and bring a second set to change into. If your schoolyard and the weather have provided muddy play areas set out a provocation of shovels, sticks, containers etc. for students to play with in existing mud. If not, provide a water source, a flat surface for working on, (like a mud kitchen, straw bales, wide planks on stumps or a pallet on the ground) and the tools for pouring, mixing and serving.



Wonder-full Questions:

I wonder if more water would make it stickier?

Where could we put that to let it dry? What will happen when your mud pie dries?

Which dirt makes the best mud? Which mud makes the best mud pie?

How does the mud feel on your hands? Is mud cold?

Watch this fun video and listen to the silly song about making mud cakes and pies!



https://www.youtube.com/watch?v=w5pDrZMAa_Q

I Love Mud Song

Chorus:

Mud, mud, I love mud!

I'm absolutely, positively wild about mud.

I can't go around it. I've got to go through it.

Beautiful, fabulous, super duper mud.

(For the full song by Rick Charette visit <http://rickcharette.com/>)





Curiosity Trigger: *How does a plant grow?*



Materials: Wildflower seeds, garden tools, watering cans or latex gloves.

Plant something in your garden beds. You could choose a quick to sprout flower like Sweet Peas (7-15 days) or Sunflowers (7-10 days), or a quick growing vegetable (see table).

Variety	Alaska Peas	Zucchini (many varieties)	Prizehead Leaf Lettuce	Earliest Mincu Cucumber	Little Finger Carrots	Spinach (many varieties)
Days to Germinate	7	7-14	10	10	10	7-12
Days to Harvest	55	50	45	50	50	45

Many seeds benefit from being germinated in a clear cup with a wet paper towel before being planted in the soil. You could start your seeds indoors in cups around May 1st and move them outdoors when they have sprouted. If your garden beds are in a hot, sheltered alcove of the school you may be able to get these vegetables to harvest before school is out at the end of June.

Helpful Hints:



To water in your seeds you can fill rubber or latex gloves with water and prick a hole in each finger tip to produce the gentle sprinkle of water tiny seeds like best. This way everyone has their own watering can!



For younger children simulate the idea of planting and caring for a plant with something more durable and playful. Consider planting sticks just for fun! You can decorate your 'plant' with colorful things that blow in the wind and use your stick to create habitat for Fairies or living creatures.

Choosing Plants for Play and Learning:

- Vary the texture of leaves
- Vary the form and size of leaves
- Select plants for fragrance
- Select plants you can use for crafts
- Choose plants like reeds and tall grasses that produce interesting sounds when wind blows through their dry leaves

For more ideas see Robin Moore's book *Plants for Play*

Wildflowers Native to Alberta:

Yarrow
Gaillardia
Giant Hyssop ———●
Black-eyed Susan
Gray-headed Coneflower
Wild Bergamot
Common Blueberry



For more about native plants, visit <http://www.salisburygreenhouse.com/native-plants-in-alberta/>





Additional Resources for Earth

FEW Resources.org

Graphs, videos and statistics on soil degradation by region and around the world.

<https://www.fewresources.org/soil-science-and-society-were-running-out-of-dirt.html>

Grounds for Change

Ideas for Schoolyard Naturalization, Vegetable Gardens, Curriculum Connections and more.

https://www.calgaryzoo.com/schoolyard_naturalization/index.html

Evergreen

This Canadian organization provides resources, funding and training for schools and communities wanting to go green and naturalize their schoolyards and cities. They have hundreds of amazing teacher resources in a searchable database.

<https://www.evergreen.ca/tools-publications/?subject=286>

Helpful Hints:

Use your garden beds to attract more wildlife to your schoolyard!

Stick a support in the ground and hang bird feeders, bee hotels and even colorful decorations that blow in the wind.





Why Build a Fire at School?

Despite all the digital distractions and modern conveniences today's children grow up with, they are still fascinated by learning basic survival skills like how to light a fire. This activity builds trust among a group, demonstrates to students that you believe they are capable and trustworthy and can transform a group of rowdy kids into a quiet, focused, patient tribe.

For some age groups, teaching children to light their own fire would not be appropriate, but sharing in the gathering of the wood, in the quiet suspenseful time watching the spark catch into a flame and grow, and in the warmth of a fire, is a powerful experience for children of any age. On a cold day, or in a new setting, the act of huddling together in a circle creates a sense of belonging, a time for reflection, and a time to let your imagination wander as you gaze into the flames.

For students with sufficient fine motor skills, patience and self-control, learning to light their own fire can give children a formative boost in self-confidence, self-esteem and independence. Building a fire develops team work, resourcefulness, persistence, concentration, problem solving and communication skills.



"When children draw on their inner resources to meet their own basic needs, they connect directly to the natural world around them, and find a sense of belonging, a special place."

- Excerpt from *Play the Forest School Way*
by Peter Houghton and Jane Worroll

In the activity below students participate in a discussion about perceiving hazards associated with building fire and steps we can take to minimize risk. This process helps them develop their own routines and thought patterns around hazard assessment, risk detection, and being responsible for their own personal health and safety.

These types of adventures also give children a thrill and an experience of risky play within a supervised environment and may reduce sensation-seeking behaviors in their teenage years. Successfully lighting a fire without a match requires focus and patience and creates a huge sense of mastery and self-reliance. When a whole group gathers around a fire it provides a focal point, breaks down unease and provides a reason for being in nature, with other people.

Aside from the spiritual, physical and psychological growth fire making provides, it also teaches the chemistry of combustion, provides heat for experimentation and observation and is a concrete example of cause and effect.





How to Teach Fire Building



Materials: Portable fire pit, firewood, hatchet, matches/lighter, metal pail with lid to smother fire and contain ashes/coal when done, water or fire extinguisher.

During colder months light a fire the whole group can gather around. Find a spot where the heat from the portable fire pit doesn't damage grass, or put a concrete block underneath it.

Start by splitting two pieces of firewood into small kindling-sized pieces. Students can participate by gathering natural fire starter like Old Man's Beard, small twigs from the bottom of evergreen trees, dry moss, birch bark and fallen pine needles.

Have a discussion about the risks of fire making. Discuss the idea that if we can see and understand a risk, we can make choices to keep ourselves safe from the risk. When we make good choices and are aware of the things around us we can relax and enjoy the warmth and magic of fire.

Build a teepee or log cabin form out of the kindling and put the fire starter inside. Light the fire starter in three or more places and blow gently on the fire to give it more oxygen. When most of the small kindling is burning add larger pieces of wood. Now put the lid or grate on your portable firepit.

Keep your ash pail handy for disposing of the ashes. Empty the firepit for storage.

Provocations with your Fire Kit



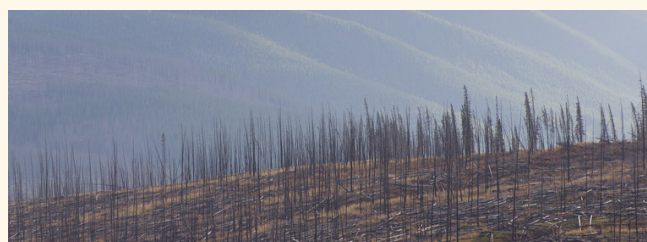
Wonder-full Questions:

Why do we blow on a fire to help it start?
Why does smoke go up?
Is fire alive?
How does this fire make you feel?



Did You Know?

Alberta's prairie and forest landscapes both depend on fire. Wild fires open up new habitat for fresh understory plants that herbivores love to eat, they crack open the pine cones of certain tree varieties, clear out old dead trees and keep insect populations in check. Lots of open grazing habitat for deer, moose, elk and bison is kept from turning into forest by frequent natural fires.





Fairy Fires (Age 8+)



Materials: Fire steels, cotton wool, Vaseline, shells or pie plates, dry twigs

On a warmer day when children can be outside without mittens and bulky clothing and can sit still for a while without getting cold, work together to start a fire without a match!

Mark a boundary. Outline a safe working zone around each person using a fire steel. There should be no flammable materials within this zone as sparks can be carried by the wind a short distance before dying.

Prepare your materials. Tease out fibres from the cotton ball to make an easier ignition point. Smear on a dab of Vaseline and place the cotton in the middle of your clam/oyster shell or pie plate.

Create a spark. Get down on one knee and position your fire steel just above the cotton wool. Check that the firesteel is the right way up. With the blade at a 45 degree angle strike firmly but slowly downward along the steel.

It will take several tries to learn how to strike the steel just right and aim it so the spark lands on the cotton wool. The moment a spark lands on the wool each student's face is sure to light up! The flame will grow and quickly die again.

This way of starting a fire can of course be used for a campfire as well. But these individual size fires allow a large group to practice lighting a fire with a fire steel.



Safety First!

- Don't start a fire, even in a contained portable BBQ/firepit, or a pie plate if there is a fire ban on.
- Let your Principal or Site Supervisor know.
- Tie back long hair and secure any dangling clothing or jewelry.
- Remove tripping hazards in the fire making area.
- Keep an open container of water nearby, for first aid if needed and to put out the fire.
- Never leave a fire unattended.

Wonder-full Questions:

- How did you feel when you lit your fire?
- What natural materials could we use instead?
- How did our ancestors start fires?
- What are the benefits of fire?
- What are the dangers of fire?

Q: What is a Fire Steel?

A: A piece of high carbon steel (hard but brittle) as well as a piece of flint with sharp edges.

When you strike the sharp edge of the flint onto the steel, tiny fresh particles of iron flake off and create a spark (look into the chemical reaction of oxidation, or rusting, to learn more).





Inquiry-Based Learning with Fire

1. Using an object for a purpose

Learning to use tools is an important skill that supports academic learning in many disciplines. Children learn transferable skills about angles, technique, persistence, and focus by using tools in outdoor play that they will then build on in a chemistry lab, a wood working shop, an art studio or a kitchen.

2. Heat Observation and Experimentation

Just as cold winter temperatures provide a freezer for experiments on state change, so can fire provide the heat source for many experiments and inquiries. For example, observations using the senses, inquiring about insulation, conductivity, boiling, steam, combustion, melting of various materials and the types of changes that are reversible and irreversible.

3. Different Types of Plant Matter

Collecting and burning different types of plant matter provides an excellent inquiry into the various types of plants and trees and the different parts of a plant.

As you gather around a fire during different seasons you will notice that it provides lots of learning opportunities, not just in the sciences, but around history, language, art and culture. Not only that but your groups will bond during their time together around a fire, and develop a deeper connection to the place where you had the fire. A fire can transform a tense group in a cold space into a relaxed group in a cozy circle.



Bannock on a Stick

When you have your campfire started why not cook some bannock on a stick!

Each student collects a long thick stick and strips the bark from one end (or take turns using half a dozen).

Mix the following ingredients in a large ziploc bag:

- 1 cup flour
- 1 tsp baking powder
- 1/4 tsp salt
- 2 tbsp powdered milk

Enough water to make it the consistency of playdough

Wrap the dough around the end of the stick and hold it near hot coals while it cooks.

Wonder-full Questions:

Which types of wood burn best?
Which parts of the plant burn best?





Use a campfire as a Talking Circle to incorporate First Nations, Métis, and Inuit traditional ways of learning



“Within the circle, each member has equality—no one is above or below anyone else. What each member says will be listened to without interruption and without criticism. Talking circles ensure that everyone has a chance to speak, so even quiet students have the opportunity to participate and be heard. It also creates opportunities for participants to develop an empathetic appreciation for points of view other than their own.”

See the **Our Words Our Ways** resource available at <https://education.alberta.ca/media/3615876/our-words-our-ways.pdf> for a full description of Talking Circle.

Additional Resources for Fire

Ducksters.com Education Site has some great facts about fire.

http://www.ducksters.com/science/earth_science/forest_fires.php

Smokey the Bear has a great website with activities and images about wildfire and campfire safety.

<https://smokeybear.com/en>

Great story books to share around a fire:

Fire has significance for all cultures, but of course our indigenous people have a more recent connection to the art of storytelling and the use of fire. Why not share one of these books around the fire with your students to help them connect with the First Nations people of Canada through their stories and culture?

1. **Turtles Race with Beaver** by Joseph Bruchac
2. **A Circle of Friends** by Terri Mack
3. **How Raven Stole the Sun (Tales of the People)** by Maria Williams
4. **Coyote Tales** by Thomas King

For more titles visit: www.strongnations.com





Final Remarks from the Author

Teaching a Survival Mindset

Many nature-play and outdoor education activities present some risk. As explained earlier, some risky play is critical to children's development. Not only that, but when considering the risks of an activity such as teaching fire starting, we must always weigh those risks against the benefits of teaching that skill – or put another way, the risk of NOT teaching that skill.

While most kids will hopefully never find themselves lost in the wilderness where the survival skill of starting a fire could save their life—having a survival mindset could pay off in a wide variety of situations.

It's been said that in a survival situation you can live 3 weeks without food, 3 days without water, 3 minutes without air, and 3 seconds without a clear mind. Even if you get on the wrong elevator and are separated from your parents in an office building, take the bus the wrong direction into a bad part of town, or suddenly become soaking wet in cold temperatures in an otherwise low risk location, feeling like you can detect and avoid the real risks of the situation, make a plan, and initiate the steps to ensure your safety will help you, know matter what your age, to navigate the sudden turn of events.

Bottom line—teaching kids to fear the world around them, avoid ALL risk and inflate things to be aware of into things to be paralyzed by is NOT in their best interest.

– *Shelagh Pyper*

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References

- Berman MG, Jonides J, Kaplan S. 2008. The cognitive benefits of interacting with nature. *Psychol. Sci.* 19: 1207-1212.
- Clements R. 2004. An investigation of the status of outdoor play. *Contemporary Issues in Early Childhood* 5:58–80.
- Hofferth SL, Sandberg JF. 2001. How American children spend their time. *Journal of Marriage and Family* 63(3): 295-308.
- Hoffman, E. 1992. *Visions of Innocence: Spiritual and Inspirational Experiences of Childhood*. Boston and London: Shambhala.
- Kimbro RT, Brooks-Gunn J, McLanahan S. 2011. Young children in urban areas: Links among neighborhood characteristics, weight status, outdoor play, and television watching. *Social Science & Medicine* 72:668–676.

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