CAHOOTS

Conspiring to Learn Together!

Outdoor Explorers

A gift to you from St. Paul Public Schools Community Education

COMMUNITY EDUCATION
Saint Paul Public Schools

This outdoor explorer journal belongs to:

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Draw a picture of yourself as an outdoor explorer:

Outdoor Explorer Journal

Explorers go new places, look at things from different perspectives, use their senses make observations, and document what they observe.

You are already an explorer! This journal will give you ideas of new things to observe, explore and try.

Recall a Previous Exploration

Can you remember a time you saw something you have never seen before? Maybe a specific bird, a seedling, the ocean, or a lightening storm?

Write or about what you remember. What did it look like? Feel like? Sound like? Smell like?

How did you feel seeing something brand new to you?

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Your Cahoots Explorer Buddies

Learn about your Cahoots friends and practice writing their names.

Stevie likes to research.

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Hoots likes to experiment.

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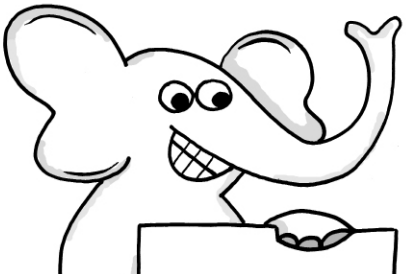

Walter likes to imagine.

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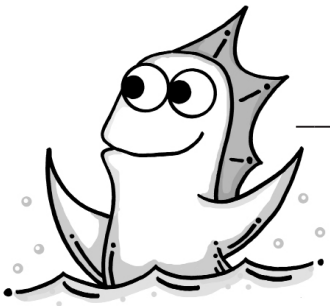

Marina asks lots of questions.

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Boots creates art.

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The 4 Elements of Matter

Beginning around 450 BCE, Ancient Greeks believed that there were four elements that made up everything in nature: earth, water, air, and fire. This idea was core to Western philosophy, science and medicine for over two thousand years.

Many other people, including the indigenous peoples of the Americas, center their beliefs and practices around the four directions. The four directions correspond to the four elements. North is connected to Earth. East is connected to Air. South is connected to fire. And, West is connected to water. Together, these make up the Medicine Wheel.

Other cultures, including Hindu, Bankogo, and Bambara, believe there is a fifth element called aether (or mbûngi, or koni, or śūnya) which is the element of absence or the void. In ancient Greece, Aristotle believed aether was what made up the stars.

Current Western scientists have determined that there are four *states* of matter, that sort of correspond to the traditional four *elements* of matter. The states of matter are: solid (earth), liquid (water), gas (air), and plasma (fire). Matter is either solid, liquid, gas or plasma based on how the atoms, the tiny building blocks that combine to create matter, are arranged.

As an outdoor explorer, you will see the four directions, the four elements and the four states of matter. You can use that knowledge to make sense of what you find!

Solids (Earth)

In a solid, the atoms are packed closely together in an ordered pattern and cannot move. This gives a solid a definite volume and shape. Examples of solids include: rocks, wood, metal, and ice.

As you explore outdoors keep track of the many different solids you see by writing down their names or drawing pictures.

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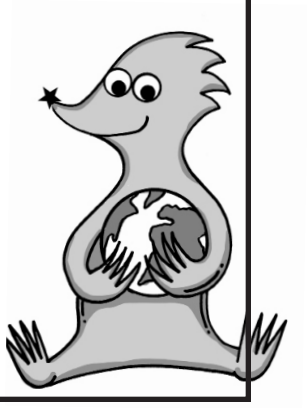

Gases (Air)

The atoms in a gas can move so freely that if they are not trapped in a container, the atoms will diffuse and spread throughout the atmosphere. Examples of gases are: oxygen, nitrogen), helium, and steam.

As you explore outdoors keep track of the many different gases you see by writing down their names or drawing pictures.

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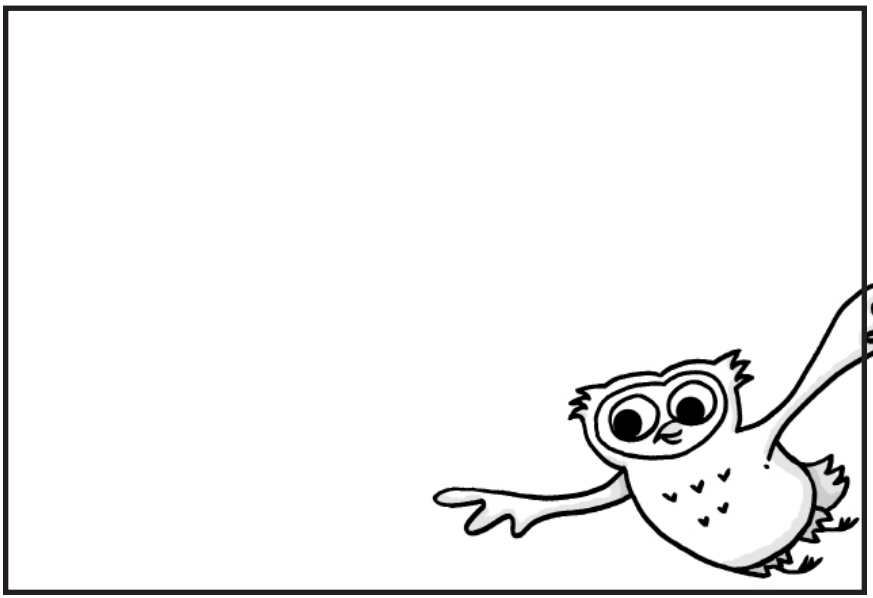

Plasmas (Fire)

In a plasma, the atoms are spaced similarly to gas except there is so much energy in a plasma, the atoms actually split into smaller pieces. Plasmas are able to carry an electrical current and generate magnetic fields. Examples of plasmas include: lightning, solar wind, the sun, fluorescent lights, and neon signs.

As you explore outdoors keep track of the different types of plasma you see by writing down their names or drawing pictures.

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Liquids (Water)

In a liquid, the atoms are close together but can move around each other. This allows a liquid to take the shape of whatever container it is placed in. Examples of liquids are: room temperature water, room temperature mercury, and molten rock.

As you explore outdoors keep track of the liquids you see by writing down their names or drawing pictures.

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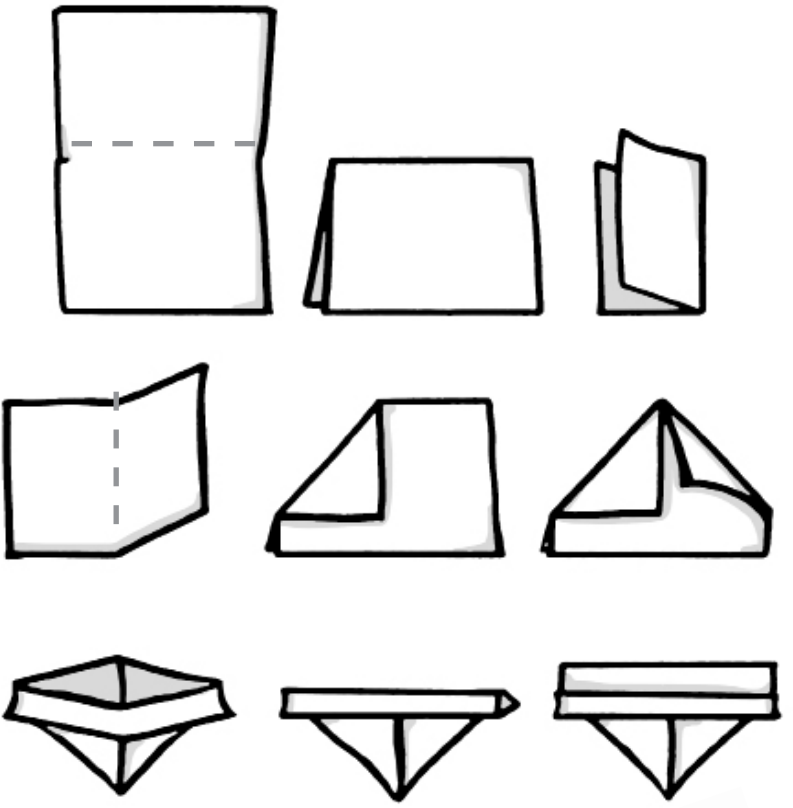
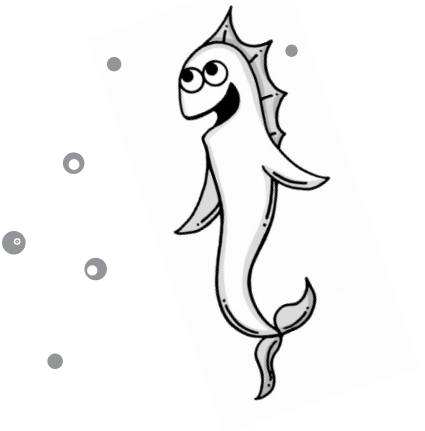
Make a Paper Boat

Marina's home is in the water. While you cannot live in the water with her, you can try making a paper boat and pretend to explore. Follow the visual instructions below to give it a try!

Remember to bring your paper boat home with you so you don't pollute.





Biomes

A biome is a region that is distinct from other geographical regions due to the climate, vegetation, and animal life. Scientists do not all agree about what makes a biome, so it is a bit of a challenge to define them.

The word biome sometimes gets confused with ecosystem or habitat. An ecocystem describes how the plants and wildlife in a specific area interact to support each other. A habitat describes the area where a specific animal lives and what is around it. A biome is much bigger. A biome can include multiple ecosystems and habitats. A biome can even span across more than one continent.

Scientists also do not agree on how many different types of biomes exist on on earth. Some say there are 5, some say 9, others say 11.

One thing that scientists do agree on is that the plants and animals that live in a biome are specifically adapted to that climate. So, if Marina leaves her Marine biome, she needs adaptive equipment to survive. And, if Stevie leaves their forrest biome, they also need supportive equipment to survive.

(Fun fact - there are 17 biomes in Minecraft!)

 TUNDRA	 DESERT	 SAVANNAH
 GRASSLAND	 BOREAL FOREST	 TEMPERATE FOREST
 TROPICAL RAINFOREST	 MARINE	 FRESHWATER

What biome do you live in?

Study the types of biomes on the last page. Then look outside and draw what you see.

Based on what you see, what biome do you think you live in?

_____

Besides you, what types of species are adapted to live in this biome?

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Investigate a different biome!

Explorers go new places! You might not be able to travel to another biome today, but you can investigate one online or at the library. Choose another biome that you are interested in and draw what you learn about that biome.

Homes

All species have homes. Marina's home is in water. Walter's home is a tropical savanna. Hoots' home is a forrest nest. Boots' home is in a gully, near the river, in the middle of a city. And, Stevie's home is underground.

When you are exploring outside, you will be able to see the homes of many different species. Be mindful of the homes of others and try not to damage them.

Draw a picture of a home you found while exploring.

Build a Nest for Hoots

Hoots likes to hammock, but Hoots' home is in a nest. Like other owls, Hoots doesn't build a nest. Instead, Hoots finds nests that were built by other species and occupies them. As they eat and live, owls add to their nests with the fur and remains of the animals they have eaten.

Build a nest that Hoots could occupy using items you find outside like sticks, feathers, grass, leaves and other plants. You could even make a nice "welcome" sign for Hoots to add to your nest.

If your exporer creativity is big - build a nest for yourself or someone you love!

Migration

Some species have more than one home. They travel with the seasons and along the way impact the ecosystems of each of their homes. Often, when people think of migration they think of birds, but many species migrate.

As you are exploring outdoors, make notes about what types of migrating specicies you have seen. If one of these animals doesn't live where you live, you could investigate their migration map on the internet.

Migrating Birds

Millions of birds undertake incredible journeys every year, traveling thousands of miles between their breeding and wintering grounds. The artic tern migrates 71,000 kilometers round trip!
What kinds of migrating birds have you seen?

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Migrating Fish

Fish migrate in freshwater rivers, oceans, and everything in between. Pacific salmon migrate from rivers to the ocean and then back up the river to spawn.
What kinds of migrating fish have you seen?

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Migrating Insects

Insects are small, but their migration routes can be epic! The monarch butterfly travels thousands of miles from Canada and the United States in the summer to central Mexico for the winter. Their migration involves multiple generations of monarchs. And each generation does their part in the journey.
What kinds of migrating insects have you seen?

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Migrating Mammals

Mammals migrate with the weather patterns, to follow food sources, and sometimes to give birth in safer areas. Wildebeests migrate across the African savanna in herds. Humpback whales break off from their larger pods to migrate in groups of 3-4 during migration. Caribou migrate across the actic tundra following the weather at access food.
What kinds of migrating mammals have you seen?

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Migrating Marine Animals

Fish aren't the only species that live in water and migrate - many marine animals migrate. Sea turtles migrate between foraging grounds (places where they eat) to nesting grounds (places where they lay their eggs).
What kinds of migrating marine animals have you seen?

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Endangered Species

Walter is very concerned about the impacts humans have had on elephants and other species. Walter understands that some types of elephants have already become extinct and many others are endangered.

Each biome and continent on earth has species that are endangered or have become extinct. These are some of the species that are native to North America and are on the endangered species list:

- rusty patched bumblebee
- utah prairie dog
- California condor
- polar bear
- axolotl
- red wolf
- bighorn sheep
- gray whale
- Mississippi gopher frog
- cougar

Walter has lots of ideas about what we can do to help protect all of the species of earth. Some things you can do are:

- Plant native species in your yards, gardens, public parks and farms.
- Volunteer or donate to organizations that are working to protect animals and the environment.
- Make wildlife havens in cities and suburbs. Besides native plants, you can also - hang bird feeders, build rain gardens, or build bat houses and bee hotels.
- Avoid using chemicals that are harmful to the planet
- Pick up trash and do not drop trash outside

As an outdoor explorer, Walter challenges you to put these ideas into action to protect the species of our earth! If you come up with more ideas, make sure to write them here in your journal

Build a Hotel for Bees

Bee hotels are made by people to create more nesting sites for solitary bees. While honeybees live in large colonies, solitary bees do not produce honey and prefer to nest alone. Solitary bees are not agressive and are important pollinators who help our ecosystems thrive.

We make bee hotels from (mostly) natural materials so that they mimic hollow plant stems or holes in trees where solitary bees usually nest.

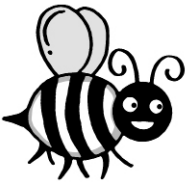
By creating bee-friendly habitats in our communities, we can try to counteract the negative impacts ecological damage is having on these pollinators.

To build a bee hotel, gather these materials:

- Tin can
- Pencil
- Yarn, string or twine
- Tape
- Optional: acrylic paint
- Construction paper
- Twigs
- Scissors
- Glue

Follow these steps:

1) Wash and dry the open tin can. Remove any labels or residue.
2) Optional: Paint the outside of your tin can for decoration or to welcome the bees.
3) Create the "rooms" for the bees to nest in. Take a piece of construction paper and roll it up tightly around a pencil, then secure it with glue or tape. Repeat this process to create enough paper rolls to fill your tin can.
4) Cut the paper rolls to size so that they fit inside the tin can.
5) Stack the paper rolls inside the tin can so that the openings align with the opening of the can.
6) Add twigs to fill in the smaller spaces between the paper rolls.
7) Use a small drill or nail to create two holes in the sides of the can. Thread string or twine through the hole and tie it securely. The hole and string should be placed to allow your bee hotel to hang paralell to the ground.
8) Hang the bee hotel in a tree or other suitable location such as in a garden.
9) Watch for your solitary bee guests to move in!



Fireflies

Fireflies are one of the most magical things you might see outside at night. Some people also call them lightening bugs or glow worms. All of these different names have been given to them because at night - especially at twilight - they light up to attract a mate!

Fireflies are not extinct or on the endangered species list. But, their population keeps drupping due to light pollution, pesticides, water quality, invasive species, and habitat loss.

All of Walter's ideas about how to protect endangered species will help protect fireflies. You can also help protect fireflies by turning off your outdoor lights at night.

How to find fireflies
Next time you are outside in the dark, make sure to take time to be still and look for fireflies. They love long grasses, marshy areas, and regions near the edges of bodies of fresh water. They can also be spotted dancing under under low-hanging trees.

If you are lucky enough to see fireflies, please do not try to catch them in a jar. Instead...

- dance with them
- pretend they are your audience and sing them a song
- imagine you are one of them and talk back to their light-up messages
- draw a picture of what they looked like
- imagine they can write and ask them to sign this page of your journal
- give them a cartwheel performance
- find a friend or family member and invite them to watch with you
- write a poem or song about what it felt like to see fireflies

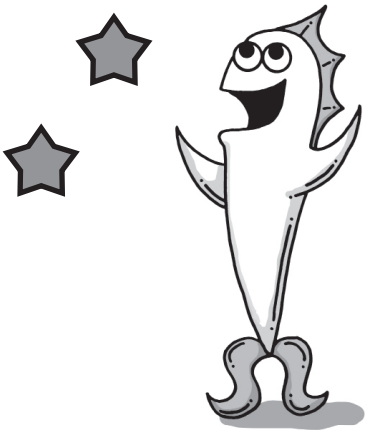
The Night Sky

The night sky has inspired ideas in science, religion, art and literature. Before modern navigation techniogy, people used the night sky to guide their journeys. Some scientists believe that fish, like Marina, also use the stars to navigate.

When you are outside at night and look up, most of the pinpricks of light you see are stars. The closest star to earth is the sun. Almost all stars are primarily made of hydrogen. In a star, the hydrogen gas is under great pressure and squeezed to the core. The pressure turns some of the hydrogen into helium. This process creates huge amounts of energy that makes the star shine so bright that we can see it on earth.

You might also see some planets when you look up. Mercury, Venus, Mars, Jupiter and Saturn are all viewable without a telescope when you are away from light pollution and the sky is clear.

Take your journal outside and draw or write about what you see in the night sky!



Seeds

Isn't it amazing that a plant as big as an oak tree or as small as a dandelion both begin as a seed?! Inside each seed you can find it's own tiny plant called an embryo. When the seed gets the right amount of sun, water, nutrients, and the right temperature - the embryo will grow into a new plant.

Plants grow their seeds inside flowers or cones. A sunflower grows it's seeds in the center of the flower and a pine tree grows it's seeds in a cone. Some plants that grow flowers store their seeds inside a fruit. Strawberry plants, raspberry bushes and apple trees are all examples of flowering plants that store their seeds in a fruit.

As you observe seeds outside, use your best hypothesis (educated guess) to fill out the chart below. After you have hypothesized, you can ask a friend, adult, or the internet for help.

Draw your seed:	Does it come from a cone or flower?	Draw what you think it will become:

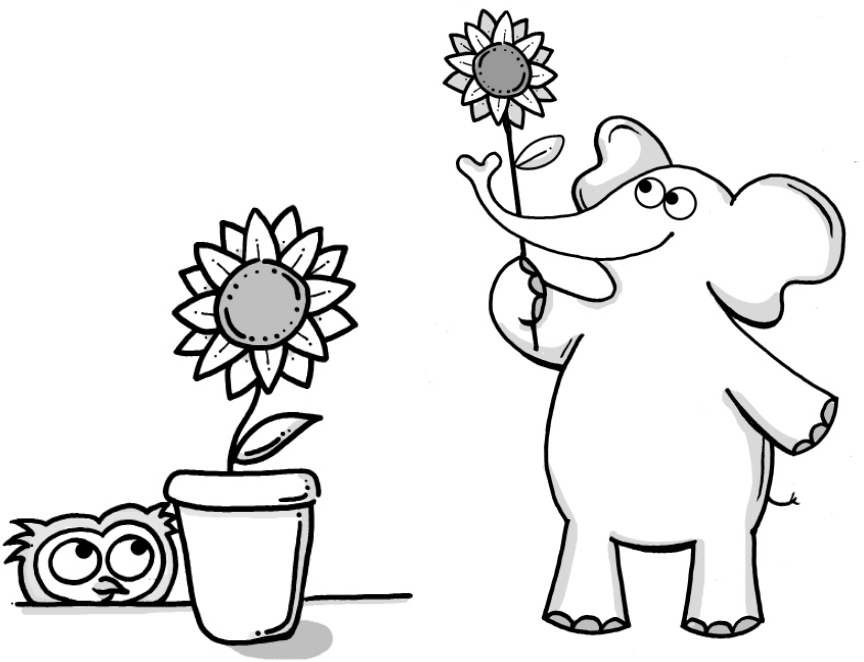



Germinate a Seed

Walter and Hoots found a sunflower growing at the park. The stem was damaged, so Walter picked the sunflower. Hoots suggested that they harvest some of the seeds to see if they could grow a new sunflower. Together, the found a pot, gathered dirt, planted the seed, watered it regulary, and waited for the seed to germinate and grow into a seedling. With a lot of patience and persistence they grew a new sunflower plant!

You can do the same thing as Hoots and Walter. Find a seed outside - like an acorn from an oak tree, a samara from a maple tree, or a seed from a long piece of grass. Or you can harvest a seed in your kitchen from a tomato, cucumber, pepper, or some other fruit or vegetable.

Fill a small container with dirt. it's ideal if the container has drainage holes. Plant your seed and cover it with more dirt. Most seeds prefer to be in a sunny spot and that their soil stays moist. Keep tending to your seed and you should see a seedling soon just like Walter and Hoots.

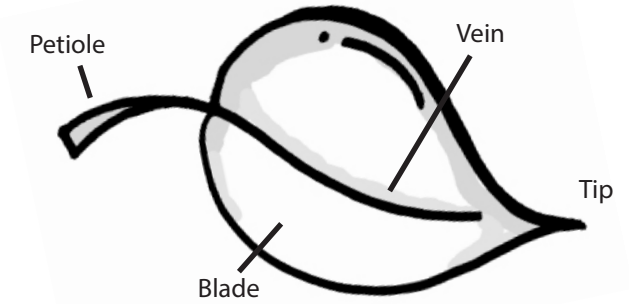


Leaves

Did you know that a leaf is an organ?! Just like your own heart or lungs, leaves do work to help a plant be healthy and grow.

The job of a leaf is to use the trap the energy of the sun. And then use that energy to combine water from the soil and carbon dioxide gas from the air to make sugars. The sugars make the plant grow.

Leaf Parts:

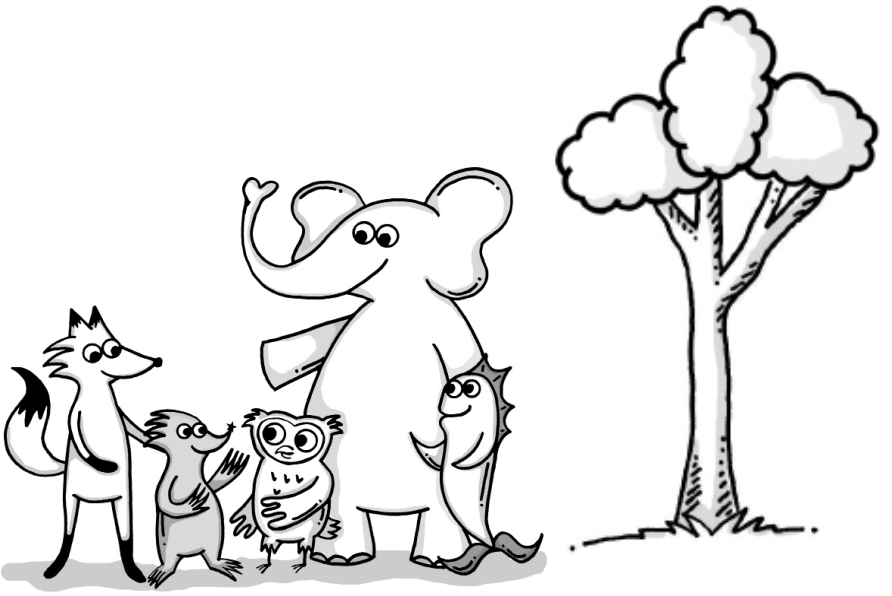


Gather two different types of leaves, draw them and label their parts. If you can, identify what type of leaf they are.



Leaf Printing & Rubbing

The next time you are out exploring, gather some leaves that you think have interesting shapes and veins. You can do a leaf printing by painting the leaf with watercolors or thinned tempera paint. Then press the leaf to the page to leave a print. Or, you can do a leaf rubbing by placing the leaf behind the page. Then rub a crayon or colored pencil on the front of the page to create a rubbing.

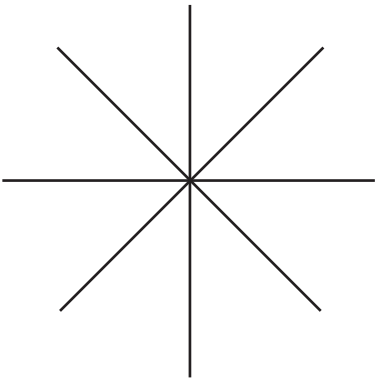


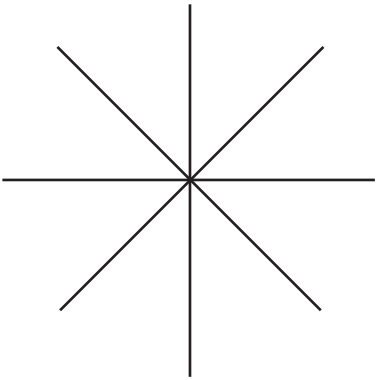
Snowflakes

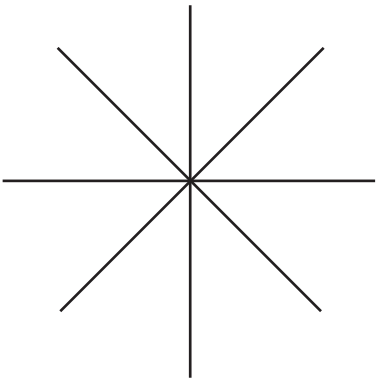
Snowflakes are made of frozen water crystals. Remember the elements of matter? Snowflakes are formed when water vapor (a gas) condenses directly into ice (a solid) without ever becoming liquid water.

All snowflakes have six sides and are made of a symmetrical pattern. But, each snowflake has it's own unique pattern.

The next time it snows, take your outdoor explorer journal outside. Study a snowflake closely and draw it's unique pattern. The lines below give you the six-sided structure that all snowflakes share.







Fun in Snow & Ice

Sometimes people forget how fun it is to play outside on a cold or snowy winter day. And, there are so many fun ways to explore and create! Try out some of these ideas the next time you get a chance to explore outside in the snow and ice.

Observe and draw:

- How do different animals behave in the snow and ice?
- What happens to a waterfall or lake in cold weather?
- What kinds of things do people do or wear in snow and ice?
- What do different plants do in the snow and ice?

Build a:

- Snow fort
- Snow person
- Snow turtle, garden, polar bear, fish, coffee shop, surfboard....
- Icicle magical wonderland

Try making:

Colorful ice balls

- Fill water balloons with water and a drop or two of food coloring
- Put them outside to freeze
- Once they are frozen, cut the balloons off

Luminaries

- Clean out an empty milk container and fill it half way with water
- Find a smaller container like a tin can and suspend that in the water
- Put everything outside to let it freeze
- Use room teperature water to help remove the containers from your ice sculpture
- Put a tea light (candle or battery-operated) inside the luminary

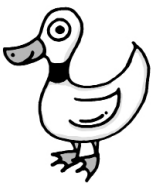
Track what you have seen!

Circle what you have seen when you have been exploring outdoors.

beaver dam

rainbow

stick



flower

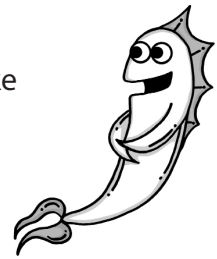
water lily

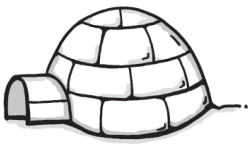
sun

wasp nest

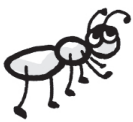
limestone

snowflake





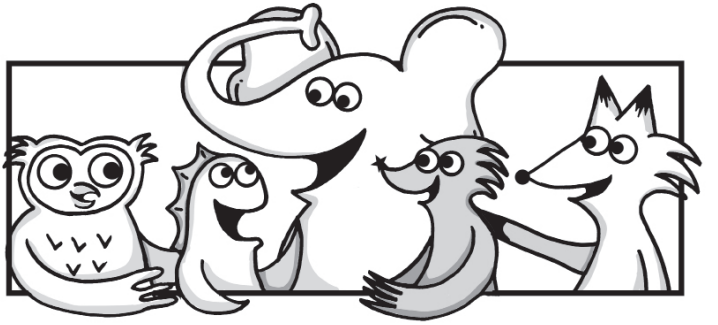
waterfall



a planet

Track where you've explored!

There are so many amazing spaces to explore in our community. Track where you've been and where you want to go on the map.



Your Cahoots buddies want to congratulate you.
You are now a certified Outdoor Explorer!

To learn more about Cahoots
and all of the programs Community Education offers, go to:
www.commed.spps.org

CAHOOTS

Cahoots illustrations were created by Maureen McGinn