

NATURE DISCOVERY BACKPACK
NIGHT SKY & NAVIGATION ACTIVITY BOOK

CONNECTING WITH NATURE

A PROGRAM OF:



DELIVERED WITH:



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ACKNOWLEDGEMENTS

This activity book was created together by Watersheds Canada and Grey Sauble Conservation with the common goal to educate students and families about the benefits of healthy waterways, lakes, and the surrounding environment for our collective future. This book is linked to the Ontario curriculum for grades K-8. Photography in this book is provided by Watersheds Canada unless otherwise labelled. Cover photo: Getty Images.

This Nature Discovery program is made possible because of support from:



**TD Friends of the
Environment
Foundation**

As one of 36 Conservation Authorities established in the Province of Ontario under the Conservation Authorities Act, Grey Sauble Conservation has made it their mission, in partnership with the stakeholders of the watershed, to champion a healthy and safe watershed through innovative conservation efforts, sound planning, and inspiring education initiatives, now and in the future.

Grey Sauble Conservation acknowledges with respect, the history, spirituality, and culture of the Anishinabek: The People of the Three Fires known as Ojibway, Odawa, and Pottawatomi Nation, who have inhabited this land from time immemorial. And further give thanks to the Chippewas of Saugeen, and the Chippewas of Nawash, now known as the Saugeen Ojibway Nation, as the traditional keepers of this land. Grey Sauble Conservation also recognizes, the Metis whose ancestors shared this land and these waters. May we all, as Treaty People, live with respect on this land, and live in peace and friendship with all its diverse peoples.

Watersheds Canada is a federally incorporated charity (863555223RR0001) and non-profit organization committed to building and delivering education and habitat restoration programs in communities across the country. By working alongside property owners, children and youth, schools, Indigenous communities, businesses, and municipalities, the health of lakes, rivers, wetlands, and shorelines can be enhanced and protected.

GETTING READY TO EXPLORE NATURE

Photo: Pathum Danthanarayana

We are so excited for you to explore your local nature and the beautiful night sky. You will learn about astronomy and how to protect the health of our local natural spaces and beyond!

You can keep this activity book. This activity book will give you tips to safely explore nature, especially at night or in the woods. You will also learn how you can help protect your local nature!

Please return all field materials in the backpack.

If you are interested in learning more about Watersheds Canada, please visit watersheds.ca or scan this QR code!



STAYING SAFE



Photo: Pixabay

Here are some things to keep in mind when exploring outside at night:

- Never go off by yourself. Tell someone where you are going and when you will be back.
- Choose a word, fun sound, or call that everyone in your group knows that you can use when you are looking for each other in the dark.
- Charge all electronics and flashlights/headlamps ahead of time and bring extra batteries/charged power banks for all devices.
- Bring snacks, reusable bottle with water, warm clothes and layers, a waterproof layer, and bug spray.
- Practice good campfire safety. Respect any fire bans. Only use locally purchased wood to prevent the spread of invasive species.
- Watch wildlife from a safe distance. Do not try to handle wild things!
- Please leave nature for everyone to enjoy. Do not pick any plants or bring home any wildlife or insects with you.
- Make sure to properly dispose of any garbage you have.
- **There are ticks in the area. Wear long sleeves and long pants when in a wooded area: <https://www.ontarioparks.com/parksblog/how-to-protect-yourself-from-ticks/>**

WHAT IS IN MY BACKPACK?

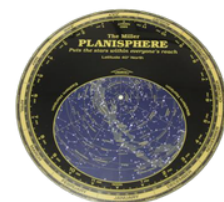
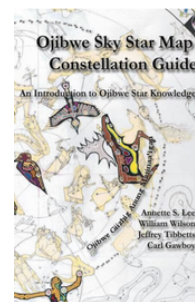
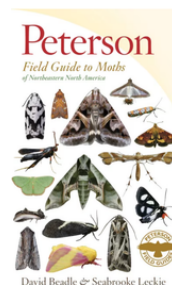
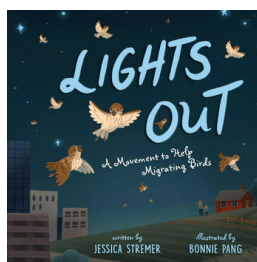
Exploration Tools

- Use the headlamp to see far away while you explore! The red light mode is great for reducing light pollution and preserving your night vision.
- Learn how to use a compass and navigate yourself around in nature using the cardinal directions (north, east, south, west).
- Turn the knob on the binoculars to make it easier to see things that are far away!



Guides & Games

Use the identification guides and books to learn more about constellations, nighttime wildlife, and light pollution. Practice telling campfire stories, or play a fun game with the night hike 'fundana'!



ACTIVITY #1: POETRY

List 6 things that describe what you love about the night sky using the first letter of each line. This will make an acrostic poem, where the first letter of each line spells out the word 'lookup' when read vertically. Lines do not have to rhyme.

L

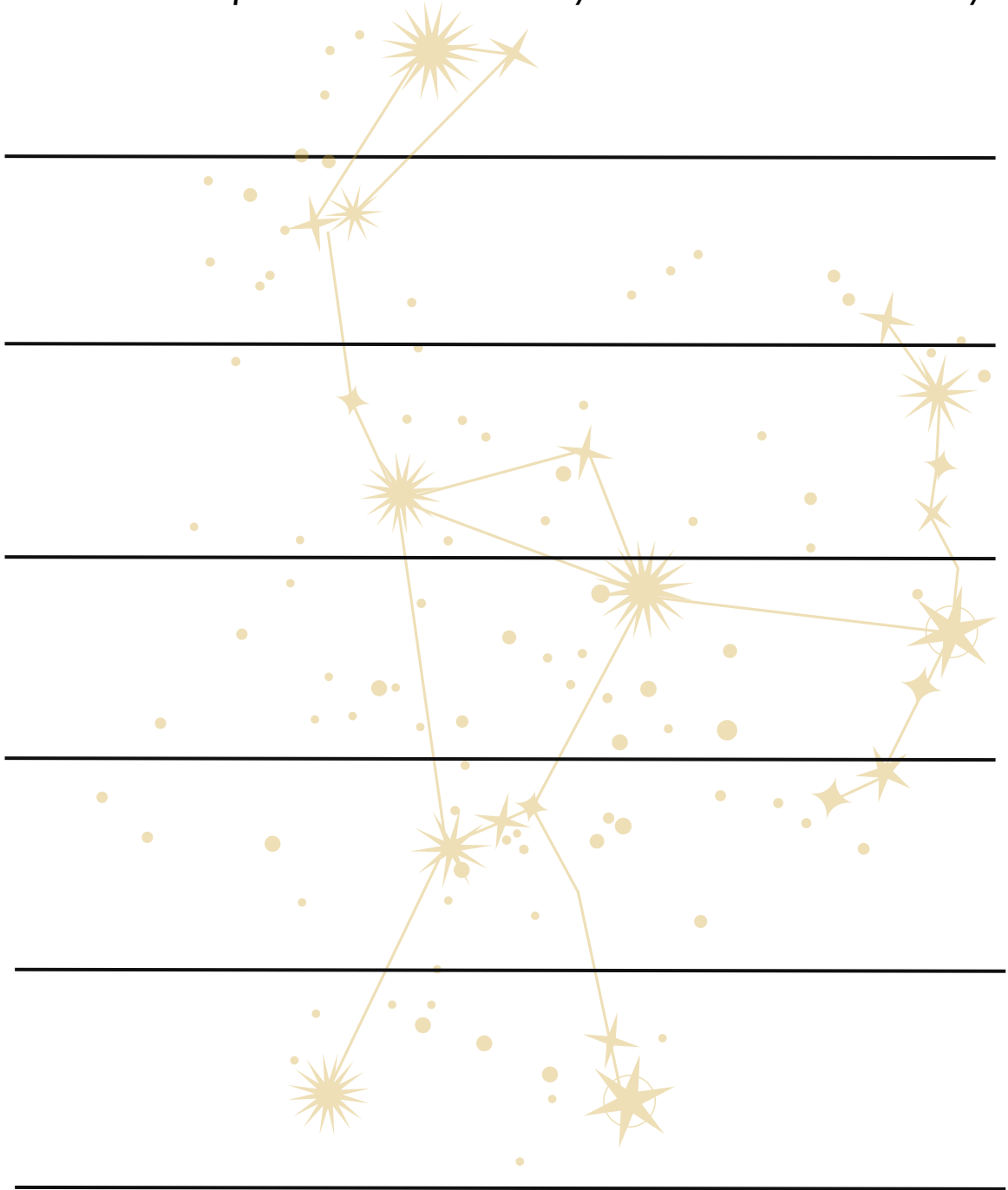
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ACTIVITY #2: STARGAZING FUN

The night sky is like a giant puzzle. Hidden among the thousands of stars you can find many constellations. A constellation is a group of stars that forms a recognizable pattern and people have given it a specific name.

Materials:

- Headlamp
- Night sky guides
- Moth guide
- Planisphere, and Moon Gazer's Guide
- Compass
- Blanket (optional)
- Binoculars, or telescope (optional)



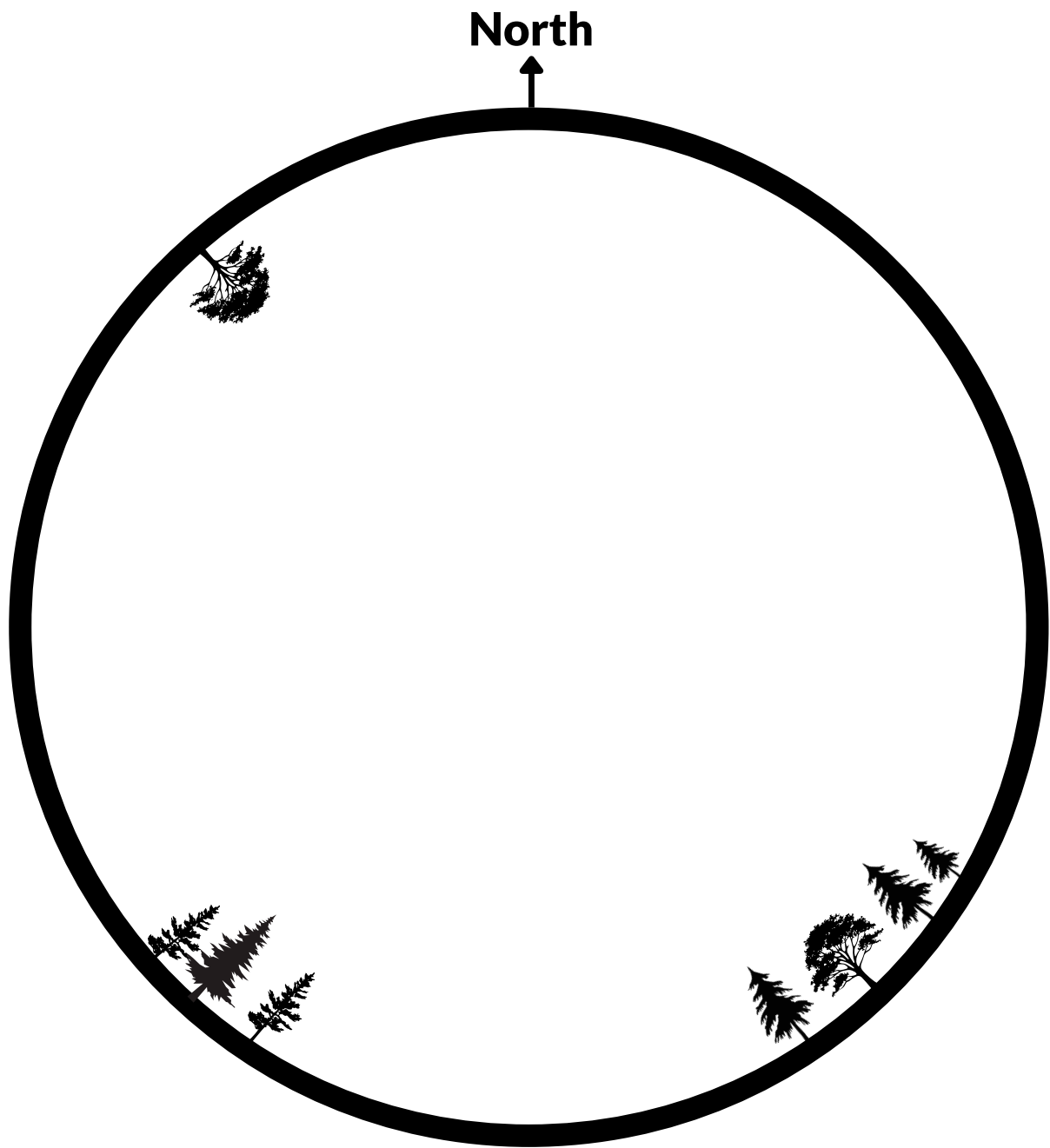
Stargazing Tips:

- Go out in the right conditions. This means little or no moonlight and a cloud-free sky.
- Find an area away from bright lights like street lamps and stores so you can see the stars.

Use the next page to record your constellation sightings! Draw the constellations and name them in the circle using your night sky guide.

DATE: _____

TIME: _____



WEATHER CONDITIONS: _____

WHERE: _____

OTHER NOTES:

ACTIVITY #3: BUILDING A FIRE

Campfires are regularly enjoyed with marshmallows and storytelling, but they are also essential in survival situations!

Fires provide light, warmth, security, and comfort. In any survival situation, this is the first thing you want to build. A fire makes a great light signal in the dark or a smoke signal during the day.



Building a fire and keeping it going is not always an easy task. You need to battle wind, rain, and other elements to keep it going and contained. That is why having the right skill and knowledge is important.

Pick your site, find your source of fuel, and pick the design of your fire and how you are going to light it.

LET'S TALK... CAMPFIRE SAFETY!

Use a fire ring

Use an existing fire ring wherever possible to help contain your fire.



Consider surroundings



Do not burn close to overhanging logs, steep slopes, rotten stumps, branches, and dry grass or leaves.

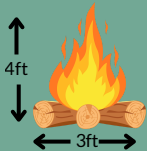
Use proper fuel

Use untreated wood or charcoal as fuel. Do not bring firewood from a different place to burn as this can spread invasive species.



Keep it contained

Campfires should be less than 3 feet in diameter and 4 feet in height.



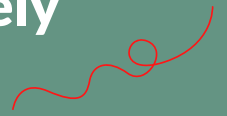
Get an adult to help

Never light a fire without adult supervision and always make sure an adult is nearby to help you.



Dress appropriately

Avoid loose clothing and instead dress in fitted, tightly woven clothing.



Put it out

Put your campfire out by pouring water on it. Ensure all branches, coals, and sticks are wet. Use dirt if you do not have water.



Pay attention

Never leave a campfire unattended. Even a small breeze can spread a fire.



Stay back!

Stay 5 feet away from an open fire at all times.



5ft



Remove hazards

Take time before starting your fire to clear the area around the fire pit of any leaves and other items that could catch fire easily.





ACTIVITY #4: NATURE GROCERY STORE

What happens when you need to use nature for your needs instead of going to the store? This activity will help you see that nature has many amazing things for us to borrow and use!

Nature provides us with everything we need to survive, like food, shelter, water, and medicine. Many of us have the convenience of going to a store and getting all of these things, not remembering that they originally came from nature!

What if you need something, but a store is too far away? In this activity, your task is to go out into nature and look for things you could use. Everything from pinecones to rocks can have a use.

Find 5-7 items in nature, like a stick, rock, or leaf, and use your imagination to describe how you could use it in a survival situation.



WHAT I FOUND	HOW I COULD USE IT

ACTIVITY #5: STAR PROJECTORS

In this activity, you will see how light pollution changes if you can see the flashlight stars, just like a sparrow trying to see real stars while flying near a brightly-lit town.

Materials:

- Cardboard
- Pencil
- Tape
- Flashlight

What To Do:

- Cut out a circle of cardboard that fits over your flashlight lens.
- Using a pencil, poke small holes in the cardboard to act as stars.
- Tape your cardboard piece over your flashlight lens.
- In a dark room, turn on the flashlight and see the stars you made!

In the book *Lights Out: A Movement to Help Migrating Birds*, we learn how birds use maps made of stars to guide them south for the winter, and how city lights can block out the stars and confuse them.



Turn on your room lights one at a time. Start with small lights like a nightlight or candle. Turn on more lights until you can't see your flashlight stars anymore. **Did it take much light to make it hard to see your stars? What can you do to make it easier for birds to migrate through your community?**

ACTIVITY #6: WHAT DO YOU SEE IN THE STARS?

Take out your constellation guide and look at each of the different constellations. What do they remind you of? Maybe you see a horse or a flower! Give one example for as many constellations as you can think of.



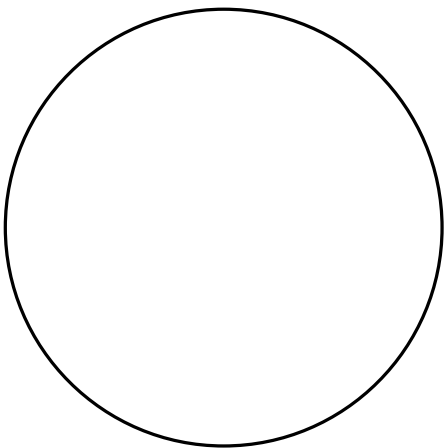
Example: Cepheus looks like a... tent

ACTIVITY #7: MY MOON JOURNAL

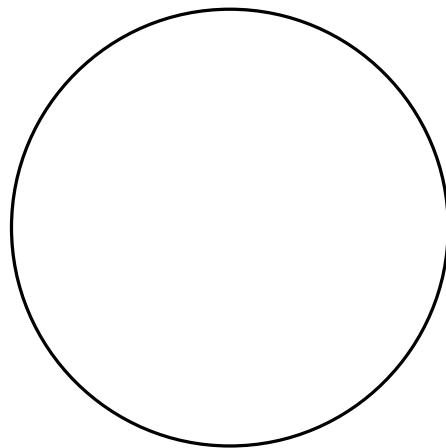


Moon phases represent the different shapes of the Moon that we see at different times of the month. The way the Moon looks will change throughout the month. The Moon has 8 lunar phases (shown above).

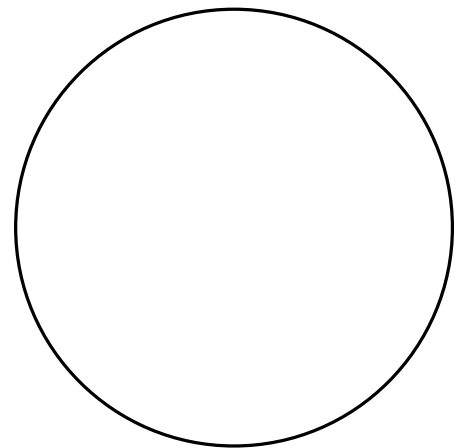
Keeping a Moon Journal for a month is a great way to see those patterns and be able to predict the phase that will appear the next night and next week. Using the next few pages, record the lunar phases over the next 30 days to see the full lunar cycle.



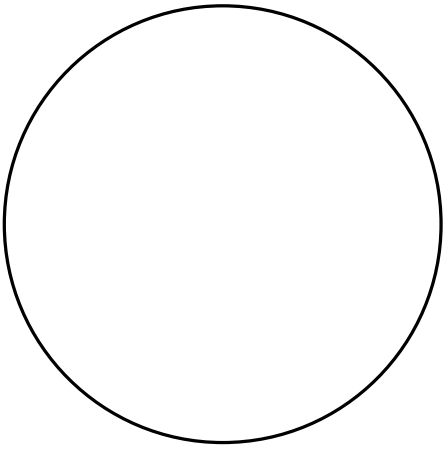
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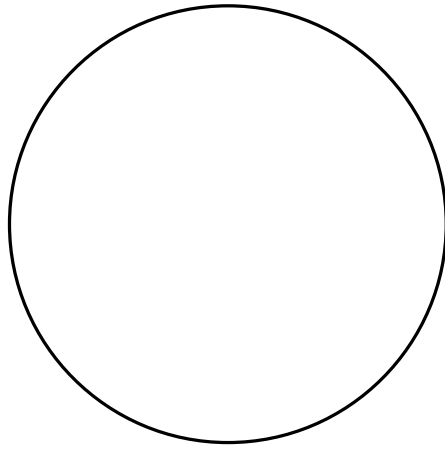
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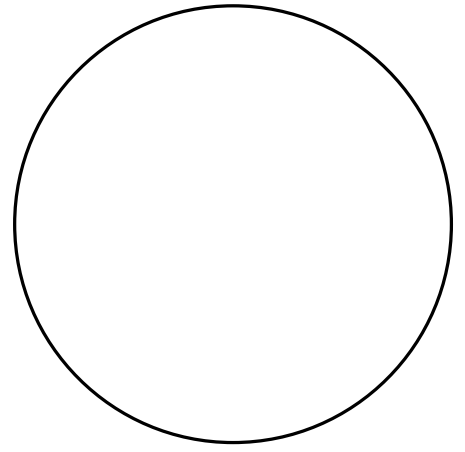
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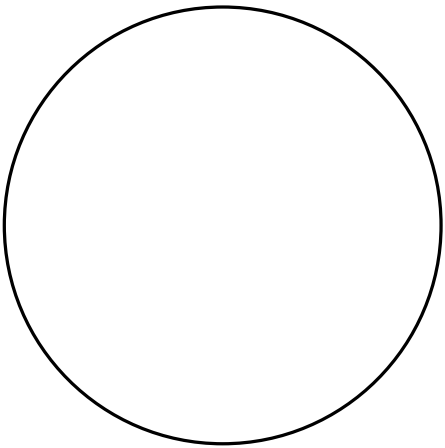
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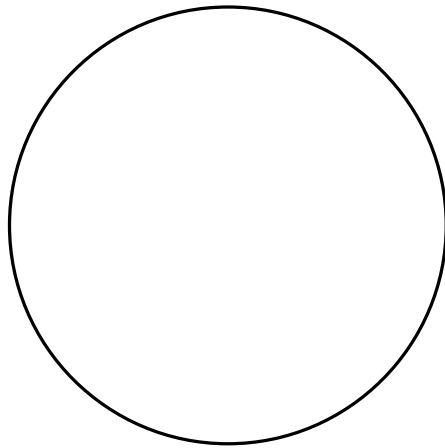
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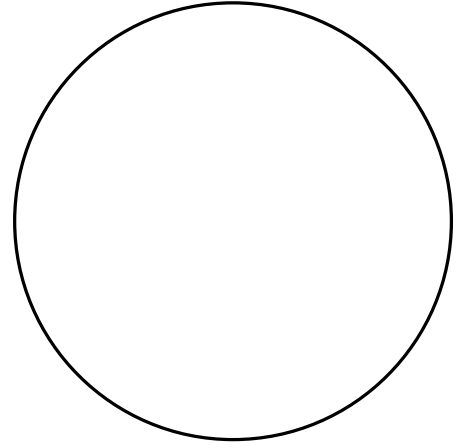
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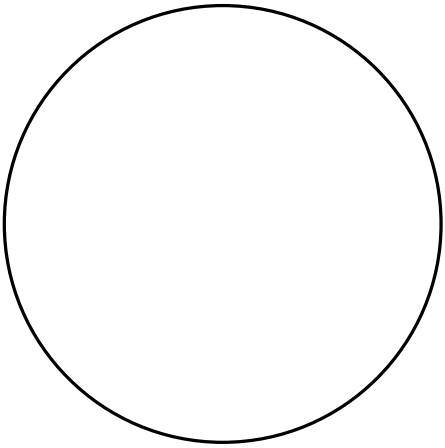
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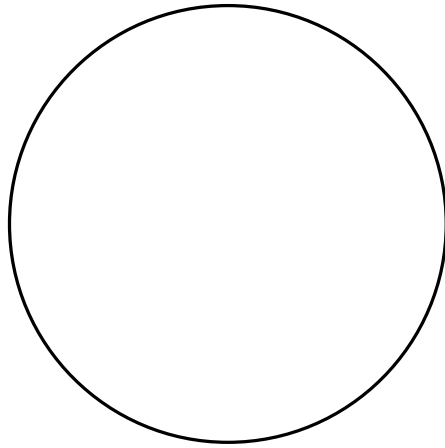
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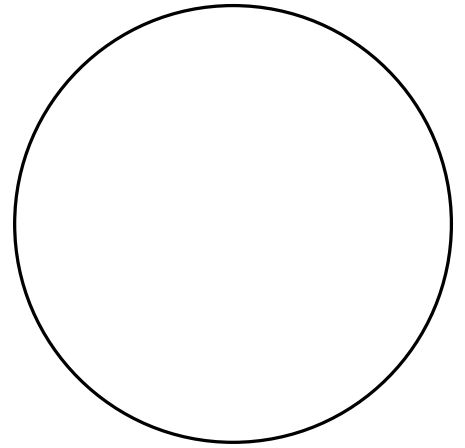
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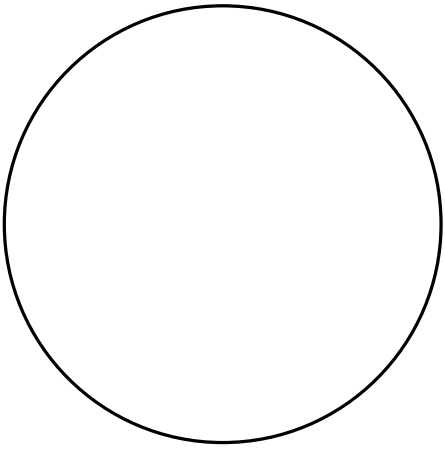
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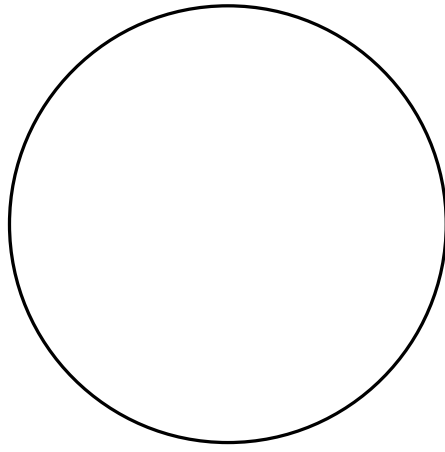
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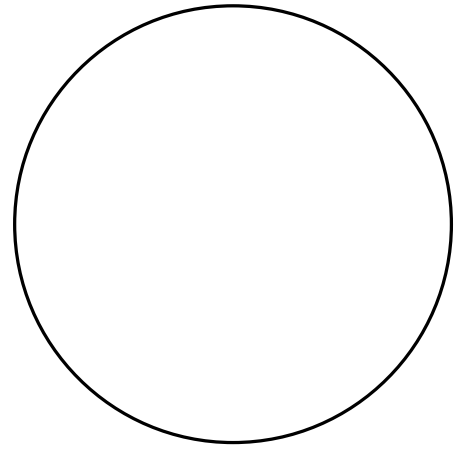
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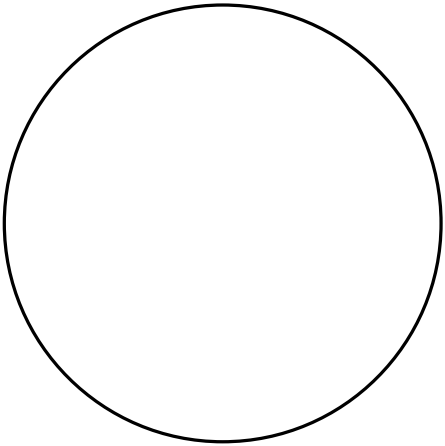
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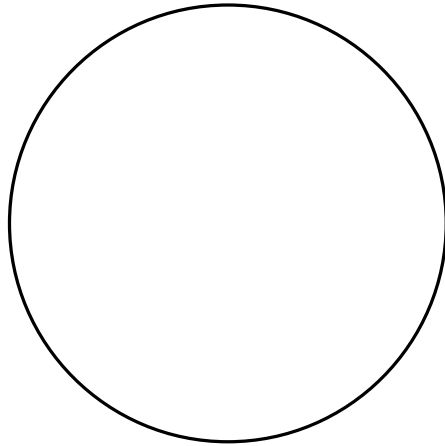
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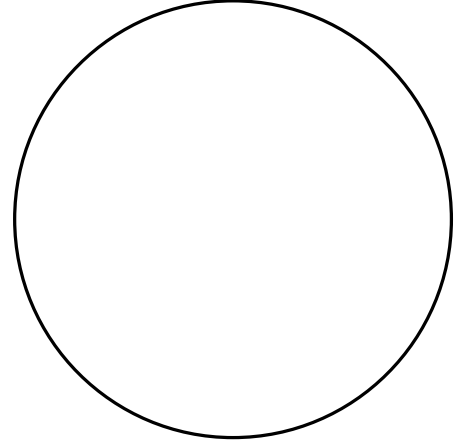
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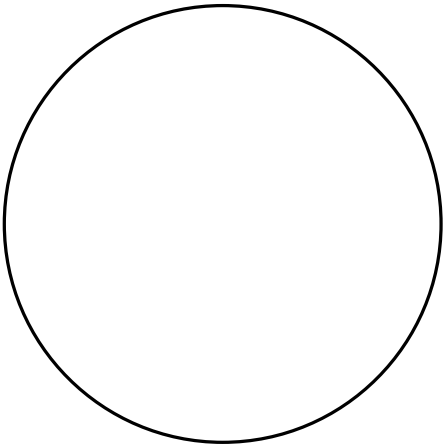
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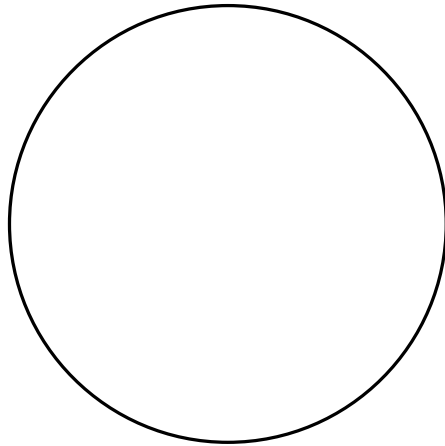
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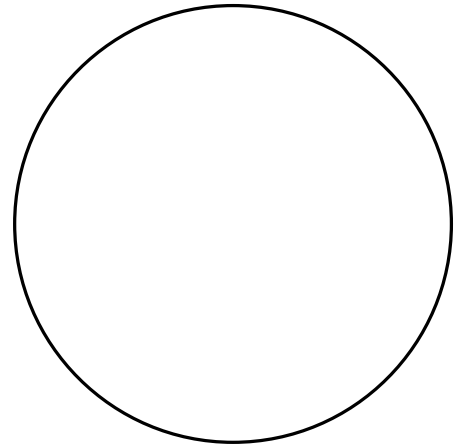
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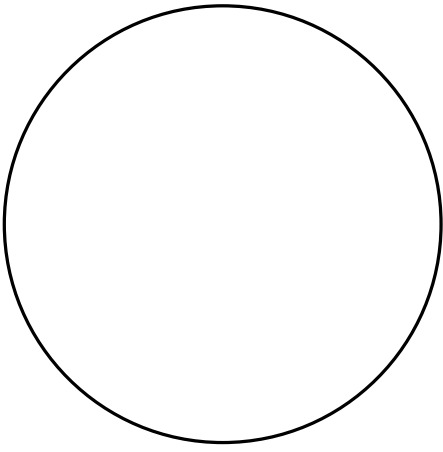
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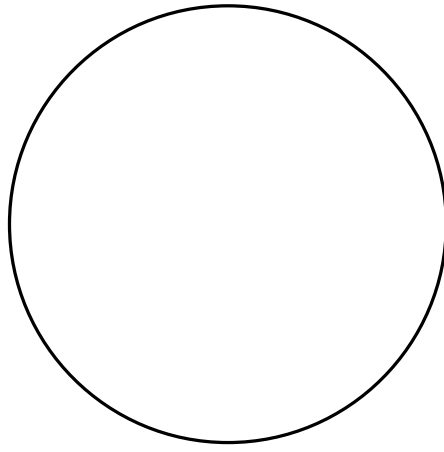
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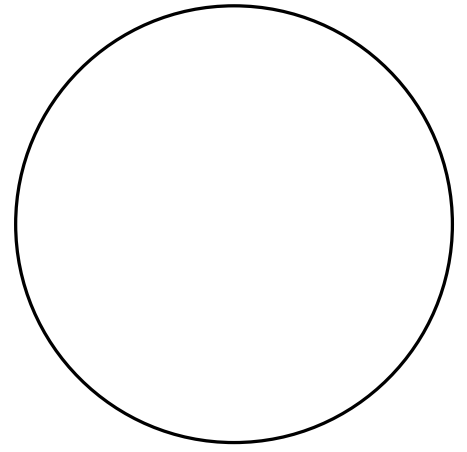
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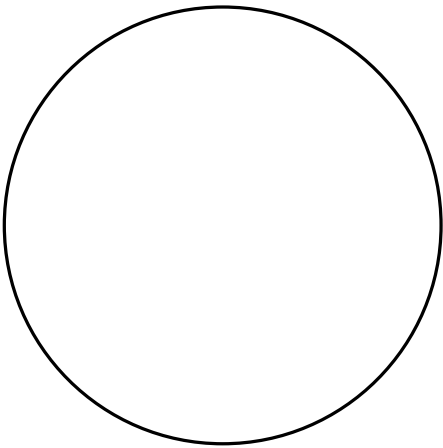
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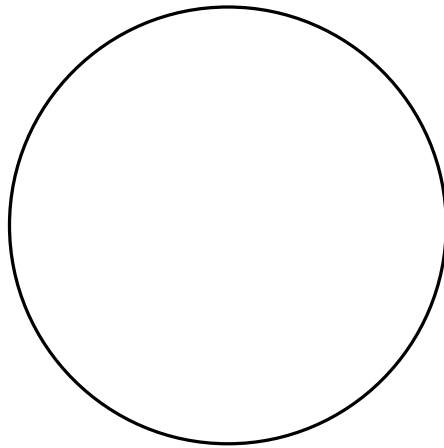
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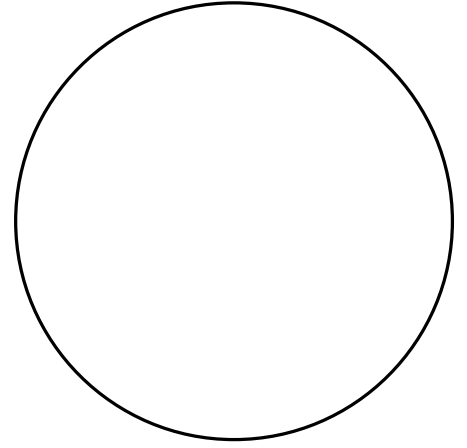
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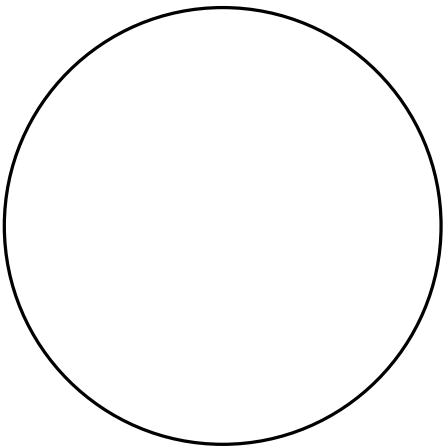
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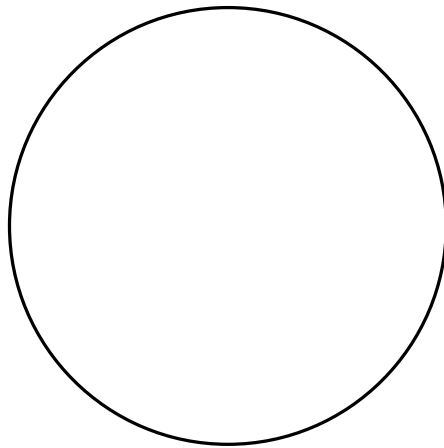
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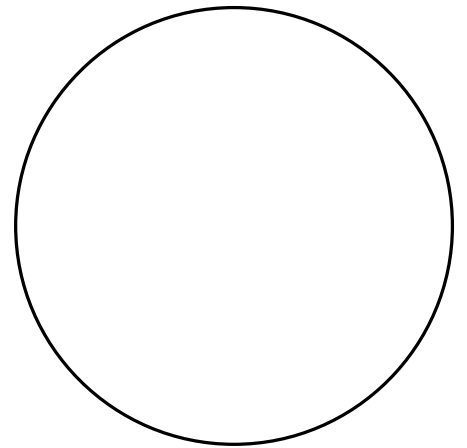
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Date: _____
Time: _____

ACTIVITY #8: CREATE A MOTH

Design your own moth! On the right, list 4 things your moth needs in its home.

1 _____

2 _____

3 _____

4 _____

*general observations

FLYING INSECTS WITH SCALE COVERED WINGS

FOLD WINGS UP BEHIND THEIR
BACK WHEN RESTING

CLUB-SHAPED ANTENNAE

USUALLY OUT DURING THE DAY



Monarch Butterfly

BUTTERFLY

SPREAD WINGS OUT OR HOLD
AGAINST THEIR BODY AT REST

FEATHERED ANTENNAE

MORE ACTIVE DURING THE NIGHT



Luna Moth

MOTH

ACTIVITY #9: BUILDING A SHELTER

For this activity, you will be creating and drawing a shelter to protect yourself from the elements!

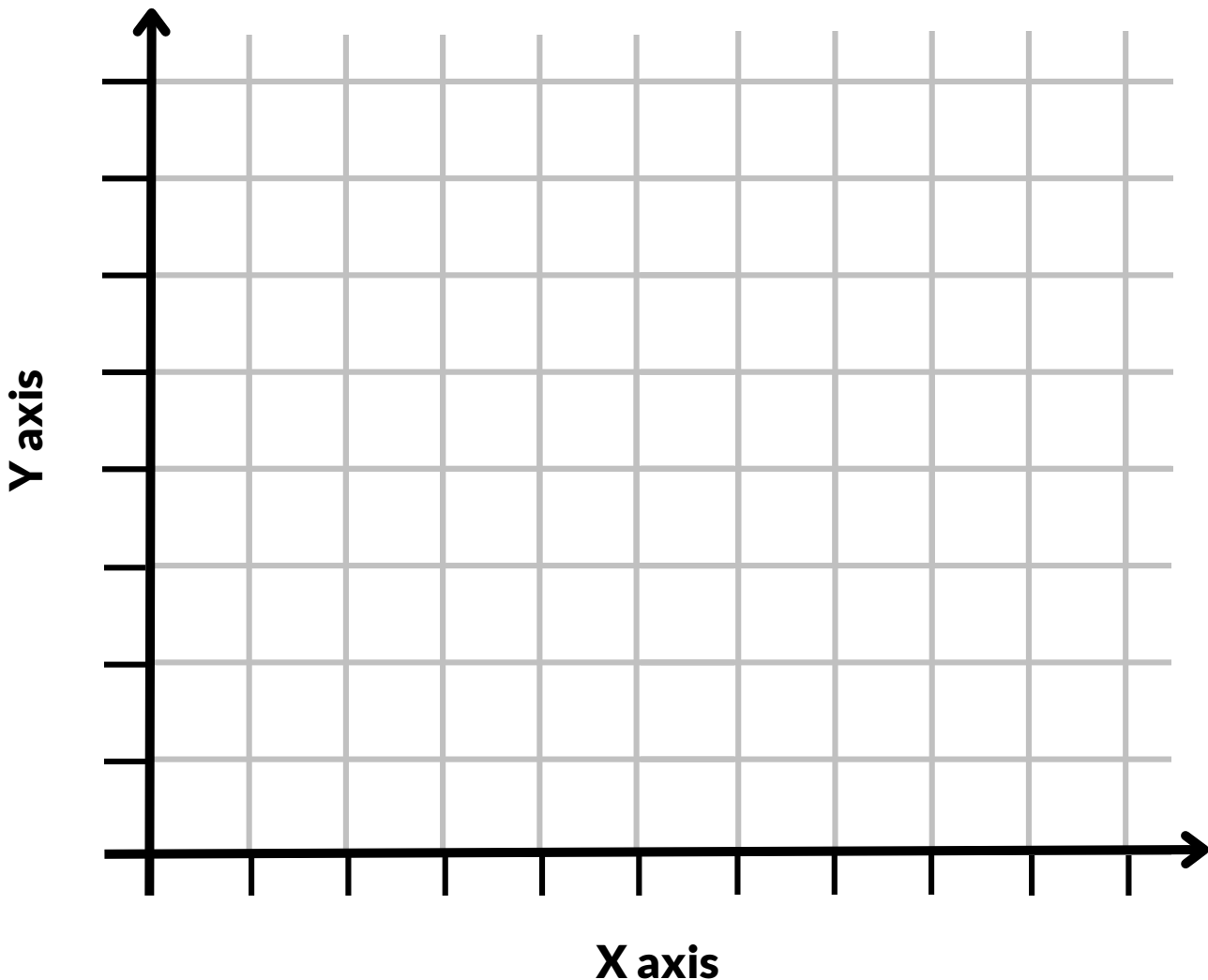
Decide what type of shelter you are going to draw. Also choose what you are going to protect yourself from, like the winter cold, or summer heat and bugs. Draw your shelter in the box below! Label any key survival elements or design choices you made.



ACTIVITY #10: CREATE A CONSTELLATION

A constellation is a group of stars that form a shape and has a name (Orion, Ursa Major/Big Dipper, etc.). Many cultures use constellations to tell the stories of their ancestors and their beliefs. Constellations can be used to navigate the globe and they connect us to the place where we live.

Create your own constellation on the grid below, making sure to put your dots where two lines come together!



What is the story, teaching, or meaning behind your constellation?

Next, take your field guide out at night and along with a trusted adult, see how many constellations you can find. Make a list of the ones you find:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.



ACTIVITY #11: MOON MODELS

Materials:

- Small white foam ball
- Pencil
- Tinfoil
- Headlamp
- Black construction paper



What To Do:

1. Stick the pencil into the white foam ball.
2. Wrap up the ball in tinfoil. Try to make sure that the wrapping is as smooth as possible.
3. Turn on the headlamp and turn off all other lights to make the room dark. You can also close curtains and doors.
4. Place a piece of black paper on the table and place the moon on the black paper.
5. Next, shine the headlight onto the moon.
6. Slowly move around the table, keeping your eyes on the moon, which is lit up on one side by the headlamp. You will see the different shapes it takes - these shapes are the moon's phases!

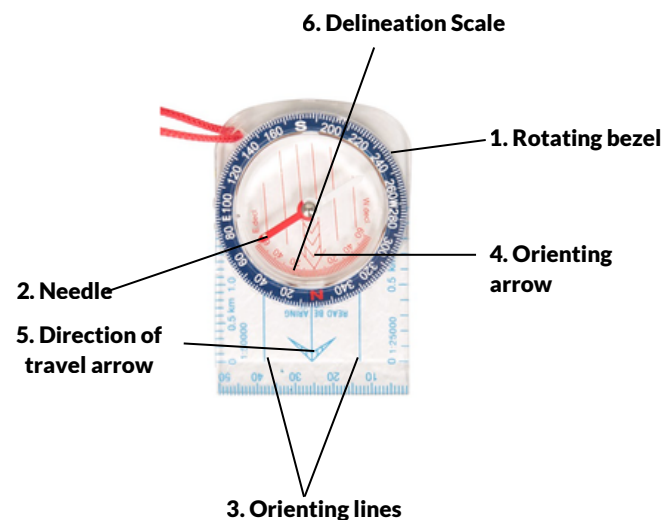
WHAT IS A COMPASS?

The magnetic compass has been used for navigation for hundreds of years. At one time, it was the only reliable means of direction-finding on days when the sun and stars were not visible. Using a compass will help you:

- Know which direction you are travelling in. This is called your **heading**.
- Align your map with your surroundings. This is called **setting the map**.
- Work out which direction an object or destination is from you. This is known as its **bearing**.
- Walk in a straight line. This is called **following a bearing**.

Understanding Your Compass

1. **Rotating bezel/compass wheel:** shows four main compass points N-E-S-W. It also has a mark every two degrees up to 360°.
2. **Magnetic needle:** the red end indicates north and the white end for south.
3. **Compass lines:** on the bottom of the baseplate; also known as orienting lines.
4. **Orienting arrow:** fixed and aligned to north within the dial.
5. **Travel arrow:** the direction is the big arrow at the end of the baseplate.
6. **Delineation scale:** used to adjust the difference between magnetic north and true north, known as "magnetic declination".



ACTIVITY #12: MAKING A MAP

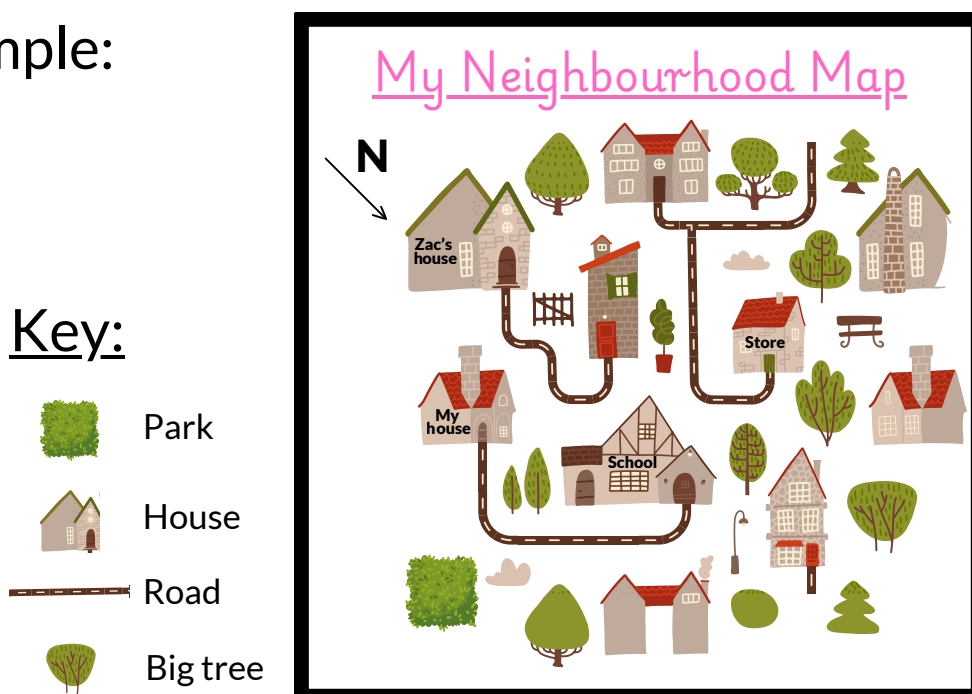
*Until very recently, maps were the main tool for navigation.
It is still an important skill today to be able to read a map!*

In this activity, you will make a map of your surroundings. Your map could be of any place you like, like your classroom, school, schoolyard, house, or backyard. You want to pick a place where you can draw lots of details so someone using your map would be able to find their way around.

Draw your map on the next page. Your map should have a:

- Title
- Compass (make sure everything on your map is facing the right way)
- Key that lists all of the different elements on your map

Example:



ACTIVITY #13: NAVIGATE USING A MAP

In this activity, you will be using the map you made in Activity #12 to explain how to get to different places by using compass directions (example: to get from the couch to the kitchen, take 7 steps north).

Give 5 examples of routes you can take using your map. These directions should be detailed enough that someone else who is unfamiliar with the area could follow them and get to the right spot.

1. _____
2. _____
3. _____
4. _____
5. _____

WAYS TO HELP NATURE

- Gather data.** Take photos and observations of different animals and plants you see in nature and submit them to an online database like [iNaturalist](#), [eBird](#), [MonarchWatch](#), or [Water Rangers](#).
- Be natural.** Consider adding native plants to provide stabilization, habitat, and food to your property. Learn what native species to plant on your property: naturaledge.watersheds.ca/plant-database/
- Grow Me Instead!** Learn about native plants you can grow in your garden by checking out the “Grow Me Instead” chart: <https://ontarioinvasiveplants.ca/wp-content/uploads/2020/04/Southern-Grow-Me-Instead-1.pdf>
- Keep it clean.** Prevent the spread of invasive species by staying on trails while hiking and by cleaning equipment after boating. Learn more: <https://ontario.ca/page/invasive-species-fact-sheets>
- Be respectful.** Take only photos and leave only footprints when exploring in the forest. This lets other people, animals, and plants use the space too.
- Support local.** Buy local native plants at the Inglis Falls Arboretum Alliance: <https://greysauble.on.ca/arboretum-alliance/>
- Help local turtles!** Get involved with the turtle stewardship program at Grey Sauble Conservation: <https://greysauble.on.ca/turtle-stewardship-program/>
- Protect baby turtles.** Turtle nest predation rates are very high in our area. Help protect turtle eggs and ensure they have a chance to hatch. As a family, consider if it may be appropriate for you to make your own turtle nest protector: <https://ontarioturtle.ca/get-involved/turtle-nests-and-nest-protection/>

RESOURCES FOR PARENTS

Fireworks

Although fireworks create a spectacular show enjoyed by many, there are risks to this activity.

Noise and light from fireworks can have a negative impact on wildlife, including nest desertion. The particulate left in the sky after a firework explodes contains heavy metals which can land directly on the lake or be washed into the lake following a rain storm. This has harmful effects on the aquatic food chain. Fires and injuries to people and pets are also possible.



Be 'Wake-Aware'

Lakes and rivers are fragile environments. Fish, wildlife habitat, shorelines, and docks are vulnerable to damage from boat wakes.

- Be aware of the size of your wake while operating a boat. Adjust your speed and directions to minimize your impact on shorelines.
- Distribute passengers throughout the boat to reduce time spent in transition speed.
- Wakeboard and water ski away from shorelines.
- If you are boat shopping and a motor-free boat is not an option, opt for an outboard motor which gives the driver more control over the amount of water being forced downwards.

SHORELINE LIGHTING

Many of us have likely sat out at night and noticed the lights at properties across the way. Take a moment to think about how this makes you feel, and consider if light from your property is also trespassing. This doesn't mean we have to get rid of all our outdoor lights, though! Maybe we do not need as many or they can be retrofitted to reduce the glare.

Ask yourself:

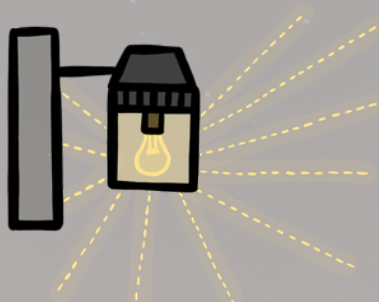
- Does the area on my property really need to be lit (is it useful)?
- Does it need to be this bright (low level and warm-coloured)?
- Is the light transmitted further than it needs to be (is it targeted and controlled)?

Not Recommended: Glare Lights

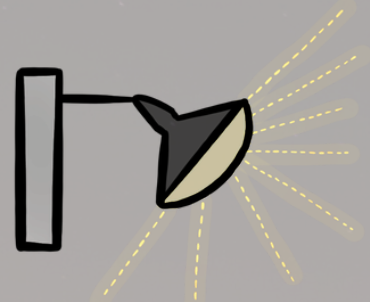
Typical 'Wall Pack'



Typical 'Yard Light'

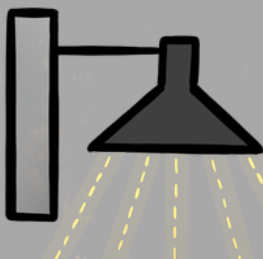


Flood Light

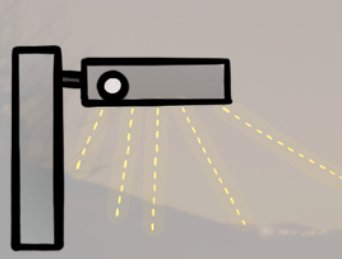


Recommended: Shielded Lights

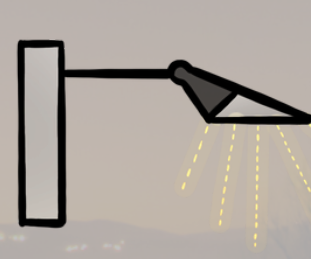
Opaque Reflector



Typical 'Shoebox'



Flood Light with Hood





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