Girl Guides
BC Council

BC Program Committee

2025

ACTIVITIES
EXTREME WEATHER

Extreme weather events are unusually severe or unseasonal conditions. Climate change influences weather patterns, leading to more extreme weather events.

TABLE OF CONTENTS

WHAT IS EXTREME WEATHER?

Extreme weather is when the weather is way different from normal—like super heavy snow, really strong winds, or super hot days.

Impactful or severe weather is when the weather causes problems for people—like knocking out power, closing schools, or damaging homes.

So, **extreme** means it's really unusual, and **impactful/severe** means it causes trouble, even if it's not super rare.

The activities in this crest can take two to three meetings to complete. Choose 4-10 activities for your unit to complete - depending on the time required for each activity.

Sparks and Embers 4

Guides 16

Pathfinders and Rangers 42

Additional Resources 71

Activity Index 114

TYPES OF EXTREME WEATHER:

Heatwaves: Prolonged periods of excessively hot weather. Global warming is causing a rise in average temperatures, resulting in more frequent, longer, and more intense heat waves.

Cold snaps: Extended periods of unusually cold temperatures.

Heavy Rainfall/Flooding: Intense downpours leading to flash floods or widespread inundation. Warmer air holds more moisture, leading to heavier rainfall and increased risk of flooding.

Droughts: Prolonged periods of abnormally low rainfall, leading to water shortages. Climate change alters precipitation patterns, causing some areas to experience prolonged and severe droughts. This is especially true in the regions that were already dry.

Hurricanes/Typhoons/ Cyclones: Powerful rotating storms with high winds and heavy rainfall.

Tornadoes: Powerful rotating storms with high winds and heavy rainfall.

Winter storms/Blizzards: Heavy snowfall, strong winds, and low temperatures. While warmer emperatures may lead to less frequent snowfalls in some areas, they can also cause more intense winter storms in other places, with heavier snowfall and increased precipitation.

Thunderstorms: These can bring heavy rain, lightning, hail, and damaging winds (and sometimes tornadoes).

Wildfires/Wildfires: Wildfires are fast-moving, uncontrolled fires that spread through vegetation. Warmer temperatures and drier conditions increase the risk of wildfires, making them more likely to ignite, spread rapidly, and become harder to contain.

Coastal Flooding: As global temperatures rise, glaciers and ice sheets melt, and ocean water expands, leading to sea level rise. This increases the risk of coastal flooding, especially during storm surges.

Air Quality: When the Air Quality Health Index (AQHI) is high, the air is significantly polluted. This can be caused by wildfires, emissions from factories and vehicles, and weather conditions.

GENERAL WEATHER ACTIVITIES

WEATHER BINGO

Create bingo cards with pictures of different weather conditions (sunny, rainy, cloudy, snowy, windy, stormy). Call out the weather types and have youth mark them on their cards with game pieces. The first youth to get a bingo (e.g., vertically, horizontally, diagonally, etc.) wins!

Download bingo cards › Source: *Nature Inspired Learning*

WEATHER MATCHING GAME

Create pairs of cards with pictures or diagrams of different weather events and their descriptions (e.g., a picture of a tornado and a card that says a rotating column of air). Have youth match the pictures and descriptions.

See resources for printable matching cards (print two sets per group).

WEATHER STORY TIME

Read a story about extreme weather and discuss the different events in the story.

- ***The Wonder of Thunder*** – Sharon Purtill
- ***Ten Ways to Hear Snow*** – Cathy Camper, Kenard Pak
- ***Look Inside: Wild Weather*** – Emily Bone, Bao Luu
- ***Extreme Weather*** – Tom Jackson
- ***The Secret World of Weather*** – Tristan Gooley
- ***Wacky Weather*** – Todd Tarpley

WEATHER PAINTING

Have youth paint pictures of different weather events using bright colours and simple shapes.

WEATHER MASKS

Have youth create weather masks using paper plates, construction paper, and other materials. They can decorate their masks to look like different weather conditions (e.g., a sunny day, a rainy day, a snowy day, etc.).

HEAT EVENT ACTIVITIES

A heatwave is when it's very hot for a few consecutive days in a row.

Imagine you're baking cookies in an oven. Sometimes, the oven gets really, really hot, right? A heat event is kind of like that, but for the whole outside!

It's like a giant invisible lid gets put over a big area, trapping all the hot air underneath. The Sun's heat gets stuck, and it just keeps getting hotter and hotter for many days. It's like the Earth is wearing a big, hot blanket!

That's why it's so important to drink lots of water and stay in the shade when there's a heat event.

What are some ways we can make shade when we're outside?

MAKE YOUR OWN FAN

Materials:

Paper plates, popsicle sticks, markers, stickers, paint, paint brushes, glue, scissors

INSTRUCTIONS:

1. Cut the paper plate in half.
2. Decorate the half plate. You can use markers to draw or paint first. If painting both sides, let the paper plate dry for a few minutes before flipping over to paint the other side.
3. Once fully dry, colour the paper plate with markers.
4. Glue craft sticks together at one end at about a 90-degree angle, then attach to the back of the plate, or use hot glue.
5. Let the glue dry and then enjoy a cool breeze with the fan.

Source: *The Playful Parent*

ICE CUBE MELT RACE

MATERIALS:

Ice cubes, small plates

INSTRUCTIONS:

1. Give each youth an ice cube on a plate.
2. Youth should try to melt the ice cube as fast as they can by using their body heat or by blowing on it. NOTE: Do not allow youth to use any other source of heat.

WINTER STORM/COLD SNAP ACTIVITIES

A cold snap is when it gets very cold for many days. A winter storm brings lots of snow, wind, and sometimes ice.

Show pictures of snowy landscapes and people wearing warm clothes.

Explain how the temperature drops during winter and how storms form.

What does it feel like when it's really cold outside?

ICE MELT

Freeze small toys or objects in ice cubes. Have youth explore different ways to melt the ice (e.g., using warm water, salt, or their hands). Discuss how different weather conditions can cause ice to melt.

BUILD A SNOW FORT (INDOOR VERSION)

MATERIALS:

Blankets, pillows, cardboard boxes.

INSTRUCTIONS:

1. Let youth work together to build a cozy fort.
2. Discuss how forts can provide shelter during a storm.

WARM CLOTHING RELAY

MATERIALS:

Oversized winter clothing items (hats, scarves, mittens, jackets).

INSTRUCTIONS:

1. Divide youth into teams.
2. Have youth race to put on all the clothing items and run to a designated point and back.

SNOWSTORM IN A JAR

Materials:

Clear jar (like a Mason jar), baby oil, water, white acrylic paint, Alka Seltzer tablet

Instructions:

1. Fill ¾ of the clear jar with baby oil or vegetable oil. Vegetable oil works, but the experiment will be yellow instead of transparent. You can also add drops of blue food colouring to make the oil the colour of the sky. It must be oil-based

   food colouring to mix.
2. Mix ¼ jar of water and a small squirt of white paint in a small bowl.
3. Pour the white water into the jar.
4. Break up an Alka-Seltzer tablet into small pieces and then drop them into the jar.
5. Watch and enjoy!

Watch the video!

Source: *Taming Little Monsters*

FAKE SNOW

Materials:

Baking soda, white (coloured) hair conditioner, large bowl, wooden spoon.

Instructions:

1. Mix 2 ½ cups of baking soda with ½ cup white hair conditioner in a large bowl.
2. Stir mixture in a large bowl with a wooden spoon until the ingredients are well mixed.
3. Enjoy sensory play activity!

Source: *The Purposeful Nest*

RAINSTORMS, ATMOSPHERIC RIVERS, AND FLOODING ACTIVITIES

- **Heavy rainfall** is when a lot of rain falls in a short time
- An **atmospheric river** is like a river in the sky that brings a lot of rain.
- **Flooding** happens when there's too much water and it covers the land.
- **Coastal flooding** happens when the ocean water comes onto the land.

Show pictures of rainstorms and flooded areas (see resources).

RAIN CLOUD IN A JAR

Materials:

Clear glass jar, water, food colouring, shaving cream foam, dropper, small bowl.

Instructions:

1. Mix a few drops of food colouring in a small bowl with a small amount of water.
2. Fill the clear glass jar about ¾ full of water.
3. Add shaving cream on top of the water to make a fluffy cloud.
4. Use the dropper to suck up some of the coloured water and squirt it on top of the shaving cream cloud.
5. Wait a few seconds to see if the "rain"

makes its way through the shaving cream into the water underneath.

6. If not, add more coloured water until the cloud is too heavy to hold the "rain."
7. Watch as the coloured water seeps down into the water in the jar!

The Science Explanation: Clouds are formed when water evaporates into the air. The water vapour condenses onto tiny particles of dust and becomes the clouds we see in the sky. More and more water vapour gathers in the cloud until the clouds are so full and heavy that they can't hold any more water. At that time, gravity pulls the water down to the ground as rain.

Source: *Mombrite*

BUILD A FLOOD BARRIER

Materials:

Plastic containers, sand, rocks, water, various absorbent Materials:(e.g., cotton balls, sponges, paper towels, etc.), towels, paper, tape, glue, play dough, dish pan.

Instructions:

1. Have youth make a small paper house from the paper. They can also create animals or people to go inside the house.
2. Provide different options to create a barrier to protect their house from flood waters. This could include cotton balls, packing peanuts, sponges, paper towels, etc.
3. Put the house with the people inside in the middle of the dish pan. Build the flood barrier around it.
4. Add water to the dish pan and see if the barrier protects the house and people!

WATER ABSORPTION EXPERIMENT

Materials:

Sponges, paper towels, cotton balls, different soil types, water.

Instructions:

1. Test various Materials:to observe how they absorb water. Which material absorbs the most water? Discuss how different surfaces react to heavy rain.

MAKE A RAIN GAUGE

Materials:

Clear plastic bottles, rulers, permanent markers, pebbles or marbles, scissors or an X-Acto knife, tape.

Instructions:

1. Create simple rain gauges to measure rainfall. Discuss how scientists track rainfall.
2. Use scissors or an X-Acto knife to carefully cut the top off the empty plastic bottle. Cut about 2 inches down from the top.

3. Whether you are using water bottles or soda bottles, the bottom is probably not flat. Filling up the bottom part of the bottle with pebbles or marbles will help even it out. The weight of the pebbles will also keep the DIY rain gauge upright when there are strong winds.
4. Turn the top of the bottle upside down so that when you put it over the bottle opening, the top points downward. It will act as a funnel for the rain.
5. Use tape to secure the top of the bottle to the bottle. Do this step even if the funnel fits snugly in the bottle because it might still fall off if the rain gauge tips.
6. Set the bottle on a flat surface. Mark the "0" line, which should be slightly above the top of the pebbles. Place the ruler against the bottle and line up the "0" line to the 0 cm or 0 in mark on the ruler. Draw a vertical line. Use the permanent marker to mark off every centimetre until you reach the top of the bottle.
7. Pour some water into the bottle until the water reaches the 0 mark.
8. Go outside and put the DIY rain gauge in an open area. You want to ensure there are no overhead obstructions, such as the roof, that would block the rainfall.
9. After the rain stops, check the rain gauge to see how much rain has fallen!

Source: *Mombrite*

TORNADOES, HURRICANES, AND TYPHOONS ACTIVITIES

A tornado is a spinning air column coming down from a storm cloud. It looks like a funnel.

Imagine a big thunderstorm. Sometimes, the wind inside the storm starts spinning really fast, like when you stir water in a cup with a spoon. If that spinning wind reaches down from the clouds to the ground, it

becomes a tornado! Tornadoes are big, twisty air tunnels that can move things around really fast. They don't happen all the time, but when they do, people stay safe by going inside and away from windows. Show pictures and videos of tornadoes.

Hurricanes and typhoons (and cyclones) are different names for the same kind of big storm. Each name is used in a different part of the world. They form over the ocean, have strong winds and lots of rain.

A tornado is a small, spinning column of air that forms under a thunderstorm and touches the ground. They can move very fast and last less than an hour, often just a few minutes. A hurricane is a huge storm that forms over warm ocean water and can last for days. Tornadoes are like fast, spinning tops, and hurricanes are like a giant swirling pancake in the sky.

- Big storms can cause large waves and flooding.
- Show pictures and videos of hurricanes, typhoons, and storm damage. (see resources)

TORNADO IN A BOTTLE

Materials:

2 clear plastic bottles (such as a 1 or 2-litre pop bottle), water, dish soap, duct tape, food colouring (optional), pitcher for mixing.

Instructions:

1. Pour water into the pitcher.
2. Add food colouring to the water.
3. Mix the food colouring and water together.
4. Use the pitcher and begin filling the bottle by pouring the coloured water into it.

5. Fill the bottle with water until it is about ¾ full.
6. Align an empty bottle directly on top of the filled bottle.. Use the duct tape to secure the 2 plastic bottles together. To create the tornado, turn the bottles full of water over and swirl the water clockwise. Then, a tornado funnel shape will form as the water moves from the top bottle to the lower bottle.

Source: *One Crazy Mom*

JELLYFISH WIND SOCK

Materials:

Paper or plastic cups, streamers or ribbons, string, fabric strips, glue, scissors, stapler

Instructions:

1. Decorate cups and attach streamers to create a jellyfish wind sock. Poke holes in the cup to attach ribbon, streamers, or string. Discuss how wind socks show wind direction.

WAVE IN A BOTTLE

Materials:

Clear plastic bottles, water, blue food colouring, vegetable oil, small items (e.g., sequins, pom poms, tiny toy fish, etc.)

Instructions:

1. Fill a bottle ⅔ full with water and a few drops of blue food colouring.
2. Add vegetable oil.
3. Add the small objects if desired.
4. Seal the bottle and tilt it to create waves.

DROUGHT ACTIVITIES

What happens when there's not enough rain?

Imagine if you forgot to water a plant for a long time—its leaves would start to droop, turn brown, and maybe even die. A drought is when there isn't enough rain for a long time, and it makes the ground really dry.

Without water, plants can't grow well. Some might stop making food, and others might even die. That means there's less food for animals and people.

- Show pictures of dry landscapes and cracked Earth. (see resources)
- Explain how plants, animals, and people need water to live.
- Discuss how droughts can affect plants, animals, and people.
- Talk about ways to save water as a group.

PLANT A DROUGHT-TOLERANT SEED

Materials:

Small pots, soil, drought-tolerant seeds (like sunflowers or herbs), and watering cans.

Instructions:

1. Plant seeds and discuss how some plants need less water than others.

Plant Recommendations: Hens and Chicks (Sempervivum), Echeveria, Sedum (Stonecrop), Rosemary, Thyme, Lavender, Zinnias, Lantana, Geraniums.

By planting these drought-resistant plants, youth can learn about the importance of conserving water and enjoy the beauty of nature, even in dry conditions.

Drought-resistant plants have evolved a variety of fascinating adaptations that allow them to survive in environments with limited water. Here's a breakdown of the various adaptations:

Water Conservation Strategies:

- Reduced Water Loss:

- **Thick, Waxy Cuticles**: Many drought-resistant plants have thick, waxy coatings on their leaves and stems. This cuticle acts as a barrier, preventing water from evaporating.
- **Small or Reduced Leaves**: Smaller or even reduced leaves (like in cacti) minimize the surface area from which water can evaporate.
- **Hairy Leaves**: Fine hairs on leaves create a micro-climate that traps

moisture and reduces airflow, thus reducing water loss.

- **Sunken Stomata**: Stomata (tiny pores on leaves) are often sunken or hidden, which helps to trap moist air and reduce evaporation.
- **Water Storage**:
  - **Succulent Tissues**: Succulents have specialized tissues that store water in their leaves, stems, or roots. This allows them to survive long periods without water.
  - **Tuberous Roots**: Some plants have enlarged roots or tubers that store water underground.
- **Specialized Metabolism:**
  - **CAM Photosynthesis**: Some succulents use Crassulacean Acid Metabolism (CAM), a specialized form of photosynthesis. CAM plants open their stomata at night to allow carbon dioxide to enter the leaf, reducing water loss during the hot daytime.
- **Root System Adaptations**:
  - **Deep Root Systems**: Many drought-resistant plants have deep root systems that can reach water sources far below the surface.
  - **Extensive Root Systems**: Some plants have wide-spreading root systems that maximize water absorption from a large area.
- **Drought Avoidance**: Some plants don't so much "tolerate" drought as they "avoid" it.
  - **Ephemeral Plants**: These plants complete their life cycle quickly, during brief periods of rainfall, and then die, leaving behind seeds that can survive until the next rainy season.
  - **Deciduousness:** Some plants drop their leaves during dry periods to reduce water loss.

Drought-resistant plants have evolved various

strategies to minimize water loss, store water efficiently, and maximize water uptake, allowing them to thrive in arid conditions.

MAKE A WATER CYCLE MODEL:

Materials:

Sealable clear plastic bag, permanent marker, water, blue food colouring, tape or painter's tape.

Instructions:

1. Start by drawing a basic water cycle on your bag. Depending on youth's age, it may be simple with just a sun and a cloud or more complex with a mountain and runoff water.
2. Add ¼ cup of water (or more, depending on the size of your bag) to your bag. Add a couple drops of blue food colouring to allow youth to easily observe the water collection at the bottom. It also helps with seeing the evaporated water droplets that gather at the top. Seal the top of the bag.
3. Use tape to attach the bag to a sunny window where the water cycle can start, and youth can easily observe what is happening.
4. You have made a simplified version of Earth's vital water cycle that sustains all life. Earth's water supply is constant and therefore considered to be a closed loop. The Sun's energy heats water in oceans, rivers, and lakes, turning liquid water into invisible water vapour that rises into the atmosphere. This vapour gathers, forming clouds. In your bag, the blue water at the bottom mimicked this water cycle process. As water warmed, it evaporated and rose, just like in nature. Then, as the water vapour cooled at the top of the bag, it condensed back into liquid droplets, similar to how clouds form. Eventually, these droplets became too heavy, and like rain, they fell back down.

Source: *123 Home School Me*

THUNDERSTORM ACTIVITIES

What do you hear and see during a thunderstorm?

On a hot, sunny day the air near the ground gets really warm, warm air rises up, just like steam rises from a hot drink. As the warm air goes up into the sky, it cools and forms clouds.

If there's a lot of warm, wet air, the clouds keep growing bigger and darker. Inside the clouds, tiny drops of water and ice bump into each other, making electricity—like when you rub your socks on the carpet and get

a little shock! When the electricity gets too strong, BOOM! It flashes as lightning and makes a loud thunder sound.

- Show pictures and videos of thunderstorms. (see resources for pictures)
  - *Why Does Thunder Rumble* (video)
  - *Thunder and Lightening* (video)
- Explain the 30/30 rule. If you see lightning and hear thunder less than 30 seconds later, go inside and stay inside for 30 minutes after the last thunder you hear.
- Discuss how to find safe shelter during a thunderstorm.

INDOOR LIGHTNING SAFETY

Instructions:

1. Practice going to a safe indoor location, away from windows and electrical appliances.
2. Discuss why staying away from water and electronics during a storm is important.
   - Avoid water. It's a great conductor of electricity, so do not shower, wash your hands, wash dishes or do laundry during a lightning storm.
   - Do not use a corded telephone. Lightning may strike exterior phone lines.
   - Do not use electric equipment like computers and appliances during a storm.
   - Stay away from windows and doors, and stay off porches.

DEMONSTRATE A THUNDERSTORM

Materials:

Water, ice cube tray, blue food colouring, red food colouring, clear plastic shoe box.

Instructions:

1. Before the demonstration, freeze some water with blue food colouring in your ice cube tray.

2. Once the cubes are frozen, fill a plastic shoe box half full with lukewarm water. NOTE: Remember the lukewarm part, or you will end up with purple water.
3. Have youth add 3 to 4 drops of red food colouring on one side of the shoe box. Then, let them add two ice cubes to the opposite side.
4. The water-soluble food colouring disperses into the surrounding water while the ice slowly melts, sending icy blue water into the container and chilling it.
5. As the blue and red water meet, you can observe the colder, blue water forcing the warmer red water up. Where the two coloured waters are meeting, and the blue is pushing the red up, is the air that results in a thunderstorm!
6. This happens with thunderstorms, too. Rain cools the warm air mass and decreases the moisture in the atmosphere, allowing the air to stabilize again.

Source: *Life with Moore Babies*

WILDFIRE ACTIVITIES

What are some ways that people can prevent wildfires?

Wildfires are large fires that burn in forests and other natural areas. They can be caused by lightning or by people.

- Show pictures and videos of wildfires and their effects. (see resources for pictures)
  - *Let's Understand Wildfires* (CBC Youth)
- Explain how dry conditions and strong winds can make fires spread quickly. Many factors contribute to how a wildfire will spread and how intense the fire will be. They include:
  - **Weather** - The weather impacts how a fire will spread. Fires are more likely to start and spread during droughts when the grass and plants are dry. A strong wind can help a fire spread and move quickly. The temperature and humidity also impact how well the fire will spread.
  - **Fuel** - Fires need fuel to burn. The fuel type will impact how quickly the fire will spread and how intense it will be. In a forest, there can be plenty of fuel, including trees, leaves, needles, shrubs, and grasses growing beneath the trees.
  - **Topography** - The topography is the shape and features of the land where the fire is burning. Fire tends to move faster uphill. Fires may spread quickly up steep slopes on mountains and hills.
- Emphasize the importance of staying away from fires and reporting them to an adult.
- Keep your house safe from fires by giving it a big, clear space so fire can't get too close. Here's how you can help:
  - **Keep the ground clean** – Make sure there are no dry leaves, sticks, or dead plants close to your house. These can catch fire easily!
  - **Trim trees and bushes** – If trees have branches close to your house or touching each other, they can help fire spread. Cutting some branches makes it harder for fire to move.
  - **Move flammable stuff away** – Things like firewood, dry grass, and even some decorations can burn. Keep them far from the house.
  - **Make space** – If a fire comes, it won't have anything to burn near your home, so it will be harder for it to spread..
- Discuss the importance of respecting nature and preventing fires.

Resources:

- *Firesmart activities*

FIRE SAFETY ROLE-PLAY

Instructions:

1. Act out fire safety scenarios, such as what to do if you see a fire or how to evacuate a building.
2. Discuss the importance of having a family escape plan.

BUILD A FIRE BREAK

Firebreak - One of the best ways to stop a fire is to get rid of the fuel (trees, grass, etc.) that helps it to burn. Firefighters often remove the fuel in a long line ahead of the fire. This line is called a firebreak. When the fire reaches the firebreak, it runs out of fuel and stops spreading.

Materials:

Sand, small rocks, sticks.

Instructions:

1. Create a mini firebreak using sand and rocks to show how it can stop a fire from spreading.

AIR QUALITY ACTIVITIES

Air is all around us, even though we can't see it! Sometimes, the air is clean and fresh, which makes it easy to breathe and helps plants, animals, and people stay healthy. But sometimes, the air gets dirty because of things like smoke, car fumes, and dust. That's called air pollution.

If the air is really dirty, it can make it harder to breathe and can even make people sick. That's why we try to keep the air clean by planting trees, turning off car engines when we don't need them, and not burning too much stuff outside.

Good air means we can run, play, and feel great, but bad air can make us cough or feel tired. So, taking care of our air is important!

BUBBLE CHASE

Materials:

Bubble wands, bubble solution

Instructions:

Blow bubbles outside on different days (windy, still, smoky, rainy) and see how they move. Talk about how air carries things like smoke and pollution.

LEAF DUST TEST

Instructions:

Wipe a leaf from a busy street with a white tissue and compare it to a leaf from a quiet park. See which one has more dirt to show how air carries pollution.

LUNG POWER CHALLENGE

Materials:

Cotton balls, straws

Instructions:

Have youth blow through a straw at a cotton ball to see how far they can move it. Explain how we breathe in air, and if it's dirty, it can make breathing harder.

WEATHER PREPAREDNESS ACTIVITIES

WEATHER SAFETY KIT

Have youth help plan a weather safety kit with essential items like a flashlight, water, and snacks. Discuss why it's important to be prepared for extreme weather events.

WEATHER EMERGENCY PLAN

See resources section to a family emergency plan template.

This activity will help youth prepare for extreme weather events. Have them work together to create a weather safety plan for their homes and families. This plan should include things like evacuation routes, emergency contacts, and what to do in case of a power outage.

Order the *Master of Disaster: Youth Emergency Preparedness kits* from the BC government.

GENERAL WEATHER ACTIVITIES

EXTREME WEATHER CHARADES

This is a fun way to get youth thinking about different types of extreme weather. Write down various kinds of extreme weather on slips of paper and have youth act them out. The other youth can guess what kind of weather they are acting out.

EXTREME WEATHER TRIVIA OR JEOPARDY

This is a great way to test youth's knowledge about extreme weather. Prepare a list of trivia questions about different types of extreme weather, and have youth answer them. Youth with the most correct answers wins!

Online Jeopardy

WEATHER FORECASTING

Have youth create their own weather forecasts, using weather maps and data. They can present their forecasts to the entire unit.

Instructions:

1. Have youth watch the weather forecast online at *Environment and Climate Change Canada* for one week.
2. Use the *weather watcher worksheet* to record the forecast and the following day's actual weather. Note whether the forecast was accurate.
3. Have youth create their own weather reporting skit for the group. Their report should include today's weather, record highs and lows, outlook for the evening, air quality report, tomorrow's forecast, and their five-day prediction.

HEAT EVENT ACTIVITIES

A heat event happens when warm air is trapped under high pressure, preventing hot air from escaping, causing temperatures to rise significantly.

RAINBOW FAN ORIGAMI

Materials:

Paper (15cm x 15cm), markers in rainbow colours, popsicle sticks, glue.

Instructions:

1. Cut paper to 15cm x 15 cm.
2. Create rainbow stripes along two opposite sides with the colours mirrored (e.g., start with violet at the outside edge on both sides and end with red on the inside on both sides). Remember the colours of the rainbow are: ROYGBIV (red, orange, yellow, green, blue, indigo and violet)
3. Fold in half – rainbows together.
4. Fold in half the opposite way.

5. Accordion fold (about .5-1.0 cm wide with the rainbows on the outside edges (not top and bottom).
6. Flip over and fold the fan fold marks in the opposite direction.
7. When fully folded, fold in half and glue the two edges together.
8. Make another one and glue it to the first one.
9. Glue a popsicle stick to each free edge.
10. Decorate the centre with a cloud image if desired.

Source: *Snappy Art*

HEAT EVENT IN A JAR

Materials:

Clear container (glass or plastic), heat source (e.g., lamp with incandescent bulb - not LED), thermometer (optional but recommended), balloons (optional), small pieces of paper (to stimulate air movement), stopwatch or timer (optional)

Instructions:

1. **Set Up Your Experiment**
   - Place the bowl upside-down on a flat surface (table or desk).
   - If you have a thermometer, place it under the bowl.
   - If you're using pieces of paper, place a few small pieces inside the bowl (these represent air particles).
2. **Explain the Setup**
   - Tell youth that the bowl represents the high-pressure system that traps air. The air inside the bowl is the atmosphere over an area.
3. **Simulate the heat event**
   - Shine a desk lamp or heat lamp directly onto the upside-down bowl.
   - If you're using sunlight, place the setup in direct sunlight.
   - Wait for a few minutes (around 3-5 minutes).
4. **During this waiting period:**
   - Explain that the heat lamp or lamp represents the Sun's heat warming the Earth's surface, and normally warm air rises and escapes. But the bowl (high pressure) traps this warm air.
5. **Observe**
   - After a few minutes, carefully lift the bowl slightly.
   - Let youth feel the air trapped under the bowl. They should notice it's warmer than the air outside.
   - If you placed a thermometer, check the temperature before and after heating. (They will see a temperature increase.)
   - Explain that the bowl acts just like a high-pressure system, keeping hot air trapped and raising temperatures.
6. **Optional balloon demonstration:**
   Inflate a balloon lightly and place it under the bowl before heating.
   - Heat the bowl again for a few minutes.
   - The balloon might expand slightly, showing how trapped hot air expands, creating pressure and increasing temperature.

The science:

- A heat event is like a giant invisible bowl in the sky made by high pressure.
- The sun heats the air and ground, and the warm air usually rises and cools off.
- But when there's a heat event, the warm air can't escape—it's trapped by the high-

pressure “bowl.”
- As the air stays trapped, it gets hotter and hotter, leading to very hot days and heatwaves.

BEAT THE HEAT CHALLENGE

Organize a challenge where youth learn and practice strategies for staying cool during a heatwave.

What happens when you get too hot?

Have you ever felt really tired, dizzy, or thirsty after playing in the sun?

Have you ever felt sick or had a headache when it was very hot?

Heat exhaustion happens when your body gets too hot and tired.

Heat stroke is even more serious. It happens when your body can’t cool down, and it needs help right away.

Identifying signs of heat exhaustion and heatstroke.

Heat Exhaustion Signs (Moderate):

☑ Feeling dizzy or tired
☑ Sweating a lot
☑ Skin feels cool but clammy (sticky)
☑ Feeling sick (nausea), stomachache, or headache
☑ Feeling very thirsty
☑ Muscle cramps (legs, arms, stomach)

These signs tell us our body needs to cool down and rest.

Heat Stroke Signs (Serious!):

☑ Not sweating, even if you’re very hot
☑ Skin that feels hot, dry, or red
☑ Feeling confused, dizzy, or acting strangely
☑ Bad headache, feeling sick, or throwing up
☑ Breathing fast, racing heartbeat
☑ Feeling faint or passing out (falling down)

These signs mean someone needs help right away from an adult. This can be an emergency!

What can you do if someone shows these signs?

For Heat Exhaustion:

☑ Tell an adult right away.
☑ Move to a cool, shaded area.
☑ Drink water or sports drinks (little sips, not all at once).
☑ Rest and cool down.

For Heat Stroke:

☑ Tell an adult immediately—this is very serious!
☑ Move the person to a cool place or shade quickly.
☑ Help cool the person down: apply cold water, wet towels, or ice packs to their head, neck, and wrists.
☑ Fan them to cool them down.
☑ Call 911 or get medical help immediately.

What are some ways we can help people to cool down?

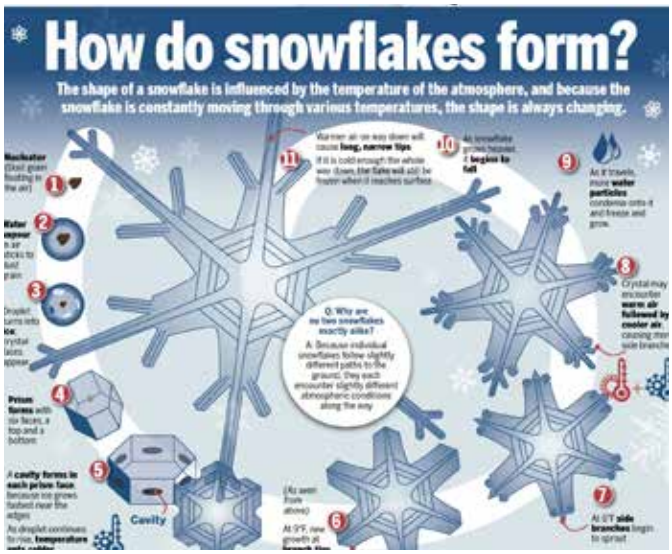
CREATING A COOLING KIT

Have youth create a list of items that would be helpful during a heatwave. This could include items like:

- Water bottles
- Sunscreen
- A spray bottle
- A wide-brimmed hat

- Wet bandanas or cooling neck ties (filled with water beads)
- Fan (USB or handmade fan)

WINTER STORM/COLD SNAP



ACTIVITIES

SNOWFLAKE SCIENCE

Image source: *Wildcard Weather*

- Explore the science of snowflake formation. Have youth create their own snowflake designs or use microscopes (if available) to observe real snowflakes.
  - The shape formed when water freezes comes from the structure of the molecules.
  - Water molecules form a hexagon when they freeze.
  - The corners collect more molecules because they stick out.
  - If the humidity is high enough and the temperature isn't too cold, molecules build up on the corners.
  - The hexagon grows arms.
  - The arms collect more molecules on the corners and grow more arms.
  - As the frozen snow crystals fall, they stick together and make snowflakes.
  - The snow crystals pass through different humidity and temperature levels in the atmosphere as they fall.
  - Each snow crystal takes a slightly different path. Each path yields a different combination of shapes formed on the snow crystal's arms.
  - The shapes of snowflakes are determined by the temperature and humidity. For arms to form, the humidity must be high.
- Discuss the different types of snowflakes and how they form.
- *Where do snowflakes come from?* (video)
- *How snowflakes form* (video)
- *The science of snowflakes* (video)

COLD AIR DENSITY EXPERIMENT

Materials:

Water, two bowls, empty plastic bottle, ice cubes, spoon, balloon, red food colouring (optional), blue food colour (optional).

Instructions:

1. Prepare the water bowls:
   - Fill one bowl with hot water from the tap.
   - Fill the second bowl with cold water and add ice cubes to chill it.
2. Optional: Add red food colouring to the warm water and blue to the cold water to help youth visualize the two temperatures.
3. Place the balloon on the bottle opening. Stretch the balloon over the top.
4. Submerge the bottle in the bowl of hot water and observe as the balloon inflates!
5. After a few minutes, transfer the bottle to the cold water bowl and watch the balloon

slowly deflate.

6. Repeat as needed. Encourage youth to try the experiment multiple times to see consistent results and record their observations.

Relate this to how cold air masses affect weather patterns.

- **Cold air masses**, denser than warm air, push under and lift warmer air, causing weather changes like sudden temperature drops, strong winds, and precipitation, including thunderstorms.
- When a **cold air mass** encounters a warm air mass, the denser cold air slides underneath the warmer air, forcing it upwards.
- **Cold Fronts**: The boundary where a cold air mass displaces a warm air mass is called a cold front.
- **Air masses** can travel and change their characteristics as they move over different terrains and interact with other air masses.
  - A cold front moving in from can bring a sudden drop in temperature and potentially heavy precipitation.

Resources:

- *Air masses and fronts – earth science for youth!* (video)

WEATHER MAP ANALYSIS

Teach youth how to read weather maps and identify cold fronts, low-pressure systems, and areas of potential snowfall.

Use online weather resources to track real-time winter storms.

Resources:

- *Meteorologist Ryan Davidson Explains Weather Map* (video)
- See weather station symbols resource and weather map example in Resources at the end of this document.

FIRST AID FOR COLD INJURIES

Provide hands-on training in first aid for hypothermia and frostbite.

Symptoms for hypothermia:

☑ Shivering
☑ Cold, pale, or blue-grey skin
☑ Slurred speech
☑ Slow/shallow breathing
☑ Weak pulse
☑ Lack of coordination
☑ Fatigue and drowsiness
☑ Confusion and memory loss
☑ Loss of consciousness

Treatment for hypothermia:

☑ Call 9-1-1 or local emergency number
☑ Move to a warm place
☑ Remove wet clothing
☑ Dry the person with a towel or other dry material
☑ Provide warmth by wrapping them in dry blankets or clothing
☑ Offer warm liquids if the person can swallow
☑ Monitor breathing and circulation
☑ Provide care until help arrives.

Symptoms for frostbite:

☑ Numbness in the affected area
☑ Skin changes - skin appeard pale, white, or waxy
☑ Loss of feeling
☑ Blisters, signs of hypothermia, tissue loss in severe cases

Treatment for frostbite:

☑ Call 9-1-1 or local emergency number if the frostbite is severe or the person has signs of hypothermia
☑ Move to a warm place
☑ Do not rub the affected area
☑ Rewarm gently

Have youth practice recognizing symptoms and providing appropriate care.

Resources:

How hypothermia kills (video)

HAND WARMERS

Materials:

1 pair of 100% cotton socks, uncooked beans or rice, twine or needle and thread, optional cotton fabric scraps for decorating, scissors, essential oil (optional)

Instructions:

- **Prepare the sock:** Ensure the sock is clean and free of any synthetic materials.
- **Fill the sock**: Slowly pour uncooked beans or rice into the sock, leaving a small amount of space at the top.
- **Secure the opening**: Tie the top of the sock tightly with a knot or sew it shut.
- **Optional**: Add a cozy cover: If desired, create a cover by sewing two fabric scraps together, leaving a small opening to insert the bean-filled sock.
- **Heat in the microwave**: Place the bean-filled sock (or the covered version) in the microwave and heat for 1-2 minutes.
- **Test the temperature**: Before applying to your hands, test the temperature by touching the inside of your arm.
- **Use as a hand warmer**: Place the heated sock in your coat pocket or hold it in your hands to stay warm.

Tips:

- **Rice vs. Beans**: Both rice and beans work well as a filler, but rice tends to heat up more evenly.
- **Microwave time**: Adjust the microwave time based on your microwave's power and the desired temperature.
- **Safety**: Always supervise the heating process and handle the hot sock with care.
- **Reheating**: These hand warmers can be reheated multiple times as needed.

SNOWBALL RELAY RACE

Teams compete in a relay race to carry "snowballs" from one side of the playing area to another using spoons or mittens. The first team to move all their snowballs to the finish

line wins!

Materials:

Snowballs: white ping-pong balls, cotton balls, foam balls, or crumpled white paper, spoons, buckets or bins (two per team), cones or markers: (optional, to mark start/finish lines)

How to Play:

1. **Set Up**
   - Clearly mark a start line and finish line about 6-8 metres apart.
   - Divide youth evenly into teams (4-6 per team is ideal).
   - Place one bucket filled with the same number of "snowballs" at the start line for each team (8-12 snowballs per team).
   - Put an empty bucket at each team's finish line.
2. **Explain the Rules**
   - Players must move one snowball at a time from the start bucket to the finish bucket using only the spoon or mittens.
   - Players cannot hold snowballs with their hands; they must balance them on spoons or carry them carefully with mittens.
   - If a snowball is dropped, the player must stop, pick it up (using the spoon or mitten only) and keep going.
   - Once a player successfully places the snowball in the finish bucket, they run back and hand the spoon or mittens to the next teammate.
   - Continue until all snowballs have been moved from start to finish.
3. **Start the Relay**
   - At "Go!," the first player from each team grabs a snowball and races to their finish bucket.
   - After placing their snowball, they run back quickly to their team to hand off the spoon or mittens.
4. **Finish**
   - The first team to successfully transfer all snowballs wins!

Variations:

- **Obstacle Relay:**
  Place obstacles or cones that players must navigate around.
- **Snowball Rescue:**
  Add a story or scenario (e.g., "Rescue the snowballs from melting!") for extra fun.
- **Timed Challenge:**
  Instead of competing simultaneously, each team races against the clock. Fastest time wins.

MINI BLIZZARD

Materials:

Clear jar (like a Mason jar), baby oil, water, white paint, Alka Seltzer tablet

Instructions:

1. Fill ¾ of the jar with baby oil or vegetable oil. Vegetable oil works, but the experiment will be yellow instead of transparent. You can also add drops of blue food colouring to make the oil the colour of the sky. It must be oil-based food colouring to mix.
2. Mix ¼ jar of water and a small squirt of white paint in a small bowl.
3. Pour the white water into the jar.
4. Break up an Alka-Seltzer tablet into small pieces and then drop them into the jar.
5. Watch and enjoy!

Watch the video!

Source: *Taming Little Monsters*

RAINSTORMS, ATMOSPHERIC RIVERS, AND FLOODING ACTIVITIES

WATER CYCLE IN ACTION

MATERIALS:

Sealable clear plastic bag, permanent marker, water, blue food colouring, tape or painter's tape.

INSTRUCTIONS:

1. Start by drawing a basic water cycle on your bag. Depending on youth's age, it may be simple with just a sun and a cloud or more complex with a mountain and runoff water.
2. Add ¼ cup of water (or more, depending on the size of your bag) to your bag. Add a couple drops of blue food colouring to allow youth to easily observe the water collection at the bottom. It also helps with seeing the evaporated water droplets that gather at the top. Seal the top of the bag.
3. Use tape to attach the bag to a sunny window where the water cycle can start, and youth can easily observe what is happening.
4. You have made a simplified version of Earth's vital water cycle that sustains all life. Earth's water supply is constant and therefore considered to be a closed loop. The Sun's energy heats water in oceans, rivers, and lakes, turning liquid water into invisible water vapour that rises into the atmosphere. This vapour gathers, forming clouds. In your bag, the blue water at the bottom mimicked this water cycle process. As water warmed, it evaporated and rose, just like in nature. Then, as the water vapour cooled at the top of the bag, it condensed back into liquid droplets, similar to how clouds form. Eventually, these droplets became too heavy, and like rain, they fell back down.

Activity source: *123 Home School Me*

Image source*: Rookie Parenting*

BUILDING A RAIN GAUGE

MATERIALS:

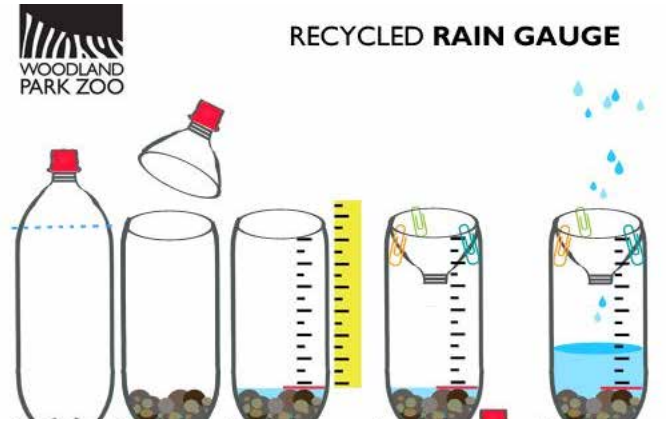
Clear plastic bottles, rulers, permanent markers, pebbles or marbles, scissors or an X-Acto knife, tape.

INSTRUCTIONS:

1. Create simple rain gauges to measure rainfall. Discuss how scientists track rainfall.
2. Use scissors or an X-Acto knife to carefully cut the top off the empty plastic bottle.

Cut about 2 inches down from the top.

3. Whether you are using water bottles or soda bottles, the bottom is probably not flat. Filling up the bottom part of the bottle with pebbles or marbles will help even it out. The weight of the pebbles will also keep the DIY rain gauge upright when there are strong winds.
4. Turn the top of the bottle upside down so that when you put it over the bottle opening, the top points downward. It will act as a funnel for the rain.



5. Use tape to secure the top of the bottle to the bottle. Do this step even if the funnel fits snugly in the bottle because it might still fall off if the rain gauge tips.
6. Set the bottle on a flat surface. Mark the "0" line, which should be slightly above the top of the pebbles. Place the ruler against the bottle and line up the "0" line to the 0 cm or 0 in mark on the ruler. Draw a vertical line. Use the permanent marker to mark off every centimetre until you reach the top of the bottle.
7. Pour some water into the bottle until the water reaches the 0 mark.
8. Go outside and put the DIY rain gauge in an open area. You want to ensure there are no overhead obstructions, such as the roof, that would block the rainfall.
9. After the rain stops, check the rain gauge to see how much rain has fallen!

Source: *Mombrite*

FLOODPLAIN IN A PAN

Demonstrate how floods affect land, create floodplains, and influence human activities by using a simple model with sand, clay, and water.

Materials:

- Aluminum baking pan or large plastic tray (approximately 12"x18")
- Modelling clay or play dough (500g - 1kg per group)
- Sand (2-3 cups per group)
- Small plastic houses, trees, toy cars, or LEGO bricks (to simulate towns, farms, etc.)
- Small watering can, cup, or spray bottle (to simulate rainfall and flooding)
- Food colouring (optional, blue, to tint the water)
- Sponges or towels (for clean-up)

Instructions:

1. **Prepare the Landscape**

   Create your landforms:

   - Place a large piece of modelling clay in the middle or along one side of your pan, shaping it into hills or mountains.
   - Slope the clay so it gradually moves downward toward the opposite side of the pan.
   - Ensure the clay covers about one-third of the pan.

   Form a riverbed:

   - Use your fingers to carve out a small river channel down the slope of the

clay toward the lower part of the pan.
    - This channel represents your river flowing from mountains/hills to flat areas.
- **Add the Floodplain**
  Pour sand into the lower flat portion of the pan (opposite from the hills/mountains).
- Smooth the sand evenly across the pan, about 2cm deep. This sandy area represents your floodplain.

2. **Populate Your Floodplain**
   - Add small plastic houses, trees, cars, or LEGO bricks on the sand near the river. Explain to youth:
     - "These houses and towns are built on the floodplain. It's flat, easy to build on, and great for farming, but it might flood!"
3. **Simulate Rain and Flooding**
   - Fill your watering can or spray bottle with water. (Optionally add blue food colouring.)
   - Slowly pour or gently spray water at the top of your "mountains/hills," letting the water flow down through the clay channel (river) toward your floodplain.
   - Allow the water to spread across the sand.
4. **Observe and Discuss**

   Ask youth:

   - What happens to the sand when the water reaches it? (It spreads, gets soaked, creates small puddles, or even covers the houses.)
   - Why does flooding occur mostly in the flat areas? (Water collects easily in flat, lower areas.)
   - What happened to the homes and buildings? (They got wet, submerged, or moved around.)
5. **Modify and Experiment**

   Encourage youth to experiment:

   - Build levees or dams from modelling clay along the river to see if that helps prevent flooding.
   - Re-test by pouring more water to see how effective their structures are.

Discussion Questions:

Would you choose to live on a floodplain? Why or why not?

What are ways people protect themselves from floods?

How can we plan towns better to avoid flood damage?

FLOOD SAFETY RELAY CHALLENGE

Teach practical water safety tips for flood scenarios through active, memorable, and interactive role-play and teamwork.

Materials:

- Safety cards (prepared on index cards, see examples below)
- Traffic cones or markers (optional, to create relay lines)
- Two buckets or baskets (one labelled "Safe," one labelled "Unsafe")
- Timer or whistle
- Large, clear play area (indoors or outdoors)

Instructions:

1. **Create safety cards:**
   - Write down flood-related scenarios on index cards. Include examples of safe

and unsafe choices during floods.
- Have a mix of "Safe" and "Unsafe" actions described on each card.

Example Scenarios for Safety Cards:

- Make enough cards for each participant (or double if needed). Ideas for cards:
  - Walk through moving floodwater (unsafe)
  - Move to higher ground immediately (safe)
  - Drive through deep water to the road (unsafe)
  - Listen to flood warnings on the radio (safe)
  - Touch electrical wires in water (unsafe)
  - Stay away from rivers and streams during floods (safe)
  - Swim across flooded areas to reach friends (unsafe)
  - Stay inside your home if it's safe and dry (safe)
- Set up two buckets labelled "Safe" and "Unsafe" at the opposite end of the relay area.

2. **Explain the Game**
   - Divide youth into two even teams.
   - Line teams up at the starting line, each team in their own line.
   - At the opposite side, place the two labelled buckets.
   - Explain to youth:
     - You'll each receive a safety card. Your job is to decide quickly if your card describes a Safe or Unsafe choice during a flood.
3. **Start the Relay**
   - When the game leader blows a whistle or says "GO!," the first child in each line runs down the relay area holding their card.
   - They quickly decide if their card represents a safe or unsafe decision.
   - They drop the card into the corresponding bucket (Safe or Unsafe), then run back to tag the next teammate.
   - Continue until all cards are sorted.
4. **Review the Choices**
   - After the relay, gather all youth around and review each bucket.
   - Discuss each card briefly, asking why it was safe or unsafe.

TORNADOES, HURRICANES, AND TYPHOONS ACTIVITIES

TORNADO IN A BOTTLE

Materials:

2 clear plastic bottles (such as a 1 or 2-litre pop bottle), water, dish soap, duct tape, food colouring (optional), pitcher for mixing.

Instructions:

1. Pour water into the pitcher.
2. Add food colouring to the water.
3. Mix the food colouring and water together.
4. Use the pitcher and begin filling the bottle by pouring the coloured water into it.
5. Fill the bottle with water until it is about ¾ full.
6. Align an empty bottle directly on top of the filled bottle.. Use the duct tape to secure the 2 plastic bottles together. To create the tornado, turn the bottles full of water over and swirl the water clockwise. Then, a tornado funnel shape will form as the water moves from the top bottle to the lower bottle.

HURRICANE IN A BOWL

Show how hurricanes form and spin using simple Materials:to represent hurricane movement, spinning winds, and the storm's "eye."

Materials:

Large clear bowl or container (clear plastic or glass bowl, ideally at least 20-25 cm wide), water (enough to fill about ⅔ of your bowl), spoon or stirring stick, food colouring (preferably blue, optional but helps visualization), glitter or small bits of paper/confetti (optional, to visualize wind movement), small balloon or ping-pong ball (optional, representing the hurricane's "eye")

Instructions:

1. **Set Up the Hurricane Model**
   - Fill your clear bowl about ⅔ full with water.
   - Add a few drops of food colouring to help youth see the movement .
   - Sprinkle glitter or bits of paper into the bowl to represent clouds or wind movement.
2. **Start the Hurricane (Spin the Water)**
   - Use a spoon or stirring stick to gently and steadily stir the water in a circular motion around the inside edge of the bowl.
   - Start slowly, then speed up just a little until you have a smooth spinning motion.
   - Explain: "The circular spinning represents strong winds spinning around the centre of a hurricane."
3. **Observe the Hurricane**
   - After about 10-15 seconds of stirring, quickly remove the spoon.
   - Watch carefully as the water continues to spin on its own, forming a spiral or swirling shape.
   - Notice how glitter or paper bits (clouds/wind) move around, and a calm centre begins to form.
   - Explain: "The calm centre you're seeing is like the 'eye' of a hurricane, where winds are calmest."
4. **Add the "Eye" (Optional but Effective)**
   - Gently place a small balloon or ping-pong ball carefully into the spinning water.
   - The ball will likely move toward the centre (eye) of the spinning water, demonstrating how hurricane winds spin around a calm centre.

Discussion:

What made the water spin?

(Strong, steady winds that move in a circle.)

Why did we see a calm spot in the middle?

(This calm spot represents the hurricane's eye, where winds are much weaker.)

Why do you think hurricanes can be dangerous?

(Strong winds, flooding, heavy rains, waves.)

AIR PRESSURE EXPERIMENTS

Demonstrate how air pressure differences create wind. Explain how the low pressure in the centre of a hurricane or tornado causes the high winds.

Materials:

Balloon, water, glass Mason jar, paper, matches or lighter.

Instructions:

1. Fill the balloon with water until it becomes too large to fit inside the jar and rests on top.
2. Demonstrate how the balloon cannot pass through the opening.
3. Using the matches (or a lighter), ignite a piece of paper and drop it into the jar. Then, place the balloon on top. The balloon will tremble slightly and then be pulled into the jar. It may not be fully sucked in, but it should go about halfway.
4. Challenge youth to remove the balloon once the fire is extinguished and the jar cools down. It will require some effort to free it!
5. Youth can decorate the balloons with markers before conducting the experiment.

WATCH VS. WARNING: READY, SET, GO!

Help youth understand the difference between a weather watch (be prepared, conditions could happen) and a weather warning (take action immediately, danger is happening or very close). When there is a watch - it means the ingredients for severe weather are in place. A warning means that it will happen very soon.

Materials:

Large open play area, marked start line, marked "safe zone," whistle or bell (optional, two signs labelled: WATCH (get ready) and WARNING (take action).

Instructions:

1. **Before the game, tell youth:**

- A **WATCH** means weather conditions might become dangerous soon. ***(Example: "The sky looks dark, and there might be a storm. Be ready, but no need to run yet.")***
- A **WARNING** means dangerous weather is already happening or very close. ***(Example: "It's a storm right now! Take shelter quickly!")***

2. **Explain the Rules of the Game**

- All children stand at the start line.
- The leader holds the two signs (WATCH and WARNING), one in each hand.
- When the leader says "WATCH!" youth must freeze and get ready, but they cannot run yet.
- When the leader shouts "WARNING!" youth must immediately run quickly toward the "safe zone."
- If the leader says "WATCH" again while youth are running, everyone must freeze immediately.
- Continue alternating between "WATCH" (freeze, get ready) and "WARNING" (run quickly) until all children reach the safe zone.
- Play the Game
- Start slowly:
  - Leader says "WATCH!" (Youth freeze, ready stance).
  - Leader then shouts "WARNING!" (Youth run quickly toward the safe zone).
  - Switch unpredictably between WATCH and WARNING several times to keep the game exciting.

Discussion:

After the game, gather youth and ask:

When we heard WATCH, why didn't we run yet?

(Because it wasn't dangerous yet, but we had

to get ready.)

Why did we run quickly when we heard WARNING?

(Because danger was happening immediately, and we had to act fast.)

- Reinforce:
  - **Watch**: Be prepared and alert.
  - **Warning**: Act immediately and find safety.

DROUGHT ACTIVITIES

WATER CYCLE REVISITED

Start by reviewing the water cycle. Help youth understand that droughts limit water availability, disrupting the normal water cycle and impacting people, animals, and plants.

Materials:

- 2 large sponges, two clear bowls or containers, water, measuring cups (optional), small plastic animals, plants, or toy houses (optional, to illustrate the impact visually), food colouring (blue, optional)

Instructions:

1. **Preparation and Set-Up**

- Place two clear bowls side by side on a flat surface.
- Label one bowl “Normal Water Cycle” and the other “Drought Conditions.”
- Soak one sponge fully with water (representing normal rainfall and healthy water cycle) and put it in the “Normal” bowl.
- Slightly dampen the other sponge, leaving it mostly dry (representing drought conditions). Put it in the “Drought” bowl.

Optional: Add a few drops of blue food colouring to the water to visually represent water .

2. **Demonstrate Normal Conditions**
   Squeeze the sponge labelled “Normal Water Cycle” gently over its bowl to release water.

- Explain : “The sponge is like the ground or lakes after rainfall. It stores water, releasing it gradually for plants, animals, and people to use.”
- Youth see water flowing steadily, representing a healthy water cycle.

3. **Demonstrate Drought Conditions**
   Squeeze the sponge labelled “Drought Conditions” over its bowl.

- Only a few drops (or nothing) will come out.
- Explain: “Because there hasn’t been enough rain, the sponge (ground, rivers, lakes) has very little or no water to give. This is called a drought.”

Why is water important in the water cycle?

What happens to the water cycle during a drought?

How can droughts affect us and the environment?

Allow youth to “refill” the drought sponge slowly by adding small amounts of water, simulating rain finally returning after a drought.

SOIL MOISTURE EXPERIMENTS

Materials:

Clear plastic cups or containers (3 per group), different types of soil (sand, clay-rich - mix modelling clay with soil, regular garden or potting soil), water, measuring cups, paper towels, magnifying glasses (optional), permanent marker or labels (to label each container).

Instructions:

1. **Prepare Your Containers**

- Label your three clear cups: Sand, Clay, Potting Soil
- Fill each cup about halfway with the corresponding soil type.

2. **Add Equal Amounts of Water**

- Use measuring cups or a graduated cylinder to add exactly ½ cup (125 ml) of water to each cup.
- Pour slowly and evenly onto the soil surface.

Tip: Add a drop of blue food colouring to the water before pouring to better observe moisture.

- Ask youth to observe closely and discuss:

Which soil immediately absorbs water?

Does water pool on top or soak into the soil quickly

- Record initial observations on a simple chart or notebook.

3. **Wait and Observe (15-30 minutes)**

- Allow about 15–30 minutes for water to settle.
- During this waiting time, have a brief discussion:

Why do plants need soil to hold moisture?

What might happen to plants in sandy or clay soils?

"Touch Test"

After 15-30 minutes, have youth:

- Carefully touch the top of each soil sample with their fingers.
- Compare how wet or dry each type feels.
- Use paper towels to test moisture absorption by gently pressing on the soil surface.
- Have them record observations:
    - Which soil feels wettest or driest?
    - Which soil type would plants prefer?

Discussion:

Gather youth to discuss their results:

- Sand usually drains quickly and retains little moisture.
- Clay often absorbs water slowly but holds it longer.
- Potting or garden soil tends to balance drainage and water retention, ideal for most plants.

Ask questions to reinforce learning:

If you had a garden, which soil would you choose and why?

Why is understanding soil moisture important for farmers and gardeners?

EVAPORATION RACE

Understand how evaporation works and how conditions like sunlight, shade, and wind affect the rate at which water evaporates. This also illustrates why faster evaporation can contribute to drought conditions.

Materials:

4 shallow containers (identical size and shape, such as small bowls or saucers), measuring cup, water, permanent marker or masking tape (for labelling containers), stopwatch or timer (one per group, or use classroom clock), observation worksheet or paper and pencils for recording results, optional: small fan (for wind simulation).

Instructions:

1. **Setup**

- Label each container :
  - Sunlight
  - Shade
  - Wind
  - No Wind
- Pour an equal amount of water (e.g., ½ cup or 100 ml) into each container. Be precise.

2. **Place Containers**

- Place Container #1 (Sunlight) outside or near a sunny window.
- Place Container #2 (Shade) outside in a shaded area or indoors away from direct sunlight.
- Place Container #3 (Wind) indoors or outdoors in a windy location (use a fan indoors if no natural wind is available).
- Place Container #4 (No Wind) indoors or outdoors in a still-air location with minimal air movement.

3. **Start the Experiment**

- Record the exact start time.
- Predict which container will lose water fastest and slowest. Write these predictions down.

4. **Observations**

- Check the containers at regular intervals (e.g., every 30 minutes or every hour, depending on your time availability).
- Each time, observe carefully:
- Which container's water level is dropping fastest?
- Note any noticeable changes (e.g., warmth of water, presence of bubbles, etc.).
- Record your observations on your worksheet or notebook.

5. **Completion**

- After a set time period (suggested: 3–4 hours, depending on available time), measure and record the amount of water left in each container.

Discussion:

Which condition caused water to evaporate fastest? Why?

Which condition had the slowest evaporation? Why do you think so?

How does increased evaporation relate to drought conditions?

If the weather gets hotter or windier due to climate change, how could that affect evaporation rates and water availability?

DROUGHT DOMINO EFFECT

Help youth visually understand how drought conditions affect plants, animals, and humans through a domino-style simulation of the food chain.

Materials:

Index cards or card stock, coloured markers or crayons, tape, table or flat surface

Instructions:

1. **Prepare the food chain cards**

- Create food chain cards labelled and illustrated on index cards or card stock (see resources).
- Sun, grass/plants, insects (grasshopper), small birds, snakes, hawks/eagles, humans
- Make extra copies of plant and insect cards to create realistic layers of the chain

2. **Set up the domino food chain**

- Fold each card slightly at the bottom so

it stands upright on a table (you can use tape to secure).

- Arrange cards in a line from left to right to show the order of the food chain:
  - Sun → Plants → Insects → Birds → Snakes → Hawks → Humans.
- Note: Arrange multiple plant and insect cards to show that many plants/insects support the chain.

3. **Discuss a healthy food chain**

- Explain: "In a healthy environment, each organism in the chain gets the energy it needs."
- Briefly review how energy flows from plants (producers) up through the animals (consumers).

4. **Introduce drought scenario**

- Explain: "Now let's imagine a drought. There hasn't been rain for a long time."
- Remove the "Plants" cards, or lay them flat to show they're not healthy or available.
- Ask youth: "What do you think will happen next?"

5. **The domino effect demonstration**

- Gently knock down the plant cards. As plants fall:
  - Knock down insect cards (because they have no food).
  - Knock down bird cards (no insects to eat).
  - Continue through snakes, hawks, and finally humans, demonstrating a chain reaction.
- Explain : "This domino effect shows how drought impacts the food chain. Without plants, all life above them is affected."

Discussion:

- Engage youth with questions to reinforce understanding:

What did you notice about how the drought affected the food chain?

Which organisms were impacted first? Which ones were affected last?

How can droughts affect humans?

What can people do during droughts to help plants, animals, and themselves?

WATER CONSERVATION

Help youth understand the importance of conserving water through role-play scenarios. They'll brainstorm practical ways to reduce water use in everyday activities.

Materials:

Scenario cards (see below), paper and pencils (for brainstorming notes), props (optional for skit realism - such as watering cans, dishes, towels, etc.), timer or stopwatch, space for performing skits, whiteboard or chart paper (to record group ideas).

Scenario cards:

- **Scenario 1:** Watering the Garden
  Your family waters the garden every day, but water levels are getting low. How can you save water?
- **Scenario 2:** Taking a Shower
  You love long, hot showers, but you need to reduce your water usage. How can you save water?
- **Scenario 3**: Brushing Your Teeth
  You usually leave the tap running while brushing your teeth. How could you use less water?
- **Scenario 4**: Washing Dishes
  Your family washes dishes by hand every

night, but you're concerned about water waste. How can you save water?

- **Scenario 5**: Washing the Car
  Your family uses a garden hose running continuously to wash your car. What could you do instead to conserve water?

Instructions:

1. **Introduction (5–10 minutes)**
   - Introduce the concept of water conservation.
   - Discuss briefly why conserving water matters for communities and the environment.
   - Explain the activity clearly and form small groups (3–5 youth per group).
2. **Scenario Selection (5 minutes)**
   - Let each group select or randomly draw a scenario card.
3. **Brainstorming Solutions**
   - Each group reads their scenario and discusses ways to save water in their scenario.
   - Encourage creative thinking and practical ideas.
   - Have each group write down their solutions.
4. **Creating the Skit (10–15 minutes)**
   - Groups plan a short skit (2–3 minutes) showing:
     - The problem presented in their scenario.
     - Practical ways they would save water.
   - Encourage youth to add humour or fun elements to make skits engaging.
5. **Performances (15–20 minutes)**
   - Groups perform their skits for everyone.
   - The audience watches and takes notes on interesting solutions they see.

Discussion:

Which water-saving ideas seemed easiest to implement?

Did you learn something new from other groups?

How could you apply these water-saving ideas at home?

Write key ideas and reflections on chart paper or whiteboard.

Example solutions:

- **Garden**: Watering plants early in the morning or evening to prevent quick evaporation.
- **Shower**: Setting a timer to limit shower duration; turning off water while soaping up.
- **Teeth Brushing**: Turning off the tap while brushing teeth, using a small cup of water.
- **Dishes**: Using a basin or stopper to fill the sink once instead of continuously running water.
- **Car Washing**: Using a bucket of water instead of running the hose; washing cars less often.

PLANT A DROUGHT-TOLERANT SEED

Materials:

Small pots, soil, drought-tolerant seeds (like sunflowers or herbs), and watering cans.

Instructions:

1. Plant seeds and discuss how some plants need less water than others.

Plant Recommendations: Hens and Chicks (Sempervivum), Echeveria, Sedum (Stonecrop), Rosemary, Thyme, Lavender, Zinnias, Lantana, Geraniums.

By planting these drought-resistant plants, youth can learn about the importance of conserving water and enjoy the beauty of nature, even in dry conditions.

Drought-resistant plants have evolved a variety of fascinating adaptations that allow them to survive in environments with limited water. Here's a breakdown of the various adaptations:

Water Conservation Strategies:

- Reduced Water Loss:
  - **Thick, Waxy Cuticles**: Many drought-resistant plants have thick, waxy coatings on their leaves and stems. This cuticle acts as a barrier, preventing water from evaporating.
  - **Small or Reduced Leaves**: Smaller or even reduced leaves (like in cacti) minimize the surface area from which water can evaporate.
  - **Hairy Leaves**: Fine hairs on leaves create a micro-climate that traps moisture and reduces airflow, thus reducing water loss.
  - **Sunken Stomata**: Stomata (tiny pores on leaves) are often sunken or hidden, which helps to trap moist air and reduce evaporation.
- **Water Storage**:
  - **Succulent Tissues**: Succulents have specialized tissues that store water in their leaves, stems, or roots. This allows them to survive long periods without water.
  - **Tuberous Roots**: Some plants have enlarged roots or tubers that store water underground.
- **Specialized Metabolism:**
  - **CAM Photosynthesis**: Some succulents use Crassulacean Acid Metabolism (CAM), a specialized form of photosynthesis. CAM plants open their stomata at night to allow carbon dioxide to enter the leaf, reducing water loss during the hot daytime.
- **Root System Adaptations**:
  - **Deep Root Systems**: Many drought-resistant plants have deep root systems that can reach water sources far below the surface.
  - **Extensive Root Systems**: Some plants have wide-spreading root systems that maximize water absorption from a large area.
- **Drought Avoidance**: Some plants don't so much "tolerate" drought as they "avoid" it.
  - **Ephemeral Plants**: These plants complete their life cycle quickly, during brief periods of rainfall, and then die, leaving behind seeds that can survive until the next rainy season.
  - **Deciduousness:** Some plants drop their leaves during dry periods to reduce water loss.

Drought-resistant plants have evolved various strategies to minimize water loss, store water efficiently, and maximize water uptake, allowing them to thrive in arid conditions.

THUNDERSTORM ACTIVITIES:

RAIN CLOUD IN A JAR

Materials:

Clear glass jar, water, food colouring, foam shaving cream, dropper, small bowl.

Instructions:

1. Mix a few drops of food colouring in a

small bowl with a small amount of water.
2. Fill the clear glass jar about ¾ full of water.
3. Add shaving cream on top of the water to make a fluffy cloud.
4. Use the dropper to suck up some of the coloured water and squirt it on top of the shaving cream cloud.
5. Wait a few seconds to see if the "rain" makes its way through the shaving cream into the water underneath.
6. If not, add more coloured water until the cloud is too heavy to hold the "rain."
7. Watch as the coloured water seeps down into the water in the jar!

The Science Explanation: Clouds are formed when water evaporates into the air. The water vapour condenses onto tiny particles of dust and becomes the clouds we see in the sky. More and more water vapour gathers in the cloud until the clouds are so full and heavy that they can't hold any more water. At that time, gravity pulls the water down to the ground as rain.

Source: *Mombrite*

STATIC ELECTRICITY FUN

Help youth visualize and understand how static electricity builds up in clouds, causing lightning during a thunderstorm.

Materials:

Inflated balloons (1 per youth), wool cloth, fleece fabric, or clean hair, small pieces of paper (confetti size) or Rice Krispies cereal, aluminum pie pan (optional), metal spoon or coin (optional), darkened room (optional)

Instructions:

1. **Explain:**
- "Thunderstorms happen when clouds build up static electricity."
- "Lightning occurs when this electricity discharges or jumps between clouds or to the ground."

2. **Create Static Electricity (Charge the Balloon)**
- Give each child or group an inflated balloon.
- Have them rub the balloon vigorously on their hair, wool cloth, or fleece fabric for about 20-30 seconds.
- Explain: "Rubbing creates static electricity, similar to how clouds build static charges when ice and water particles collide inside them."

3. **Demonstrate lightening (static attraction)**
- Immediately hold the charged balloon close to the small pieces of paper or Rice Krispies.
- Youth will see the paper or cereal pieces jump or cling to the balloon.
- Explain : "The charged balloon attracts the small pieces just like lightning is attracted to other charged particles or the ground."

4. **Sparks and Static Electricity (Advanced)**
- Darken the room slightly.
- Charge the balloon again.
- Hold the charged balloon close to the metal spoon or aluminum pie pan, watching closely.
  Youth may see or hear tiny sparks jump from the balloon to the metal (very small spark or crackle).
- Explain: "This tiny spark is like lightning—a discharge of static electricity from the

cloud to the ground."

Discussion:

How does rubbing the balloon represent cloud particles moving and creating electricity?

What did you notice happening between the balloon and the paper?

How is this activity like lightning during thunderstorms?

SOUND AND LIGHT EXPERIMENT

Understand why we see lightning before hearing thunder by demonstrating that light travels faster than sound.

Materials:

Flashlight, metal pots and wooden spoons, stopwatch or timer (optional), measure tape or rule (optional), open area or spacious room, paper and pencils (for observation).

Instructions:

1. **Briefly explain thunder and lightning:**
- Lightning is a bright flash caused by electricity in clouds.
- Thunder is the sound caused by lightning heating the air rapidly, creating a loud noise.
- Ask youth:
  - "Have you ever noticed that you see lightning first, then hear thunder later?"
2. **Setup**
- Divide youth into small groups (3–4 youth each).
- Assign roles in each group:
  - **Flashlight Operator**: controls flashlight.
  - **Sound Maker**: bangs pots together or uses wooden spoon.
  - **Observers**: note the timing difference between seeing and hearing.
3. **Conducting the Experiment**
- Each group sets up:
  - Flashlight Operator stands at one end of the room or outdoor space.
  - Sound Maker stands next to the flashlight operator.
  - Observers position themselves at varying distances away (e.g., 3 meters, 6 meters, and 9 meters).
- Instructions:for demonstration:
  - The flashlight operator flashes the light (simulating lightning).
  - At the exact same moment, the sound maker bangs pots loudly (simulating thunder).
  - Observers watch and listen carefully to notice if there is a delay between seeing the flashlight and hearing the noise.
4. **Observations and Recording**
- Youth repeat this several times.
- Observers write down their observations:
  - "Did you see the flash first, or hear the sound first?"
  - "How did distance affect the delay between seeing and hearing?"
- Optional: If using a stopwatch, observers can record how many seconds pass between the flash and sound at different distances.

Discussion:

"Why did you see the flash before you heard the sound?"

Why do we see lightning before we hear thunder?

Light travels much faster than sound, so we always see lightning before hearing thunder.

How could you use this information

during a storm?

If you counted 9 seconds between lightning and thunder, roughly how far away is the storm?

THUNDERSTORM DIAGRAM

Have youth create a diagram of a thunder storm. They can label the different parts of the storm, like the anvil cloud, the updraft, and the downdraft. (see resources)

This will help them to have a visual representation of a storm.

WHEN THUNDER ROARS, GO INDOORS

Did you know lightning can be really dangerous? Every year in Canada, lightning hurts about 180 people and even causes a few deaths. But there are ways to stay safe!

Here's what you need to know:

- If you hear thunder, lightning is close enough to hurt you. That means it's time to find a safe place right away.
- Go inside a building or a car with a metal roof (not a car with a soft, fold-down top).
- If you're outside and can't get to a safe place, stay away from tall things like trees, power poles, and fences—they can attract lightning.
- Try to find a low place like a ditch to crouch down in. Stay small and make yourself a low target.

Stay smart and stay safe when the thunder rolls!

RESOURCES:

- *Lightening injures and kills every year* (video)
- *Lightening safety* (Environment and Climatre Change Canada)

"LIGHTNING PHOTOGRAPHY"

Using a darkened room and a camera (or even a phone), simulate taking photos of lightning. Use a flashlight to create "lightning" flashes and practice capturing them.

This can lead to a discussion of how lightning is formed.

WILDFIRES ACTIVITIES

THE FIRE TRIANGLE

To teach youth about the three essential elements of fire—heat, fuel, and oxygen—and how removing any one of these elements can prevent or stop fires.

MATERIALS:

Coloured card stock or construction paper (red, yellow/orange, and blue), markers or crayons, scissors, tape or glue, optional: large poster board or whiteboard to illustrate the triangle

INSTRUCTIONS:

1. **Explain the Fire Triangle**
   For any fire to start or keep burning, it needs three important ingredients, called the Fire Triangle:
   - Heat (spark, match, sunlight)
   - Fuel (wood, leaves, grass)
   - Oxygen (the air we breathe)
- Draw a large triangle on a whiteboard or poster board and label:
  - Red side: HEAT
  - Yellow/orange side: FUEL
  - Blue side: OXYGEN

2. **Create the Fire Triangle**
   - Divide youth into small groups.

- Give each group coloured card stock/ paper (red, yellow/orange, blue).
- Ask each group to:
  - Cut out a large triangle from each coloured paper.
  - Label each: “HEAT,” “FUEL,” and “OXYGEN.”
  - Tape or glue the three sides together to create their own physical Fire Triangle.

3. **Demonstrate how the triangle works**

- Once triangles are made, ask youth :

What happens if we remove one side from the triangle?

- Have youth carefully “break” their triangle by removing one side.Demonstrate:
  - Remove HEAT: Fire cools and goes out (like water putting out a campfire).
  - Remove FUEL: Fire starves because there’s nothing left to burn (like creating a firebreak).
  - Remove OXYGEN: Fire smothers, unable to breathe (like covering a candle or campfire with dirt or a lid).

4. **Wildfire scenario (role-playing game)**

Set up a quick interactive scenario:

- “Imagine we’re fighting a wildfire. How could we stop it by breaking the fire triangle?”
- Ask youth to act out solutions :
  - Removing fuel: Clear away dry plants and trees (pretend to rake leaves or cut a firebreak).
  - Removing heat: Spray water (pretend to spray a hose).
  - Removing oxygen: Cover the fire area with dirt (pretend to shovel dirt onto a fire).

Discussion:

If we understand the fire triangle, we know how to prevent or stop wildfires by removing just one of these essential ingredients.

Why is it important to know the Fire Triangle?

What are ways you can help prevent wildfires?

5. **Fire safety poster**

- Have youth create their own fire safety posters illustrating the Fire Triangle.

TYPES OF WILDFIRES

Discuss different types of wildfires: ground fires, surface fires, and crown fires. Use pictures and videos to illustrate each type. (see resources for photos)

Ground fires:

- Burn underground (roots, peat, and deep organic matter).
- Slow-burning and harder to detect.

Surface fires:

- Burn grass, leaves, and small plants at ground level.
- Spread quickly, but usually easier to control.

Crown fires:

- Burn at the tops (“crowns”) of trees.
- Very dangerous, fast-moving, and hard to control.

This helps youth understand the different ways that fires can behave.

DEFENSIBLE SPACE

A defensible space is a safety zone around houses cleared of plants, trees, or other things that burn easily. It helps protect homes from wildfires

MATERIALS:

Paper, markers or pencil crayons

INSTRUCTIONS:

1. Have youth create their own posters illustrating a defensible space around a home.
2. Include a safety message like: "Defensible space saves homes!"

This is very important for people living in fire-prone areas.

GOOD FIRE VS. BAD FIRE – CONTROLLED BURNS

Controlled burns are fires that firefighters start on purpose. They carefully plan and control these fires to protect forests and communities from bigger wildfires.

Clearing fuel: Just like tidying your room helps avoid accidents, controlled burns remove dry plants, dead trees, and other things that could burn dangerously in a big wildfire.

Helping plants and animals: Controlled burns help plants grow healthier and create good habitats (homes) for wildlife

GUEST SPEAKERS

Invite firefighters or park rangers to speak to the Guides about their experiences and fire safety tips.

Reach out to *Firesmart BC*

This helps connect youth to their community.

AIR QUALITY ACTIVITIES

AIR QUALITY DETECTIVES

Youth will discover what particles float in the air and learn about how air quality affects our health.

MATERIALS:

White paper plates or paper sheets, petroleum jelly, magnifying glasses, tape, markers to label

INSTRUCTIONS:

1. Label paper plates with locations (inside classroom, outside playground, near roads).
2. Spread a thin layer of petroleum jelly on each plate.
3. Hang or place the plates in different locations, leave them for 24 hours. (youth can do this at home before meeting)
4. After collecting, use magnifying glasses to observe the dirt or particles stuck to the jelly.
5. Compare results to see which area had better or worse air quality.

Where did we find the most dirt or particles?

Why might some places have cleaner or dirtier air?

CLEAN AIR CITY

Youth build their own city model demonstrating good air quality practices.

MATERIALS:

Large poster boards or cardboard, markers, crayons, glue, scissors, recycled Materials:(cardboard tubes, plastic bottles, paper), small toy cars, trees, buildings (optional)

INSTRUCTIONS:

1. Youth work in groups to design their city layout on cardboard.
2. Identify:
   - Roads, houses, schools, parks, factories.
   - Ways to keep air clean (trees, parks, bike paths, public transit).
3. Each group presents their city explaining how their designs promote clean air.

Why did you choose certain features to keep air clean?

How can trees, bikes, and parks help air quality?

WEATHER PREPAREDNESS ACTIVITIES

WEATHER SAFETY KIT SCAVENGER HUNT

This is a great way to get youth thinking about what they need to have in a weather safety kit. Create a list of items that should be included in a kit, and have youth race to find them around the meeting place or outdoors. The first youth to find all of the items wins!

KIT LIST:

1. **Communication:**
   - Battery-powered or hand-crank NOAA weather radio with tone alert
   - Whistle to signal for help
   - Cell phone with chargers and a backup battery
2. **Power and Light:**
   - Flashlight (battery-powered or hand-crank)
   - Extra batteries for the flashlight and radio
3. **First Aid:**
   - First aid kit (bandages, antiseptic wipes, pain relievers, etc.)
   - Any personal medications
   - Copies of important medical information
4. **Shelter & Warmth:**
   - Emergency blanket
   - Rain poncho
5. **Basic Needs:**
   - Water (at least one gallon per person per day for several days)
   - Non-perishable food supply for several days
   - Manual can opener for food
   - Dust mask to help filter contaminated air
   - Moist towelettes, garbage bags, and plastic ties for personal sanitation
   - Wrench or pliers to turn off utilities
6. Optional
   - Cash (ATMs and card readers may not work)
   - Copies of important documents

BUILD A WEATHER SHELTER

This is a hands-on activity that will help youth learn how to build a shelter in case of extreme weather. Provide them with a variety of materials, such as blankets, tarps, and rope, and have them work together to build a shelter that will protect them from the elements.

Materials:

Tarps or plastic sheets, blankets, sheets, or fabric, rope or strong twine, poles, sticks, or branches, groundsheet or mats for flooring.

Shelter-building tips:

1. **Choose a Safe Spot**
   - Pick an area that's dry, flat, and away from hazards (falling branches, puddles, or slopes).
   - Avoid open areas if lightning or strong winds are expected.
2. **Use Sturdy Supports**
   - Trees, poles, or sturdy branches can serve as solid supports for your shelter.
   - Ensure supports are firmly in place so your shelter won't collapse.
3. **Create a Strong Frame**
   - Use rope to tie supports together securely.
   - Build a simple shape like a triangle (A-frame) or lean-to shelter for stability.
4. **Covering Your Shelter**
   - Use waterproof Materials:like tarps or thick blankets to protect against rain or wind.
   - Make sure coverings overlap and are secured tightly to keep water and wind out.
5. **Protect the Floor**
   - Place blankets, mats, or extra tarps inside the shelter to stay dry and warm.
   - Keep the floor slightly raised or lined to prevent moisture from seeping in.
6. **Check for Stability**
   - Gently shake your shelter to make sure it stays standing and can handle wind or rain.
   - Adjust or reinforce any loose parts.
7. **Leave a Ventilation Gap**
   - Make sure there's enough airflow to prevent moisture build-up and provide fresh air.
   - Don't seal your shelter completely.
8. **Work Together**
   - Communication and teamwork make building faster and more efficient.
   - Assign clear roles like holding, tying knots, or gathering materials.

CREATE A WEATHER SAFETY PLAN

See resources section to a family emergency plan template.

This activity will help youth prepare for extreme weather events. Have them work together to create a weather safety plan for their homes and families. This plan should include things like evacuation routes, emergency contacts, and what to do in case of a power outage.

Order the *Master of Disaster: Youth Emergency Preparedness kits* from the BC government. These free kits include a Get Ready Guide, a drawstring bag, and home emergency plan.

GENERAL WEATHER ACTIVITIES

CLIMATE DATA ANALYSIS

Introduce weather data sources (NOAA, Environment and Climate Change Canada, etc.). Have youth analyze historical data to identify trends in extreme weather events.

Resources:

Earth Nulschool - Real-time Weather Visualization

- Interactive, real-time map visualizing global wind, temperature, humidity, ocean currents, and more.
- Shows how changing climate conditions influence extreme weather patterns like hurricanes and heatwaves.

Climate Insteractive - En-ROADS Climate Simulator

- Interactive, visual simulator showing how various actions (energy use, emissions, land use) affect climate outcomes.
- Demonstrates impacts of different climate policies on global temperature and extreme weather events.

Surging Seas Interactive Map - Sea Level Rise Simulator

- Interactive mapping tool that demonstrates sea-level rise impacts on local communities due to climate change.
- Helps visualize flooding risks and extreme weather event impacts.

Climate data viewer

- Choose from various datasets to explore the impact of climate in Canada

Ask youth to create infographics or presentations based on their findings.

CITIZEN SCIENCE PROJECTS

Participate in citizen science projects related to weather monitoring or climate research. This could involve collecting data on rainfall, temperature, or air quality.

This empowers youth to contribute to scientific research.

Options:

- *Community Collaborative Rain, Hail, Snow network*

  Join this volunteer network of weather observers who measure and map precipitation (rain and snow) in their communities.

- *Ice Watch*

  Contribute to Canadian climate change research by helping record and analyze when ice forms and thaws on bodies of water.

- *Plant Watch*

  Help scientists discover how, and more importantly why, our natural environment is changing.

- *Snow Knowledge Collective*

  Head outside this winter and investigate snow conditions in your community with this citizen science project. Is there snow on the ground? Grab your ruler and measure snow depth, and see if you can make a snowball!

BUILD YOUR OWN WEATHER STATION

Youth create simple instruments to measure weather conditions like temperature, wind speed, and rainfall.

Materials:

- Thermometer, empty plastic bottles (rain gauge), ruler or measuring tape, paper cups and straws (anemometer for wind speed), card stock, pencils, compass (wind vane), notebook for data recording

Instructions:

- **Thermometer**: Place outside in shaded area, measure daily temperatures.
- **Rain Gauge**: Cut top off a plastic bottle, invert top to funnel rain into bottle. Mark bottle in centimeters to measure rainfall. (see detailed rain gauge Instructions:in Guide and Sparks/Embers section)
- **Anemometer (Wind speed):** Attach four cups to straws forming a cross, mount on a vertical straw, count rotations per minute. (see *How to make an anemometer* video)
- (see Instructions:below)
- Record measurements daily and analyze data over time.

WIND VANE

Materials:

Sturdy cardstock or thin plastic sheet, straw, pencil with eraser, straight pin, base to hold the wind vane upright (small ball of modelling clay or a plastic up with pebbles or sand), scissors, ruler, marker, tape or glue, compass (optional), decorative Materials:(optional).

Directions:

1. **Prepare the Arrow and Tail:**
   - Arrowhead: Draw a triangle with a long base and pointed tip. An isosceles triangle works well. For example, you could make a triangle with a 7cm base and 10cm sides.
   - Tail: Draw a square or a rectangle. The tail should be larger than the arrowhead to catch the wind effectively. A 7cm x 7cm square is a good starting point.
   - Cut: Use scissors to carefully cut out the arrow and tail shapes from the cardstock or plastic sheet. Accuracy in cutting will improve the vane's performance.
2. **Prepare the Straw:**
   - Slits: At each end of the straw, cut a slit about 1 cm (0.5 inch) long.
   - Make sure the size of the slits and the tail will match.
   - To make the slits, hold the scissors parallel to the straw and make a small, careful cut through both walls of the straw.
3. **Assemble the Vane:**
   - Insert: Slide the arrow into one slit of the straw. The pointed end of the arrow should be pointing outwards.
   - Slide the tail into the slit at the opposite end of the straw.
   - Secure: If the arrow and tail fit snugly, they may stay in place.
   - For a more secure fit, use a small piece of tape or a tiny drop of glue to hold each piece in place. Make sure the glue is dry before proceeding.
4. **Attach the Straw to the Pencil:**
   - Find the Center: Carefully find the center point of the straw. This is crucial for the wind vane to balance and rotate correctly.
   - Insert the Pin: Push the straight pin

through the center of the straw.
- Continue pushing the pin until the point of the pin emerges from the other side of the straw.
- Attach to Pencil: Push the point of the pin into the center of the eraser on the pencil.
- Important: Do not push the pin all the way into the eraser. The straw needs to be able to rotate freely around the pin.
- Test that the straw can spin easily. If it doesn't, adjust the pin slightly.

5. **Create a Base:**
   - Modeling Clay Base: Mold the modeling clay into a ball or a small mound.
     - Press the unsharpened end of the pencil into the clay, making sure the pencil stands upright.
   - Cup Base: Place some pebbles or sand into the plastic cup to weigh it down and provide stability.
     - Make a small hole in the center of the bottom of the cup (you might need an adult to help with this).
     - Insert the unsharpened end of the pencil through the hole in the bottom of the cup, so the eraser end is pointing upwards.
6. **Mark the Directions:**
   - Orientation: Use a compass to determine the directions (North, South, East, West) in your location.
   - Marking: If using the modeling clay base, you can place small labels (N, S, E, W) on the surface the clay is on. If using the cup base, you can write the directions on the outside of the cup.
   - Ensure the directions are clearly visible.

Place your wind vane in an open area where it can catch the wind.

Observe which way the arrow points. The arrow points in the direction from which the wind is blowing. For example, if the arrow points North, the wind is blowing from the North.

EMERGENCY RESPONSE SIMULATIONS

Have youth participate in realistic emergency response simulations. This could include mock search and rescue operations, or disaster relief efforts.

Select a realistic emergency scenario relevant to your location and potential hazards (e.g., earthquake, wildfire, flood, severe storm, missing person).

This will help them to put their knowledge into practice.

EXAMPLES:

- **Search and Rescue**: A hiker is lost in a wooded area.
- **First Aid Response**: A simulated car accident with multiple victims.
- **Disaster Assessment**: Evaluating damage after a mock earthquake.
- **Community Response**: Setting up a temporary shelter and distributing supplies after a flood

INSTRUCTIONS:

1. **Assign specific roles to participants, such as:**
   - **Team Leader:** Coordinates the response.
   - **First Aid Responder:** Provides medical assistance.
   - **Search Team Member:** Locates victims or missing persons.
   - **Communications Officer:** Manages

communication with other teams or agencies.
- **Logistics Coordinator**: Organizes supplies and equipment.

2. **Make a list of necessary Materials:for your chosen scenario - which may include:**
   - First aid supplies (bandages, splints, etc.)
   - Maps and navigation tools (compass, GPS)
   - Communication devices (walkie-talkies, phones)
   - Search and rescue equipment (ropes, stretchers, etc.)
   - Simulated victims (mannequins or willing participants) with mock injuries.
   - Props to create the scenario environment (e.g., debris, caution tape, signs).
   - Food and water for participants, especially for longer simulations.
3. S**et the Location and Environment**
   - An outdoor area for search and rescue scenarios.
   - A large room or open space for disaster response simulations.
   - A combination of indoor and outdoor settings for more complex scenarios.
   - Use props and environment to simulate your scenario (e.g., dim the lights, sound effects, obstacles, etc.)
4. **Conduct the simulation**
   - Start with a briefing that includes:
     - The scenario overview and objectives.
     - The assigned roles and responsibilities.
     - Safety guidelines and procedures.
     - Communication protocols.
     - Any time constraints or limitations.
   - Answer any questions participants may have.
   - Act out the scenario
     - Allow youth to carry out their assigned roles and responsibilities.
     - Observe and facilitate as needed, providing guidance and support without directly interfering.
     - Encourage youth to communicate effectively, make decisions under pressure, and adapt to changing circumstances.
     - Introduce unexpected challenges or complications to make the simulation more realistic.
5. **Debrief**
   - Review what happened and how participants responded.
   - Discuss what went well and what could be improved.

OPTIONAL:

- Invite local **Search and Rescue volunteers** to present at a unit meeting, or visit their headquarters.

EXTREME WEATHER & CLIMATE CHANGE

Have youth research the connection between extreme weather events and climate change.

They can explore the scientific evidence and potential impacts of complex issue.

Encourage them to use a variety of sources, including scientific journals, news articles, and documentaries.

Have them create a presentation or lead a discussion to share their findings with the

group.

CLIMATE ACTION ADVOCACY

- Have youth research and advocate for climate action at the local, national, or even international level.
- They can explore different climate policies and initiatives and choose one to focus on.
- They can write letters to elected officials, organize rallies or protests, or even start their own climate action campaign.
- Encourage them to use their voices and actions to make a difference in the fight against climate change and increased extreme weather events.

DEBATE AND DISCUSSION

Organize debates or discussions on topics related to extreme weather.

Divide youth into two main teams labelled as:

- "Pro" (supports the argument)
- "Con" (opposes the argument)

Within each team, assign:

- Opening speaker (introduces main points)
- Supporting speakers (provide evidence and arguments)
- Closing speaker (summarizes and rebuts opposing arguments).

Allow teams to research and outline arguments using reliable sources.

Encourage using facts, statistics, scientific evidence, and real-life examples.

Debate Round (20–25 mins total):

- Opening statements: 2 minutes each team (state positions)
- Argument presentation: 3–5 minutes per team (provide evidence)
- Rebuttal: 2–3 minutes per team (respond to opponents)
- Closing statements: 2 minutes each team (summarize, restate main points)

Climate and weather topics for debate:

- "Should fossil fuels be completely banned by 2040?"
- "Is climate change the most important issue facing our generation?"
- "Should wealthy countries pay more to combat climate change globally?"
- "Is individual action (like recycling, using less energy) effective in fighting climate change?"
- Should communities in high-risk hurricane or wildfire areas relocate permanently?"
- "Are extreme weather events becoming more common due to climate change?"
- "Should governments invest more in prevention or disaster relief after extreme weather events?"
- "Should schools require climate change education as part of their curriculum?"
- "Should corporations face stronger penalties for environmental pollution?"
- "Are youth-led climate protests an effective way to create change?"

HEAT EVENT ACTIVITIES

HEAT EVENT FORMATION

MATERIALS:

Clear container (glass or plastic), heat source (e.g., lamp), thermometer (optional but recommended), balloons (optional), small pieces of paper (to stimulate air movement), stopwatch or timer (optional)

Instructions:

1. **Set Up Your Experiment**
   - Place the bowl upside-down on a flat surface (table or desk).
   - If you have a thermometer, place it under the bowl.
   - If you're using pieces of paper, place a few small pieces inside the bowl (these represent air particles).
2. **Explain the Setup**
   - Tell youth that the bowl represents the high-pressure system that traps air. The air inside the bowl is the atmosphere over an area.
3. **Simulate the Heat event**
   - Shine a desk lamp or heat lamp directly onto the upside-down bowl.
   - If you're using sunlight, place the setup in direct sunlight.
   - Wait for a few minutes (around 3-5 minutes).
4. **During this waiting period:**
   - Explain that the heat lamp or lamp represents the sun's heat warming the Earth's surface, and normally warm air rises and escapes. But the bowl (high pressure) traps this warm air.
5. **Observe**
   - After a few minutes, carefully lift the bowl slightly.
   - Let youth feel the air trapped under the bowl. They should notice it's warmer than the air outside.
   - If you placed a thermometer, check the temperature before and after heating. (They will see a temperature increase.)
   - Explain that the bowl acts just like a high-pressure system, keeping hot air trapped and raising temperatures.
6. **Optional Balloon Demonstration:**
   Inflate a balloon lightly and place it under the bowl before heating.
   - Heat the bowl again for a few minutes.
   - The balloon might expand slightly, showing how trapped hot air expands, creating pressure and increasing temperature.

The science:

- A heat event is like a giant invisible bowl in the sky made by high pressure.
- The sun heats the air and ground, and the warm air usually rises and cools off.
- But when there's a heat event, the warm air can't escape—it's trapped by the high-pressure "bowl."
- As the air stays trapped, it gets hotter and hotter, leading to very hot days and heatwaves.

HEATWAVE IMPACT MAPPING

Youth research and visually document heatwave impacts on communities, agriculture, and health.

Materials:

Large poster boards or digital slideshow (like PowerPoint or Google Slides), internet access, markers, coloured pencils, or digital graphics

Instructions:

1. Select a historical heatwave (e.g., 2021 Pacific Northwest heat event, European heatwaves).
2. Research impacts on:
   - Public health (heat-related illnesses, deaths)
   - Agriculture (crop failures, drought)
   - Infrastructure (melting roads, power

outages)
3. Create visual maps or presentations illustrating heatwave impacts.
4. Present findings to unit.

What are the long-term impacts of extreme heat events?

How can communities prepare for future heatwaves?

THE IMPACT OF VEGETATION

Youth directly observe how vegetation (trees, grass) affects local temperatures and climate.

MATERIALS:

Two thermometers or digital temperature sensors, outdoor locations (shaded vegetated area vs. open, paved area), timer or stopwatch, notebook for observations and data

INSTRUCTIONS:

1. Place one thermometer in a shaded area with lots of vegetation (under a tree, grassy area).
2. Place the second thermometer in a sunny, paved location (parking lot, sidewalk).
3. Record temperatures every 5 minutes for 20–30 minutes.
4. Compare temperatures to demonstrate vegetation's cooling effect.

DISCUSSION:

How did vegetation affect temperature?

Why do cities often feel hotter than rural areas?

DESIGN A HEAT ACTION PLAN

Youth collaborate to create a community health action plan to address heatwave impacts and protect vulnerable groups.

MATERIALS:

Large poster boards or digital tools (Canva, Google Slides), markers, pens, and sticky notes, computers/tablets for research

INSTRUCTIONS:

1. Form teams tasked with creating an effective community "Heat Action Plan." Teams define:
   - Vulnerable populations (elderly, children, homeless, outdoor workers)
   - Health risks during heatwaves (dehydration, heat stroke, respiratory issues)
   - Solutions addressing health and safety:
     - Cooling centres and hydration stations
     - Heat warning systems (alerts via social media, texts, radio)
     - Education campaigns (signs of heat illness, preventive measures)
   - Groups present their plans to peers, discussing effectiveness and feasibility.

BUILDING A HEAT-RESILIENT CITY

Youth collaboratively design a model city incorporating heat-resilient strategies.

MATERIALS:

Large sheets of cardboard or poster board, construction paper, scissors, glue, recycled Materials:(cardboard boxes, bottles), small model trees, greenery, or LEGO bricks (optional), drawing Materials:(markers, pencils)

INSTRUCTIONS:

1. Divide youth into groups; each group creates their own model city.
2. Instruct groups to include heat-resilient features:

- Trees and green spaces for shade (urban forests)
- Green roofs or reflective roofs
- Cooling centres or community hydration stations
- Public transportation or shaded pedestrian paths

3. Groups present their city models, explaining their choices.
4. Discuss the effectiveness of each design.

Discussion:

Which features most effectively reduce heat?

How can real communities implement these ideas?

URBAN HEAT ISLAND EFFECT

The term "urban heat island" (UHI) describes how cities and towns tend to be significantly warmer than the rural areas surrounding them, particularly during the summer months and at night. This isn't just a minor difference; the temperature in urban areas can be noticeably higher, sometimes ranging from 1 to 7°F during the day and 2 to 5°F at night. In some densely developed areas, the difference can be even more dramatic, with mid-afternoon temperatures soaring 15 to 20°F higher compared to nearby vegetated areas. This persistent warmth in urban environments, especially the lack of cooling at night, has significant implications. The heat absorbed by urban structures during the day is released gradually, preventing the typical drop in temperature that occurs in rural areas after sunset. This prolonged exposure to higher temperatures can put a strain on human health, as our bodies don't get the nighttime relief needed to recover from daytime heat. In 2021, a heatwave in British Columbia led to over 600 deaths, highlighting the dangers of extreme heat in our province.

Materials:

Digital thermometers, notebook and pens, map of your city or town, GPS device or a smartphone (optional), camera or smartphone (optional).

Instructions:

1. **Research the Basics**
   - Start by learning about the urban heat island (UHI) effect using online resources. Search terms like "urban heat island British Columbia" can help you find local news, city reports, or environmental studies. Then, define UHI in your own words and note the causes most relevant to your community.
2. **Choose Your Locations**
   - Pick several spots in your city/town with different features to compare temperatures:
     - Park with trees – high vegetation, natural surfaces
     - Parking lot – paved, low vegetation
     - Residential area – mixed vegetation and surfaces
     - Downtown/industrial zone – dense buildings, hard surfaces
     - Schoolyard – mix of asphalt and green space
3. **Plan Your Measurements**
   - Timing: Take readings at different times (e.g., morning, mid-afternoon, evening)

- Repeat: Take 3–5 readings per location and average them
- Duration: Measure over 2–3 days and note weather conditions
- Technique: Use a thermometer at waist height in shade. If available, use an infrared thermometer to compare surface temperatures of different materials
- Record: Use the data sheet provided in the resources section.

4. **Observe and Analyze**
   - At each location, note:
   - Surface types (e.g., asphalt, grass)
   - Amount and type of vegetation
   - Building density and layout
   - Nearby heat sources (e.g., traffic, AC units)
   - Compare how these factors affect temperature readings, especially during peak heat hours.
5. **Take Action**
   - Use your findings to raise awareness and suggest solutions:
     - Create presentations or campaigns
     - Share at school, with local leaders, or through social media
     - Write letters to city officials
     - Plan community actions like tree planting or green space advocacy
     - Connect with youth environmental groups for support.

WINTER STORM/COLD SNAP ACTIVITIES

WHAT KEEPS ICE COLDEST?

Investigate how different Materials:insulate against heat by wrapping containers of ice and observing which material slows melting the most.

Materials:

Per group: 4 small containers - about the same size, ice cubes, insulating Materials:- newspaper, aluminum foil, fabric, plastic wrap or bag, elastic bands or tape, thermometers, timer, paper towels, notebook and pen, ruler.

Instructions:

1. **Introduction discussion**

What is insulation? Why is it important in cold snap?

Where do we use insulation in daily life? (jackets, homes, sleeping bags, coolers)

Which Materials:do you think will keep the ice from melting the longest? Why?

2. **Prepare Your Insulated Containers**
   - Distribute four containers per group.
   - Assign or let youth choose four insulation types (e.g., newspaper, foil, fabric, plastic).
   - Wrap each container completely using one type of material.
     - Use elastic bands or tape to hold Materials:securely.
     - Leave the top open to allow observation
   - Label each container with the material used.
3. **Add Ice and Start the Test**
   - Place equal amounts of ice (e.g., 3 cubes or 50g) in each container.
   - Set all containers in the same room/ location (out of direct sunlight).

- Start the timer and begin observing:
  - Every 5–10 minutes, check and record any melting.
  - Optional: Measure the remaining ice height or volume at regular intervals.
  - If using thermometers, measure the water temperature once ice begins to melt.

Discussion:

Which material worked best? Why do you think that is?

Did any Materials:make the ice melt faster?

How could this knowledge help in an emergency or winter survival situation?

FROST IN A CAN

Observe how frost forms on the outside of a container by lowering its temperature using ice and salt. Learn about condensation, freezing points, and how frost develops in cold weather conditions.

Materials:

Per group: clean metal can, crushed ice (enough to fill can), table salt (½ cup), spoon or stir stick, paper towels, timer, notebook and pen, thermometer (optional).

Instructions:

1. **Intro discussion**

What is frost and how does it form?

Where do we usually see frost in everyday life?

How do temperature and moisture interact to create frost?

2. **Set up the experiment**
   - Place the metal can upright on a table or tray.
   - Fill the can about ¾ full with crushed ice.
   - Add ½ cup of salt to the ice.
   - Stir the mixture gently with a spoon or stick to help the salt mix evenly.
   - Wait and observe the outside of the can for 5–10 minutes.
3. **Observe and record**
   - Use the timer to keep track of time.
   - Encourage youth to observe changes on the can:
     - Is the can getting colder to the touch?
     - Is water condensing?
     - Is frost starting to form?
     - What does the frost look like?
   - Optional: Use a thermometer inside the ice-salt mixture to measure temperature drop (it can fall well below 0°C).

Discussion:

What did you notice on the outside of the can?

Why did frost form instead of just water?

Where in nature does this happen?

How does this relate to cold snap or winter storms?

THE SCIENCE OF HYPOTHERMIA

Youth experience a safe simulation demonstrating how cold temperatures affect the human body and can lead to hypothermia.

Materials:

Buckets or large bowls filled with ice water, stopwatch or timer, thermometer (optional), towels (to dry hands afterward)

Instructions:

1. Youth measure the water temperature before starting.
2. Each youth immerses one hand in ice-cold water (about 1–2 mins, supervised).
3. Record the sensations felt:
   - Initial discomfort (cold, pain)
   - Numbness or tingling after extended exposure
4. Youth remove hands, dry thoroughly, and discuss sensations.

Discussion:

How quickly did your hand become uncomfortable or numb?

How does the body react to extended cold exposure?

Why is hypothermia dangerous?

DRESS FOR SURVIVAL - CLOTHING AND INSULATION EXPERIMENT

Youth test how different clothing Materials:and layers affect body heat retention.

Materials:

Thermometers (digital or infrared), different clothing materials–cotton, wool, synthetic, fleece, nylon, hot water bottles or heat pads (simulating body heat), stopwatch or timer, notebook for data collection

Instructions:

1. Wrap hot water bottles in different Materials:(cotton, wool, synthetic fleece).
2. Record starting temperature of water bottles.
3. Allow them to cool for 10–15 minutes in a cold environment (outside or freezer).
4. Measure and compare temperature loss of bottles wrapped in different fabrics.
5. Identify which Materials:retained heat best.

Discussion:

Which Materials:kept the warmth best and why?

How does clothing choice impact hypothermia risk?

What layering strategies can prevent hypothermia?

COLD IMPACT INVESTIGATION

Research documented examples of infrastructure failures caused by cold snap (e.g., power outages, transportation breakdowns).

Materials:

Computers/tablets with internet access, poster boards or digital presentation tools, markers or presentation software (e.g., Google Slides)

Instructions:

1. Divide youth into groups and assign each group a notable cold-weather event:
   - Polar vortex events (2014, 2019)
   - Canadian ice storm (1998)
2. Each group researches:

- What infrastructure failed (power grids, water systems, roads).
- Why these failures occurred.
- Consequences described (economic losses, human impacts).
- Youth discuss what they discovered with their unit.

Discussion:

What were common factors causing infrastructure to fail?

How can communities better prepare for cold snap?

What role does climate change play in these extreme weather events?

RAINSTORMS, ATMOSPHERIC RIVERS, AND FLOODING

SPARKLING LIGHTENING JAR

Capture the dramatic beauty of lightning in a safe and sparkly way with these mesmerizing lightning jars.

Materials:

Clear glass jars with lid, yellow and white acrylic paint, silver glitter, water, spoon or stirring stick

Instructions:

1. Prepare the Paint: In a small bowl, mix a little bit of yellow acrylic paint with a few drops of water until it has a thin, runny consistency. Do the same with the white paint in a separate bowl.
2. Layer the Colors: Pour a small amount of the yellow paint mixture into the bottom of the jar. Then, gently pour in a small amount of the white paint mixture.
3. Add Sparkle: Sprinkle in a generous amount of silver glitter.
4. Swirl and Mix: Gently swirl the jar to mix the paints and glitter, creating a lightning-like effect. You can add more paint or glitter as desired until you achieve the look you like.
5. Seal and Display: Once you're happy with your lightning jar, put the lid on tightly and display it on a shelf or windowsill. Watch as the light catches the glitter and makes it sparkle like real lightning!
6. Source: *Sapkr*

ATMOSPHERIC RIVER IN A BOTTLE

Demonstrate how atmospheric rivers transport moisture, leading to heavy rainfall and flooding.

Materials:

Clear plastic bottles (2-liter soda bottles), warm water, ice cubes or ice packs, blue food colouring, flashlight (optional, for better visibility)

Instructions:

1. Fill bottle about halfway with warm water (coloured blue to represent ocean moisture).
2. Place ice cubes or an ice pack at the bottle's top (representing cool upper atmosphere).

3. Observe closely: condensation forms, representing cloud formation and precipitation.
4. Tilt bottle horizontally and watch how moisture moves, similar to atmospheric rivers.

Discussion:

How do atmospheric rivers form and why do they cause heavy rain?

What areas are most affected by atmospheric rivers and flooding?

An atmospheric river is a long, narrow band of moisture in the atmosphere—like a "river in the sky." They move large amounts of water vapour from tropical oceans toward cooler regions, often causing heavy rain or snow when they reach land.

THE IMPACT OF LAND USE

Youth create model landscapes demonstrating how different types of land use (natural, urban, agricultural) affect flooding.

Materials:

Large trays or plastic tubs, sand, soil, and clay (to model landscapes), sponges or moss (simulating wetlands/vegetation), plastic wrap or foil (simulating pavement), small plastic houses, buildings, trees (optional), water in watering cans or spray bottles

Instructions:

1. Youth build landscapes showing different land uses:
    - Natural landscape: Soil, sand, sponges (wetlands, forests).
    - Urban landscape: Covered with plastic wrap or foil (paved surfaces, buildings).
    - Agricultural landscape: Soil with minimal plants.
2. Simulate rainfall by pouring water over each landscape.
3. Observe how each landscape handles flooding and water runoff.
4. Compare results, noting which land use floods most severely and why.

Discussion:

Why did urban areas flood faster?

How did wetlands or vegetation help reduce flooding?

What can we do in cities to reduce flood impacts?

FLOOD MITIGATION

Participate in community projects to mitigate flood risk, such as planting trees, restoring wetlands, or building rain gardens.

Opportunities:

- **Participate in Streamkeeper Programs**
  Join a local Streamkeepers group (e.g., with the Pacific Streamkeepers Federation) to restore streambanks, plant native vegetation, and monitor water quality.
    - **Examples**: Projects along Still Creek (Vancouver), Bowker Creek (Victoria), or Cougar Creek (Surrey).
- **Tree Planting with Local Conservation Groups**
  Volunteer with organizations like Tree Canada, City Green Solutions, or municipal programs that run seasonal tree planting events to increase urban canopy and reduce runoff.

    - **Example**: Vancouver's One Million Tree Challenge or Surrey's Releaf Tree Planting Program.
- **Wetland Restoration Projects**
  Help restore critical flood-buffering wetlands with groups like the Nature Trust of BC, Ducks Unlimited Canada, or Fraser Valley Conservancy.
    - **Example**: Nicomekl River floodplain restoration (Surrey) or Willingdon Linear Wetland Project (Burnaby).
- **Build or Maintain Rain Gardens**
  Partner with local schools, neighbourhood associations, or city programs to create or maintain rain gardens that absorb stormwater and reduce flooding.
    - **Example**: Rain Garden Project with the City of Victoria or Metro Vancouver's Green Infrastructure Projects.
- **Green Roof or Permeable Surface Installations**
  Help design or promote green roof initiatives or permeable paving projects that slow down stormwater runoff.
    - **Example**: Work with school green teams or local councils in communities like Kelowna, North Vancouver, or Burnaby.
- **Shoreline Cleanups in Flood-Prone Areas**
  Participate in Great Canadian Shoreline Cleanup events focused on rivers and creeks, helping remove debris that blocks drainage and exacerbates flood risk.
    - **Example**: Fraser River (New Westminster), Okanagan Lake shoreline (Penticton), or Millstream Creek (Langford).
- **Salmon Habitat Enhancement**
  Engage in projects that restore salmon-bearing streams, which often involve planting riparian buffers and stabilizing banks to reduce erosion and flooding.
    - **Example**: Salmon-Safe BC or Squamish Streamkeepers programs.
- **Adopt-a-Catch Basin Programs**
  Work with your municipality to clear storm drains of debris before storms to prevent localized flooding.
    - **Example**: City of Coquitlam's Adopt-A-Catch Basin program.
- **Educational Campaigns on Flood Preparedness**
  Create posters or digital content to educate your community about flood risk, how green infrastructure helps, and what they can do to help.
- **Collaborate with BC Flood and Wildfire Resilience Projects or local emergency management offices.**

BUILDING FLOOD-RESISTANT STRUCTURES

Youth will learn about flood risks and mitigation strategies by designing and building small-scale models of flood-resistant structures, testing their resilience to simulated flood conditions.

Materials:

Shoebox or shallow plastic bin, sponges, cotton balls, or washcloths, plastic straws, popsicle sticks, cardboard, skewers, toothpicks, modelling clay, aluminum foil, string and/or rubber bands, glue gun or white glue and tape, scissors, ruler, small

plastic figurines or paper cutouts, watering can/pitcher/measuring cup, towels/trays.

Instructions:

1. **Introduction and Brainstorming**
   - Begin with a short discussion on why floods occur and their impact on homes and communities.
   - Show real-world examples of flood-resistant architecture (e.g., stilt houses, levees, raised foundations, sandbag barriers).
   - Challenge youth to brainstorm what features help structures survive floods (e.g., elevation, waterproofing, drainage).
2. **Planning and Design**
   - Ask each group to sketch their design for a flood-resistant building or barrier.
   - Encourage them to think creatively about elevation, water redirection, and structural stability.
3. **Construction**
   - Provide building Materials:and let teams create their structures inside the bins or trays.
   - They may build homes, walls, levees, or any structure designed to reduce flood damage.
   - Encourage them to test elements as they go (e.g., pour a small amount of water to check absorption or water redirection).
4. **Flood Simulation and Testing**
   - Slowly pour water into the bin to simulate a flood (e.g., start with 1–2 cm depth).
   - Observe how well each structure withstands the flood. Is water redirected? Did anything collapse or get soaked?

Discussion:

What worked well?

What would you improve?

How can these ideas be applied in real life?

Optional extensions:

- **Upgrade Challenge**: Redesign the structure after testing to improve its performance.
- **Community Impact**: Have teams design for different environments (urban vs. rural; coastal vs. inland).

TORNADOES, HURRICANES, AND TYPHOONS ACTIVITIES

MODEL STORM SHELTER

Use engineering principles to design and build a small-scale storm shelter that could withstand high winds and flying debris.

Materials:

Small carboard boxes or tissues boxes, popsicle sticks, craft sticks, toothpicks, skewers, modelling clay, aluminum foil or plastic wrap, duct tape or masking tape, string or rubber bands, paper towels or small pieces of fabirc, scissors and glue, ruler, weights (small rocks or coins for testing structural strength), hairdryer or fan, ping pong balls/cotton balls/small objects (to simulate flying debris)

Instructions:

1. **Introduction**

Start with a short discussion on the dangers of tornadoes and hurricanes.

- Show real-life examples of storm shelters and safe rooms. Talk about where they're located (e.g., underground, reinforced interior rooms) and what Materials:make them safe (e.g., concrete, steel, wind-resistant doors).
- Introduce the challenge: Build a model storm shelter that can withstand strong winds and protect from flying debris.

2. **Research and Design**

   Have youth work in small groups to brainstorm key features of an effective shelter:

   - Where would it be located?
   - How can it stay anchored?
   - What will protect it from wind and debris?
   - Each group sketches a design and chooses the Materials:they plan to use.

3. **Build the Shelter**

   Using the provided materials, groups construct their shelters on a flat surface (like a cardboard base).

   - Encourage:
     - Reinforced walls (layering materials, cross-bracing)
     - Covered entrances
     - Anchoring (weighing it down or building it into the base)
     - Creativity in problem-solving

4. **Testing the Shelter**

   One group at a time, test shelters by simulating storm conditions:

   - Use a fan or hairdryer on high to mimic wind.
   - Drop or toss lightweight "debris" (e.g., ping pong balls, cotton balls).
   - Optional: apply light weights to test roof strength or structure integrity.
   - Observe how well the shelter holds up.

Discussion:

What features protected the structure best?

What would you do differently next time?

How do these models relate to real-life emergency shelters?

Optional extensions:

- **Upgrade Phase**: Give groups time to reinforce or improve their shelter based on the first round of testing.
- **Scenario Planning**: Assign different weather intensities or environments (e.g., coastal vs. inland) to adapt their designs.
- **Community Connection**: Research where storm shelters are located in your community or how people protect themselves in different parts of the world.

HURRICANE SIMULATION

Youth will simulate the formation, intensification, and impact of hurricanes using role-play and movement, helping them understand key parts of a hurricane and the role of warm water and wind.

Materials:

Large floor space, coloured paper or ribbons (blue=warm water, white/gray=clouds/.wind), labelled paper signs (eye, eye wall, rain bands, warm water, winds),timer or stopwatch, small objects or toys, [optional] safety cones or chalk/ tape to mark zones (ocean vs. land)

INSTRUCTION:

1. **Introduction**
   - Begin with a quick lesson on how hurricanes form:
     - Hurricanes form over warm ocean water (usually at least 26.5°C).
     - Evaporation adds moisture to the air; warm, moist air rises and begins to spiral due to Earth's rotation (Coriolis effect).
     - As more warm air rises, the storm gains energy and spins faster.
     - The storm weakens when it moves over land or cooler water (no more warm water to feed it).
     - Introduce hurricane parts: eye, eye wall, rain bands, and winds.
2. **Assign Roles and Set Up the Space**
   - Assign roles to participants:
     - Warm Water Energy (2–4 youth): They hand out blue ribbons or "energy" to power the storm.
     - Winds (4–6 youth): They simulate circular movement.
     - Eye (1 youth): Stands still in the center.
     - Eye Wall (2–4 youth): Stands around the eye, moving quickly.
     - Rain Bands (2–4 youth): Spread farther out, moving in wider spirals with streamers.
   - Mark off zones: one side of the space = ocean, other side = land/coastal towns.
   - Place small objects (houses, trees, people) in the "coastal" area.
3. **Hurricane Formation Simulation**
   - Begin the storm over the ocean:
     - "Warm water" hands out blue ribbons or gives high-fives to "wind" players to simulate energy transfer.
     - Winds begin rotating slowly around the "eye."
     - Gradually, the eye wall and rain bands join, creating more defined spirals.
     - The pace of rotation increases as more energy is added.
     - Use the timer to track how quickly the hurricane intensifies (e.g., 30 seconds for each energy boost).
4. **Intensification and Landfall**
   - Once the storm is moving at full speed:
     - Have it shift toward the land side of the room.
     - When it reaches land, "warm water" stops providing energy.
     - Youth must gradually slow their movements to demonstrate weakening.
   - As the storm reaches the small town models:
     - "Rain bands" and "wind" participants gently knock over or scatter small objects to simulate impact.
     - Point out which structures were most affected and why (low elevation, poor location, etc.).

DISCUSSION:

How did the warm water affect the storm's strength?

What kind of damage did the storm cause when it hit land?

What real-life solutions help protect coastal towns from hurricanes? (e.g., levees, evacuation plans, stronger building codes)

TORNADO IN A BOTTLE

MATERIALS:

2 clear plastic bottles (such as a 1 or 2-litre pop bottle), water, dish soap, duct tape, food colouring (optional), pitcher for mixing.

INSTRUCTIONS:

1. Pour water into the pitcher.
2. Add the food colouring to the water.
3. Mix the food colouring and water together.
4. Use the pitcher and begin filling the bottle by pouring the coloured water into it.
5. Fill the bottle with water until it is about ¾ full.
6. Align an empty bottle directly on top of the bottle with water. Then, use the duct tape to secure the 2 plastic bottles together. To create the tornado, turn the bottles full of water over and swirl the water clockwise. A tornado funnel shape will form as the water moves from the top bottle to the lower bottle.

Source: *One Crazy Mom*

DROUGHT ACTIVITIES

IMPACT OF DROUGHT ON ECOSYSTEMS

Investigate how droughts affect plant and animal life in various ecosystems, explore drought's role in wildfires and desertification, and analyze how invasive species can worsen drought impacts.

MATERIALS:

Access to internet or printed articles, poster or chart paper, markers, pens, sticky notes, world map or ecosystem zone map (optional for context), whiteboard or projector (for presentations), laptop/table/smartphone (for research - one per small group)

INSTRUCTIONS:

1. **Introduction**
   - Discuss:
     - **What is a drought?** (A drought is a long period of below-average rainfall or dry weather that leads to a shortage of water in a region. It can affect drinking water supplies, agriculture, natural ecosystems, and even the economy).
     - **What causes it?** (rising global temperatures, land use changes, water overuse and mismanagement, climate change impacts on seasonal rainfall).
     - **Where in the world is drought most common?** (sub-Saharan Africa, Southwestern US, Australia, Mediterranean Basin, Middle East and Central Asia, South Asia, South America)
   - Introduce the three focus questions of the activity:
     - How do droughts affect plant and animal life in different ecosystems?
     - What is the connection between drought, wildfires, and desertification?
     - How do invasive species interact with ecosystems under drought stress?
2. **Group Research**

   Break youth into small groups and assign one of the following research tasks per group (or let them choose):

   - **Group A – Ecosystem Impacts**

- Choose one ecosystem (e.g., grasslands, forests, wetlands, or agricultural land).
- Research how drought changes food availability, plant health, and animal behavior.
- **Example questions:**
  - What species are most vulnerable?
  - Are there examples of species migration or population collapse?

- **Group B – Drought, Wildfires, and Desertification**
  - Explore how drought increases the risk of wildfires.
  - Learn about desertification – what it is and how it happens.
  - Investigate where this is happening (Southern Saskatchewan and Alberta - Palliser's Triangle, Thompson-Okanagan region in BC, Southwestern Manitoba).
- **Group C – Invasive Species & Drought**
  - Research how invasive species take advantage of drought-stressed ecosystems.
  - Example: cheatgrass in western North America increases fire risk; zebra mussels disrupt freshwater systems.
  - How do invasive species compete with native plants/animals for limited resources?
- Each group should:
  - Take notes or fill in a graphic organizer
  - Create a short summary or visual representation (poster, diagram, or digital slide)

3. **Present findings**
   - Each group presents their findings in 3–5 minutes.

Discussion:

What patterns did you notice across ecosystems?

How does drought trigger a chain reaction?

Why are drought impacts different in various parts of the world?

COMMUNITY GARDEN PROJECT

Design a small-scale community garden using drought-tolerant plants and water-efficient gardening techniques. Youth will research and install simple irrigation systems and develop a maintenance plan. Optional: build your community garden.

Materials:

Internet access or gardening books from library, chart paper or whiteboard for brainstorming, clipboard, graph paper, markers, pencils, sample garden layout templates.

Instructions:

1. **Intro and planning**

What is a drought-resistant plant?

Why is water-wise gardening important in a changing climate?

How can communities benefit from shared green spaces?

2. **Research (in small groups):**
   - Group A: Research drought-tolerant plants native to your region.
   - Group B: Explore water-efficient irrigation systems.
   - Group C: Find out how mulching, composting, and shade structures reduce water use.
3. **Garden Design:**
   - Sketch a layout of the garden using graph paper or digital tools.
   - Decide where to plant each species and how water will be delivered.
   - Assign garden features: walking paths, composting area, water source, shade.

Discussion:

What did you learn about sustainable gardening?

How do water-wise practices make a difference in your community?

What would you do differently next time?

RAINWATER HARVESTING SYSTEM

Design and build a small-scale model of a rainwater harvesting system that could be used in a garden or community space. Explore how capturing and reusing rainwater helps conserve water and support sustainable living.

Materials:

Per group: 1-2 empty plastic bottles, milk jugs, or small containers, plastic tubing or straws, funnels or cut-off tops of bottles, plastic trays or shallow containers, scissors and utility knives (with supervision), taps, glue, rubber bands, zip ties, mesh or coffee filters, cups, soil and small potted plants (optional), markers, paper, rulers, water.

Instructions:

1. **Introduction**

   Begin with a short discussion on:
   - What is rainwater harvesting? Collecting and storing rainwater for

future use—especially for watering gardens, flushing toilets, or even filtering for drinking in some systems.

- Why is it important?
  - Reduces reliance on municipal water
  - Helps during droughts
  - Prevents stormwater runoff and erosion
  - Supports sustainable gardening
- Show photos or diagrams of real-life systems (e.g., rain barrels, rooftop catchment systems).

2. **Design Challenge**

   Design and build a small-scale rainwater harvesting system that can collect rainwater from a roof and direct it to a garden.

- Let teams brainstorm and sketch a basic plan:
  - Where will the water be collected?
  - How will it be filtered?
  - Where will the water go?
  - Can it be stored and released later?

3. **Build the System**

   Using provided materials, teams construct a working model. Encourage them to:

- Create an elevated roof or slanted surface to collect water
- Use a funnel and tubing to channel water into a storage container
- Add mesh or filters to keep out debris
- Direct the stored water to a simulated garden area (optional)

4. **Test and Improve**

   Simulate rain using watering cans or cups of water poured over the rooftop.and observe:

- Does the system catch the water efficiently?
- Does the water flow into the storage tank?
- Does the storage tank hold and release water into the garden?
- Allow time to modify and improve designs if needed.

5. Group Presentations & Reflection

   Each team presents their model and explains:

- How it works
- What challenges they faced
- How it could be scaled up for real-life use

DISCUSSION:

What did you learn about water conservation?

Where could rainwater harvesting systems be used in your own community?

What are the barriers to using these systems widely?

YOUR LOCAL WATER SOURCES

Research your community's primary water source, learn how it is managed, and analyze how drought could affect it.

Materials:

Internet access or local library, map of BC, notebook or worksheet for recording findings, access to municipal websites or provincial water resource portals. Optional: guest speaker from your city planning office.

1. **Introduction to Water Sources in BC**
   - Common water sources in BC:
     - Surface water (lakes, rivers, reservoirs)
     - Groundwater (wells, aquifers)
     - Glacier- or snowpack-fed systems
   - BC's reliance on mountain snowpack and seasonal rainfall
   - Growing concerns: climate change, drought, and population growth
   - Discuss how droughts impact:
     - Drinking water supply
     - Agriculture and irrigation
     - Hydroelectric power generation
     - Salmon-bearing streams and ecosystems
2. **Research Your Local Water Source**
   - Assign each participant (or group) to:
   - Identify their local water source. Use tools such as:
     - Local government or water utility websites (search "your city/town + water supply")
     - BC Water Tool: *https://www.bcwatertool.ca/*
     - Open data portals or community environmental reports
   - Answer key questions:
     - What is the name and type of your main water source?
     - Is it surface water or groundwater?
     - How is it treated and distributed?
     - What organizations manage it (e.g., local government, regional district)?
     - Has this source been impacted by droughts in the past?
   - Investigate drought risk:
     - How would a severe drought affect this water source?
     - Has your community had water restrictions or emergency plans in the past? What plans are in place?
     - What conservation efforts are already underway in your community?

Discussion:

Which communities are most vulnerable to drought?

What solutions are communities using (e.g., rainwater harvesting, reservoirs, tiered water pricing)?

How could your community improve its drought preparedness?

What surprised you about your water system?

What small actions can you take to conserve water?

Optional Extension:

- Create a digital water awareness campaign using Canva, social media, or posters.
- Write a letter to a local leader (mayor, MLA or MP) suggesting a water-wise

policy idea or expressing interest in water sustainability.

THUNDERSTORM ACTIVITIES:

STATIC ELECTRICITY

Youth explore how lightning forms.

MATERIALS:

Balloons, wool or fleece cloth, aluminum pie pan, styrofoam plates or cups, metal spoon or fork, darkened room (optional, to better see sparks)

INSTRUCTIONS:

1. Inflate balloons and rub them vigorously on wool or fleece (creating static charge).
2. Hold charged balloon near aluminum pie pan or metal utensil to see tiny sparks or feel a slight shock.
3. Observe static electricity discharging, simulating lightning formation.

DISCUSSION:

How does static electricity form in thunderstorms?

Why do thunderstorms create lightning?

What safety measures should we follow during lightning storms?

THUNDERSTORM SOUND EXPLORATION

Youth identify thunderstorm phases and features (rain, thunder, lightning) through audio recordings.

MATERIALS:

Computer or smartphone, speakers or headphones, audio recordings of thunderstorms (available online: YouTube, NOAA), notebook for observations

INSTRUCTIONS:

1. Play thunderstorm audio , pausing to discuss each sound:
   - Heavy rain
   - Thunder (rolling vs. cracking)
   - Wind and lightning strikes
2. Youth record observations about storm intensity and distance based on thunder sound delays (counting seconds between lightning and thunder).
3. Explain how thunder sound relates to storm distance. count the number of seconds between the flash and the sound of the thunder. Then divide that number by 3. Example: if you count 6 seconds, the lightining is approximately 2 kilometers away (6 / 3 = 2).

DISCUSSION:

How can you estimate the distance of lightning using thunder?

Why does thunder have different sounds (rumbling vs. sharp cracks)?

How can understanding thunderstorm sounds help us stay safe?

SUPERCELL STORM IN A JAR

Supercell storms are a unique and powerful type of thunderstorm. Their formation requires a specific set of atmospheric conditions, including wind shear, instability, moisture, and a triggering mechanism such as a front, low-pressure system, or upper-level disturbance.

In this activity, youth create a visual simulation of a rotating supercell thunderstorm, demonstrating the storm's structure and rotation.

Materials:

Clear large glass jar or transparent plastic container (1–2 liters), water (room temperature), liquid dish soap, food colouring (blue, dark grey, or purple for storm colours), glitter or small pieces of paper confetti (optional, for visibility of rotation), measuring spoon, stopwatch or timer (optional)

Instructions:

1. **Prepare the jar**
   - Fill the jar about ¾ full with water at room temperature.
   - Add 3–4 drops of food colouring (dark colour, like grey or blue) to represent storm clouds.
2. **Add the "Storm Ingredients"**
   - Add 1 tablespoon of liquid dish soap to the water (this helps simulate cloud formation and rotation).
   - If desired, sprinkle glitter or small paper confetti to visually track rotation and motion.
3. **Create the Supercell**
   - Securely place the lid on the jar tightly.
   - Hold the jar firmly, and quickly swirl it in a circular motion for about 10–15 seconds to create a rotating motion inside.
   - Place the jar on a flat surface and observe closely.
4. **Observe the Supercell Simulation**
   - Watch the rotating motion that forms inside, simulating the rotation (mesocyclone) of a supercell.
   - Note the formation of cloud-like layers (due to soap bubbles and coloured water), representing storm structures.
   - If glitter or confetti was used, observe how particles rotate around the centre, mimicking a real supercell rotation.

Discussion:

What makes a supercell different from a regular thunderstorm?

Why does rotation happen in a supercell?

How do supercells relate to tornado formation?

What weather conditions help create supercells?

FARADAY CAGE

Building a Faraday cage is a great way to learn about electromagnetic fields and how they can be shielded. Your closed-top vehicle or a building with plumbing and electricity acts as a Faraday cage, drawing lightning current away from you (not tents or picnic shelters or porta potties). ***When thunder roars, go indoors!***

Materials:

A cardboard box (a shoebox or similar size is ideal), aluminum foil (heavy-duty is preferred), copper mesh or wire mesh (fine mesh is better for blocking higher frequencies) alternative: more aluminum foil, clear tape (conductive copper tape is ideal, but regular clear tape works for this demonstration),scissors or a utility knife (adult supervision recommended), smart phone or a small AM/FM radio. Optional: a multimeter (to measure conductivity).

Instructions:

1. **Prepare the Box:**
   - Ensure the cardboard box is clean and dry.
   - If using a utility knife, an adult should

perform the cutting.

2. **Line the Inside with Foil:**
   - Cut pieces of aluminum foil to fit each inside surface of the box (bottom, sides, and top).
   - Completely cover the inside of the box with foil, ensuring the foil pieces overlap slightly at the edges.
   - Use clear tape to secure the foil to the inside of the box. Make sure the foil is as flat as possible against the cardboard.
   - If copper mesh is used, skip this step, and do the next step instead.
3. **Alternative: Line the Inside with Copper Mesh/Wire Mesh:**
   - If using copper mesh, cut the mesh to fit each inside surface of the box.
   - Completely cover the inside of the box with the mesh, ensuring the mesh pieces overlap slightly at the edges.
   - Use copper tape or regular clear tape to secure the mesh to the inside of the box.
4. **Seal the Box:**
   - Completely cover the outside of the box with aluminum foil, ensuring that the outside foil connects with the inside foil at the edges.
   - ***If copper mesh was used inside, you can still use foil on the outside, or wrap the outside with more copper mesh.***
   - Pay close attention to the lid of the box, ensuring that it is also completely covered and that the foil on the lid makes good contact with the foil on the box's body when closed.
   - Use tape to secure the outside foil, sealing all seams and edges.
5. **Test the Faraday Cage:**
   - Place a cell phone inside the Faraday cage.
   - Close the lid tightly.
   - Have someone call the cell phone.
   - The phone should not ring or receive a signal (or it may receive a very weak signal, depending on the cage's effectiveness).
   - Alternatively, place a small AM/FM radio inside the cage. AM signals are more easily blocked than FM. Tune the radio to a station, and then close the box. The signal should weaken or disappear.
   - If a multimeter is available, test the conductivity of the foil or mesh covering the box. There should be a continuous conductive path.

Discussion:

- Discuss real-world applications of Faraday cages, such as protecting electronic equipment from electromagnetic interference (EMI) and lightning strikes.

THUNDERSTORM SAFETY PUBLIC SERVICE ANNOUNCEMENT

Have youth create a public service announcement (PSA) that educates the public on how to stay safe during a thunderstorm. Record or video their PSA to share with other units and the community. Consider sharing on social media.

WILDFIRES ACTIVITIES

WILDFIRE SIMULATION

Youth visualize how wildfires spread and understand the importance of firebreaks. This activity should be done outdoors on a hard surface away from flammable items.

Material:

Large baking tray or aluminum pan, dry grass, twigs, leaves (representing forest fuel), matches or lighter (adult supervision required), sand or rocks (representing firebreaks), spray bottle filled with water (fire suppression)

Instructions:

1. Spread dry grass, twigs, and leaves evenly across the tray to represent a forest.
2. Create "firebreaks" by making lines of sand or rocks in different areas.
3. With adult supervision, ignite one edge of the dry materials.
4. Observe fire spread and how firebreaks slow or stop fire advancement.
5. Demonstrate fire suppression by spraying water.

Discussion:

How did firebreaks affect the spread of wildfire?

What factors influence how quickly a wildfire spreads?

Why is managing forest fuels important?

WILDFIRE TRACKER

Youth research and monitor real-world wildfires to understand their causes, impacts, and emergency responses.

Materials:

Computers/tablets with internet access, maps (printed or digital), poster board or digital presentation software (Google Slides, PowerPoint), markers or coloured pencils (for mapping).

Instructions:

1. Divide youth into groups; each selects a recent or active wildfire event (e.g., California wildfires, Australia bushfires, Canadian wildfires).
2. Track wildfire location, size, containment, and weather conditions using reliable sources.
3. Document:
   - Fire causes (natural, human-induced)
   - Affected areas and communities
   - Response efforts (firefighting, evacuations, community actions)
4. Present findings , discussing impacts and management strategies.

Discussion:

What common factors contributed to wildfire severity?

How do weather conditions influence wildfires?

What role does climate change play in wildfire events?

THE CHEMISTRY OF FIRE

Explore the chemical reactions involved in combustion, compare how different fuels burn, and analyze how fire affects air quality through smoke and particulate matter. This activity builds awareness of both natural and human-caused fires and their impact on the environment.

Materials:

Candle, matches/lighter, small dish or plate, heat-proof surface, safety goggles, fire extinguisher. Optional: sugar cubes, wood chips, cotton balls, rubbing alcohol. For research:

Internet access, notebook, coloured pencils.

Instructions:

1. **Combustion in Action**
   - Set up the demonstration on a heat-proof surface:
     - Place the candle on a dish or plate.
     - Ensure goggles and fire safety measures are in place.
     - Light the candle and observe:
       - The color and shape of the flame
       - The heat produced
       - Any soot or smoke given off
   - Optional Add-On (Adult-Led):
     - Carefully ignite small pieces of wood, cotton, or sugar cubes (one at a time) on a fire-safe surface to compare how each burns (e.g., smoke amount, flame color, residue left).
   - Youth record in their notebooks or worksheet:
     - What was the fuel?
     - What did the fire need to keep burning?
     - What was produced (light, heat, smoke, ash)? Combustion Chemistry – What Is Fire?
2. **Introduce the combustion reaction:**

   Fuel + O_2 → CO_2 + H_2O + heat/light

   - Define key terms:
     - Reactants: The starting Materials:(fuel and oxygen)
     - Products: Carbon dioxide, water vapor, and energy
     - Incomplete combustion: When there's not enough oxygen, producing carbon monoxide (CO), soot, and particulates

Discussion:

What surprised you about the chemistry of fire?

How do smoke and particles affect your community during wildfire season?

What actions can reduce harmful air pollution from combustion?

Optional extension:

Create a public service announcement (poster, video, or social post) warning about the health effects of smoke and how to stay safe during poor air quality days.

COMMUNITY FIRE SAFETY CHALLENGE:

Youth collaboratively design a community illustrating wildfire prevention strategies (defensible space, safe building materials, fire preparedness).

Materials:

Large poster boards or cardboard sheets, construction paper, markers, glue, scissors, recycled Materials:or LEGO bricks (optional for building structures), internet access for research (optional)

Instructions:

1. Form small groups to design and build a wildfire-resistant community
2. Illustrate key wildfire prevention methods:
   - Defensible space around homes/ buildings
   - Fire-resistant landscaping (low-risk plants, trees)
   - Evacuation routes and emergency plans

- Clear labeling and signs for fire awareness

3. Groups present their community, explaining choices for wildfire protection.

Discussion:

How can creating defensible spaces protect communities?

Why are evacuation plans crucial in wildfire-prone areas?

What else can communities do to lower wildfire risk?

AIR QUALITY ACTIVITIES

AIR QUALITY DETECTIVES

Youth will discover what particles float in the air and learn about how air quality affects our health.

Materials:

White paper plates or paper sheets, petroleum jelly, magnifying glasses, tape, markers to label

Instructions:

1. Clearly label paper plates with locations (inside classroom, outside playground, near roads).
2. Spread a thin layer of petroleum jelly on each plate.
3. Hang or place the plates in different locations, leave them for 24 hours. (youth can do this at home before meeting)
4. After collecting, use magnifying glasses to observe the dirt or particles stuck to the jelly.
5. Compare results to see which area had better or worse air quality.

Where did we find the most dirt or particles?

Why might some places have cleaner or dirtier air?

CLEAN AIR CITY

Youth build their own city model demonstrating good air quality practices.

Materials:

Large poster boards or cardboard, markers, crayons, glue, scissors, recycled Materials:(cardboard tubes, plastic bottles, paper), small toy cars, trees, buildings (optional)

Instructions:

1. Youth work in groups to design their city layout on cardboard.
2. Identify:
   - Roads, houses, schools, parks, factories.
   - Ways to keep air clean (trees, parks, bike paths, public transit).
3. Each group presents their city explaining how their designs promote clean air.

Why did you choose certain features to keep air clean?

How can trees, bikes, and parks help air quality?

WEATHER PREPAREDNESS ACTIVITIES

EMERGENCY KIT

Have them research and assemble a comprehensive emergency kit that includes essential supplies for various weather events (food, water, first-aid, communication tools, etc.).

Discuss the importance of customizing kits for different needs and locations.

Resource: *Get Prepared*

FAMILY EMERGENCY PLANS

This is an important activity that will help youth prepare for extreme weather events. Have them work together to create a weather safety plan for their homes and families. This plan should include things like evacuation routes, emergency contacts, and what to do in case of a power outage.

See template in resources.

Order the *Master of Disaster: Youth Emergency Preparedness kits* from the BC government. These free kits include a Get Ready Guide, a drawstring bag, and home emergency plan.

RESEARCHING LOCAL HAZARDS:

Have youth research the specific extreme weather hazards that are common in their region.

Discuss the unique preparedness measures needed for each hazard.

GUEST SPEAKERS

Invite experts from emergency services, meteorologists, or disaster relief organizations to speak to the group.

This provides valuable insights and real-world perspectives.

COMMUNITY RISK ASSESSMENT

Conduct a basic risk assessment of your community by identifying local vulnerabilities to extreme weather events and proposing strategies to reduce risk and improve resilience.

MATERIALS:

Map or your community of region, coloured pencils, markers, sticky dots, laptop or mobile phone for research, notebook, access to local hazard maps or data sources (*BC hazards map*, municipal or regional government websites, local news or environmental reports), large chart paper or whiteboard.

INSTRUCTIONS:

1. **Kickoff discussion**

What extreme weather events have affected your community or nearby areas?

- Common BC examples:
  - Flooding (e.g., Fraser Valley, Interior)
  - Wildfires (e.g., Okanagan, Cariboo, Kelowna area)
  - Landslides (e.g., mountainous and coastal regions)
  - Extreme heat/heat events
  - Winter storms or heavy snowfall
- Show real-life examples from near you

(Merritt flood, Lytton wildfire, Highway 1 landslide, etc.)

2. **Community Risk Assessment**
   - Map Your Area
   - Use a printed or digital map of your city/town/region to mark:
     - Key infrastructure (schools, hospitals, roads)
     - Natural features (rivers, forests, mountains)
     - Residential areas
   - Add hazard zones using symbols or color coding:
     - Blue for flood risk
     - Red for wildfire risk
     - Brown for landslide risk
     - Yellow for heat vulnerability zones (dense urban areas, few trees)
3. **Develop ideas to reduce risks and increase** community resilience.
   - What strategies could reduce the impact of these risks? Examples:
     - Installing rain gardens to reduce runoff
     - Creating defensible zones around homes
     - Building elevated walkways in flood-prone areas
     - Increasing tree cover in urban areas to reduce heat

Discussion:

What did you learn about your community's vulnerabilities?

How could you share this information with others?

What role can youth play in disaster preparedness?

DISASTER RELIEF VOLUNTEERING

Have youth volunteer with a local organization that provides disaster relief.

They can help with tasks such as packing supplies, distributing food and water, or providing emotional support to those affected by extreme weather events.

Encourage them to reflect on their experiences and the importance of community resilience in the face of extreme weather.

WEATHER MAP SYMBOLS

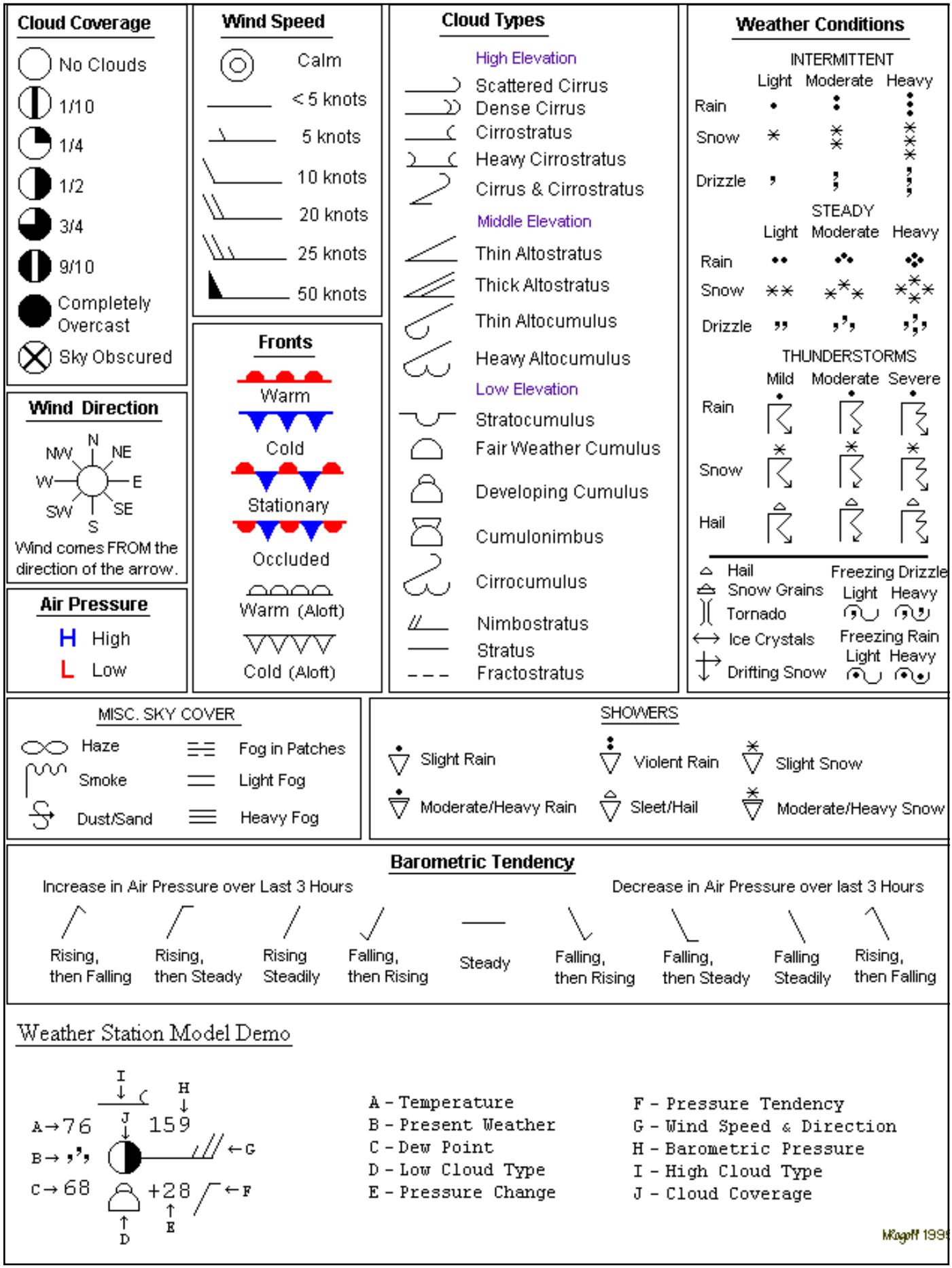


Image credit: *Earth, Ocean, and Atmospheric Sciences department, UBC*

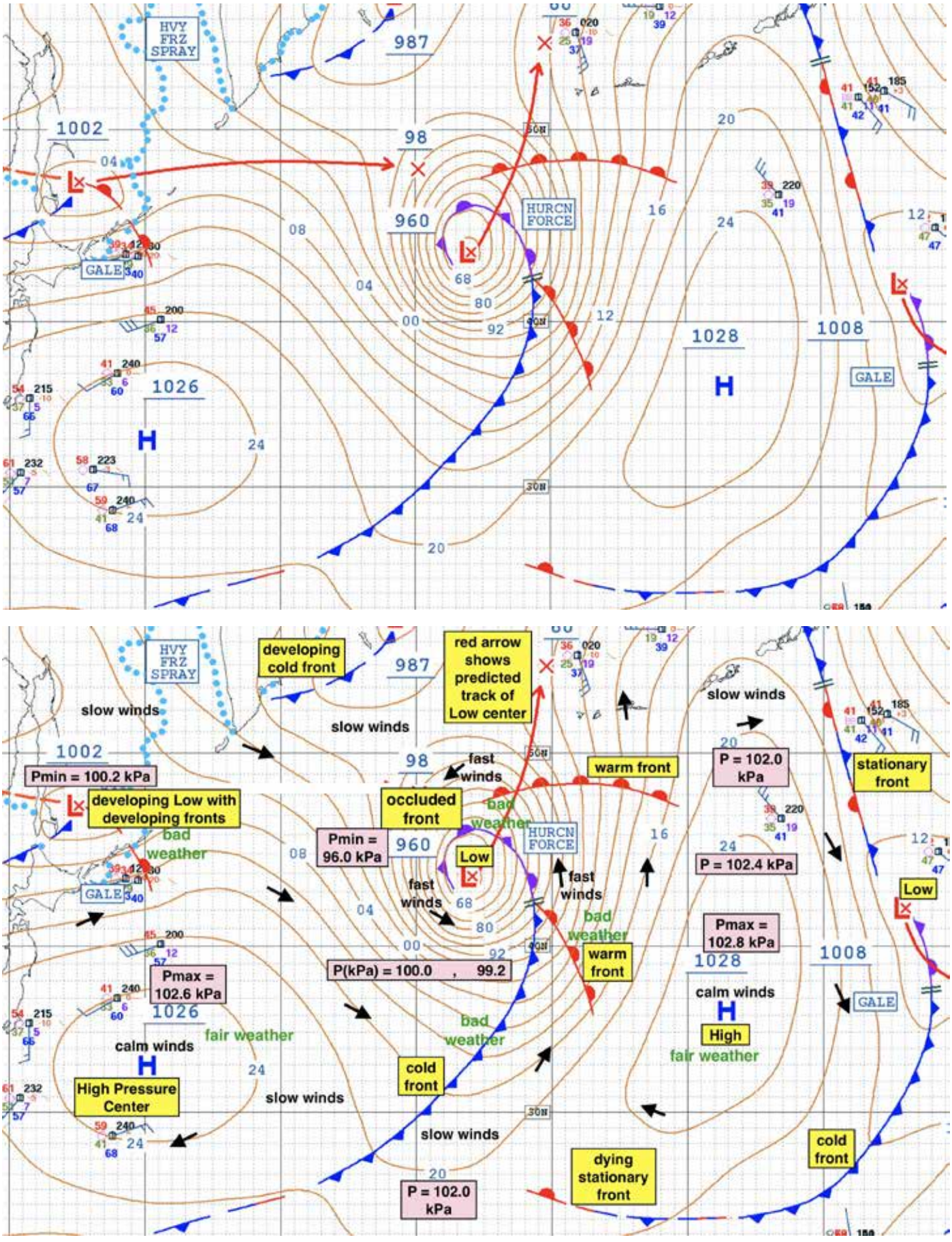


Image credit: *Earth, Ocean, and Atmospheric Sciences department, UBC*

Cloud Viewer

1 2 3

High-level Clouds

are white and thin-looking. At sunrise or sunset, they can be very colorful. They are most often made of ice crystals.

4 5 6

Mid-level Clouds

are made mostly of water droplets. When temperaures are very low, the water droplets can turn to ice crystals.

Saucer-shaped lenticular clouds are common in mountainous regions of the world.

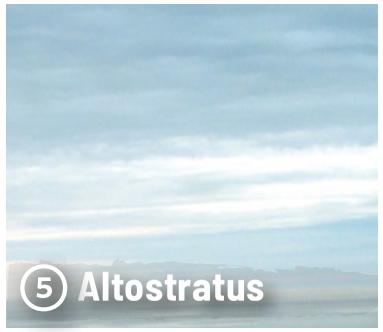
UCAR CENTER FOR SCIENCE EDUCATION

How are clouds classified?

Scientists classify clouds by how high they are in the sky (low, medium or high), and by whether they are flat (stratus), puffy (cumulus), rain-filled (nimbus), or a combination of these characteristics.

How does the Cloud Viewer work?

Cut along the dashed line in the center of the page. Look through the opening in the Cloud Viewer at the sky above you. What types of clouds do you see today? Use the Cloud Viewer to help you classify the clouds outside.



7 8 9 10

Low-level Clouds

are made of water droplets. Cumulonimbus clouds (9) can rise rapidly causing water droplets to turn to ice.

Sky Viewer

Use this **SKY VIEWER** to identify and match the sky's colors. Why does the color of the sky vary? What makes it bright blue or light blue? Is the sky's color the same from low on the horizon to high above us? Why might the sky's color vary over space and time? Why are some clouds dark and some bright white? What can cause the sky to turn orange, pink, yellow, and/or red at sunrise or sunset? Which particulates in the sky create smog? And where does the blue sky go when night falls? Be an atmosphere explorer and find the answers to these and other questions!

UCAR CENTER FOR SCIENCE EDUCATION

Learn more about the sky!

SciEd.ucar.edu/clouds
SciEd.ucar.edu/atmosphere
SciEd.ucar.edu/apps/cloud-guide

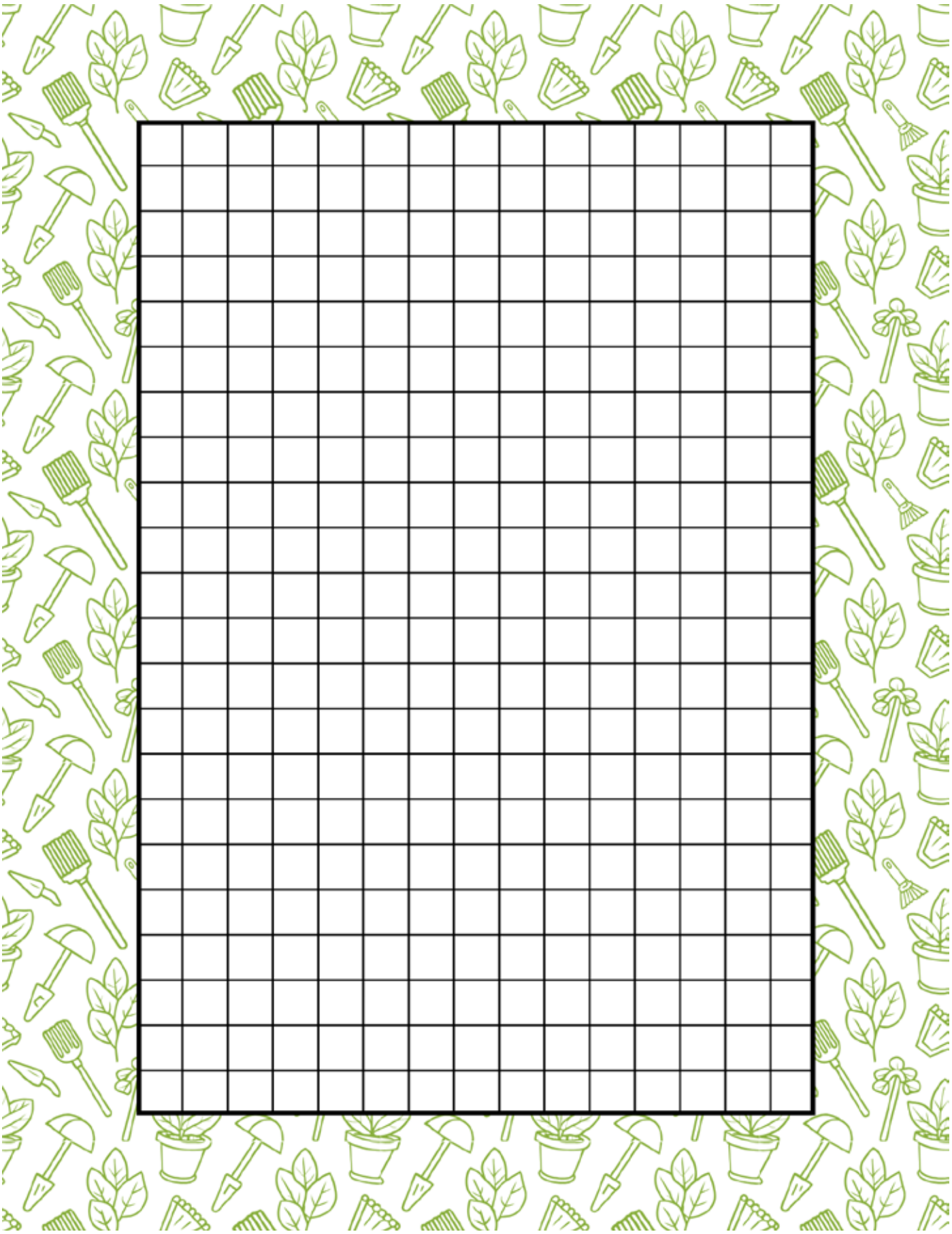
Less particles = bluer sky

More particles = whiter sky

12.2021.10000

URBAN HEAT ISLAND CHART

GARDEN LAYOUT TEMPLATE



WEATHER MATCH GAME

Lightning

Rainbow

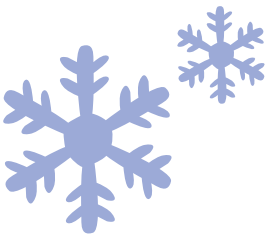
Sunny

Sleet, Rain

Partly Cloudy

Stormy

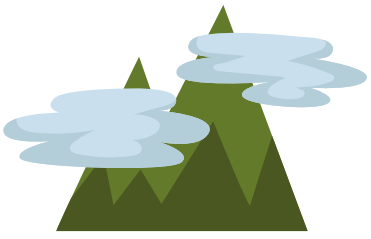
Tornado



Snowy

Hail

Windy



Foggy

Cloudy

FOOD CHAIN CARDS

THUNDERSTORM DIAGRAM

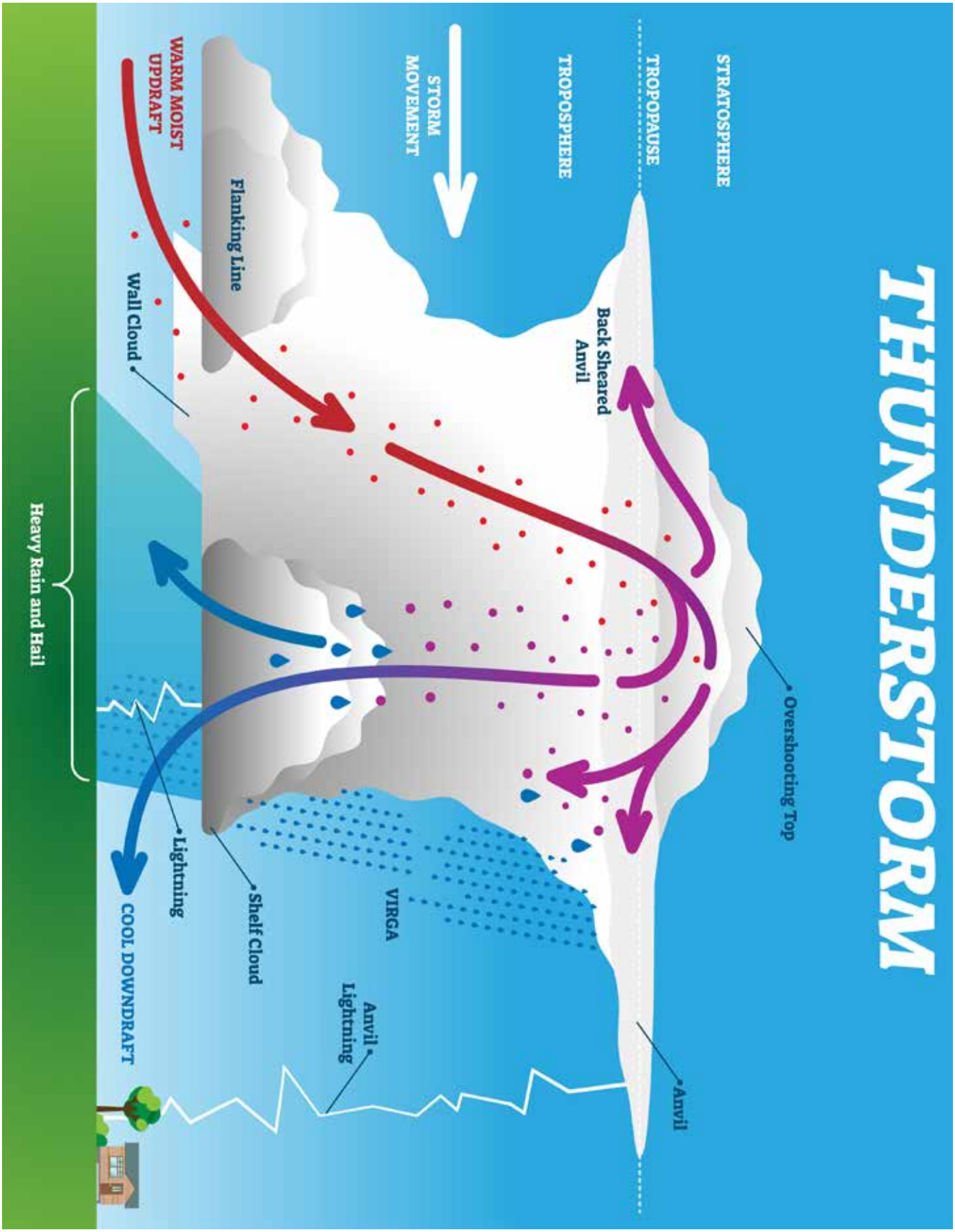


Image credit: Royal Meterological Society

FAMILY EMERGENCY PLAN TEMPLATE

This plan will help you and your family prepare for and respond to emergencies. Keep a copy in an easily accessible location, and review it regularly.

COMMUNICATIONS

Emergency contact list

Family member 1	Name: _____ Phone #: _____ Address: _____
Family member 2	Name: _____ Phone #: _____ Address: _____
Family member 3	Name: _____ Phone #: _____ Address: _____
Family member 4	Name: _____ Phone #: _____ Address: _____
Family member 5	Name: _____ Phone #: _____ Address: _____
Family member 6	Name: _____ Phone #: _____ Address: _____
Out-of-town contact	Name: _____ Phone #: _____
Emergency services	9-1-1 (if applicable) Local police (non-emergency) _____ Local fire department (non-emergency): _____
Communications plan	How will we communicate during an emergency? (e.g., phone, text, radio, in-person): _____ _____ Our go-to methods for staying informed are: (e.g., local radio station _____, news channels _____, official alerts _____): _____ _____ _____

COMMUNICATIONS

FAMILY EMERGENCY PLAN TEMPLATE

SAFE MEETING PLACES

Near home	Designated location: _____
Out-of-town	Designated location: _____
Family meeting place(s)	Designated location: _____
Communications	How will we communicate these locations to everyone?: _____ _____ _____ _____ _____ _____

EVACUATION ROUTES

Neighbourhood routes	Evacuation routes from our neighbourhood: _____ _____ _____ _____ _____ _____
Evacuation plan	Designated location: _____
Communications	If told to evacuate, we will: _____ _____ Our plan for getting to our designated out-of-town meeting place: ___ _____ _____ _____ _____ _____ _____

Home floor plans (Draw a floor plan of your home on a separate page. Include all exits, and pinpoint two escape routes for each room.)	

EMERGENCY SUPPLY KIT

Location of Emergency Kit: _____

Basic Needs:

❒ Water (at least 3 litres/person/day)
❒ Non-perishable food (3-day supply)
❒ First-aid kit
❒ Flashlight and batteries
❒ Radio (with a battery)
❒ Whistle
❒ Dust mask
❒ Moist towelettes, garbage bags, and plastic ties
❒ Wrench or pliers to turn off utilities
❒ Manual can opener

Medications:

❒ Prescription medications: _____

_____

❒ Over-the-counter medications: _____

_____

Important Documents:

❒ Copies of insurance policies
❒ Copies of identification

Other:

❒ Cash
❒ Extra clothing and blankets
❒ Pet supplies (food, water, leash, etc.): _____

_____

GROUND

Image credit: *ClimateCheck*

SURFACE

Image credit: *Freepik*

WILDFIRE TYPES

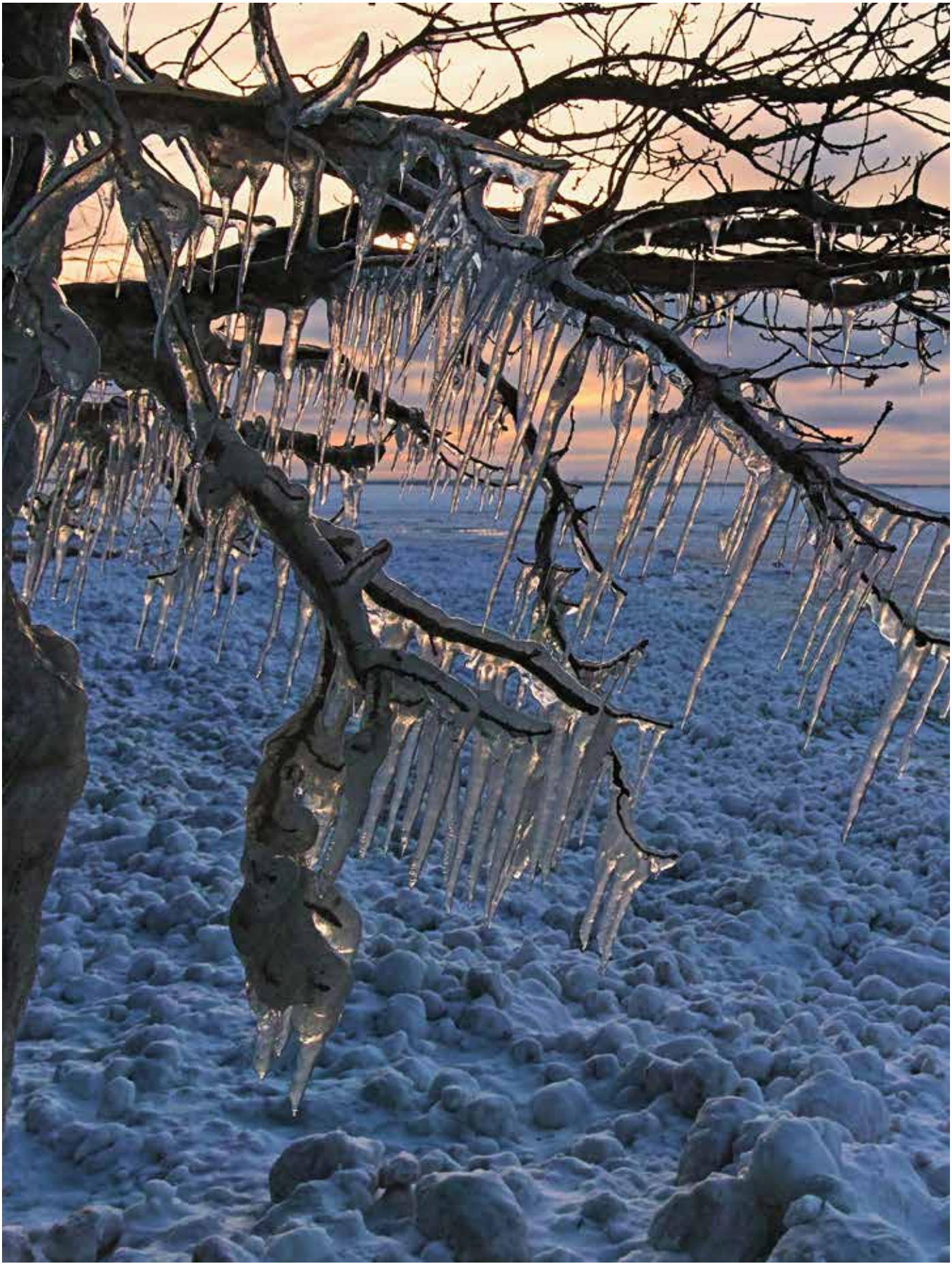
CROWN

Image credit: *Colorado State University*

Image credit: *Government of Ontario*

WINTER PICTURES

WINTER PICTURES



RAIN AND THUNDERSTORM PICTURES

RAIN AND THUNDERSTORM PICTURES

RAIN AND THUNDERSTORM PICTURES

DROUGHT PICTURES

DROUGHT PICTURES

FLOOD PICTURES

AIR QUALITY PICTURES

Image credit: Surrey Now-Leader

Image credit: Hazy Toronto skyline. Global News

TORNADO PICTURES

Image credit: Tornado in Ontario, Global News

Image credit: Tornado touching down in Alberta, ABC News

HURRICANE PICTURES

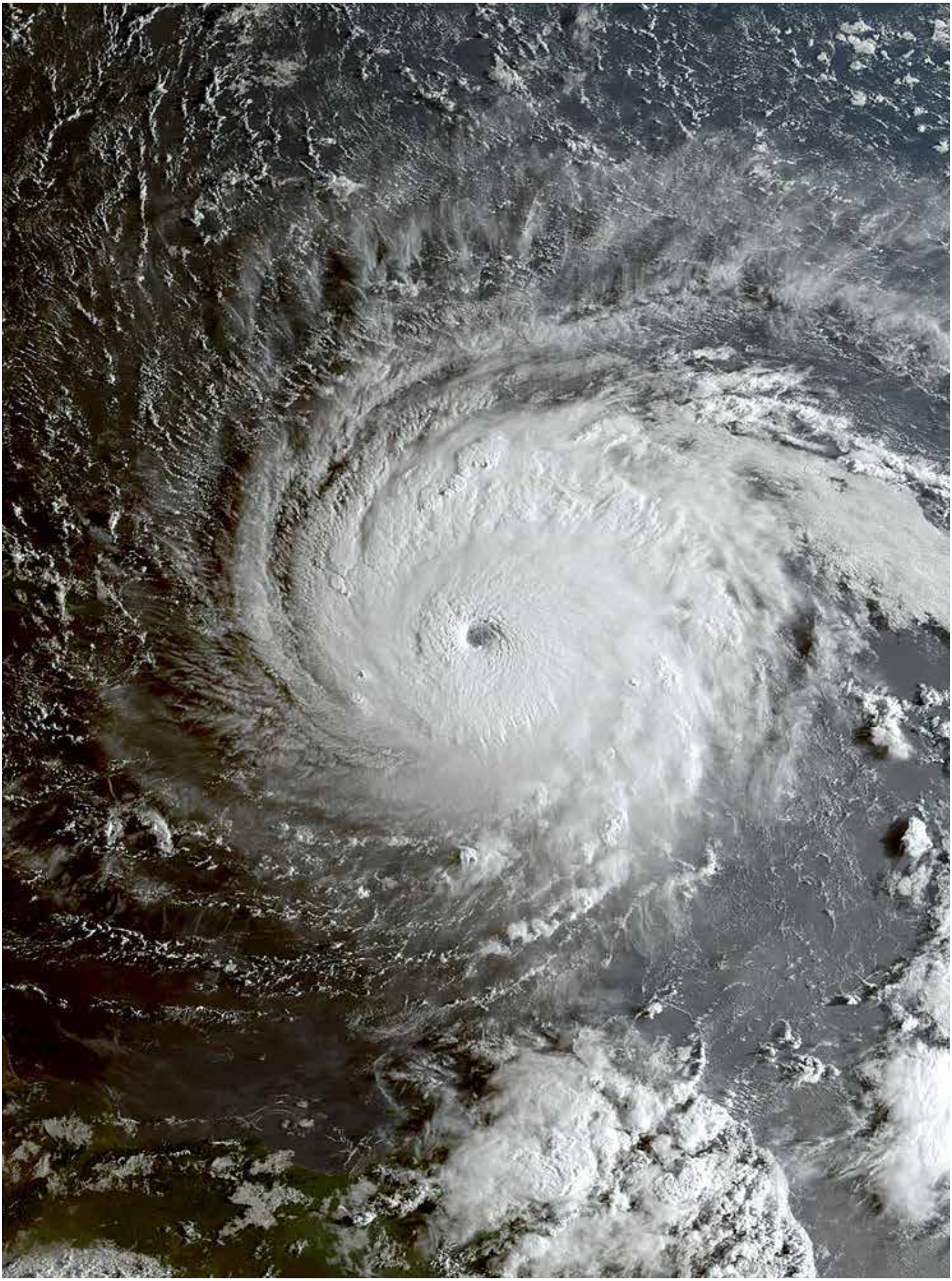


Image source: NOAA's GOES-16 Satellite

WILDFIRE PICTURES

WILDFIRE PICTURES

GENERAL WEATHER ACTIVITIES

Weather Bingo (Sparks and Embers): 4

Weather Matching Game (Sparks and Embers): 4

Weather Story Time (Sparks and Embers): 4

Weather Painting (Sparks and Embers): 4

Weather Masks (Sparks and Embers): 4

Extreme Weather Charades (Guides): 16

Extreme Weather Trivia or Jeopardy (Guides): 16

Weather Forecasting (Guides): 16

Climate Data Analysis (Pathfinders and Rangers): 42

Citizen Science Projects (Pathfinders and Rangers): 42

Build Your Own Weather Station (Pathfinders and Rangers): 42

Wind Vane: 43

Emergency Response Simulations (Pathfinders and Rangers): 44

Extreme Weather & Climate Change (Pathfinders and Rangers): 45

Climate Action Advocacy (Pathfinders and Rangers): 45

Debate and Discussion (Pathfinders and Rangers): 46

HEAT EVENT ACTIVITIES

Make Your Own Fan (Sparks and Embers): 5

Ice Cube Melt Race (Sparks and Embers): 5

Rainbow Fan Origami (Guides): 16

Heat event in a Jar (Guides): 17

Beat the Heat Challenge (Guides): 18

Creating a Cooling Kit (Guides): 18

Heat event Formation (Pathfinders and Rangers): 46

Heat Wave Impact Mapping (Pathfinders and Rangers): 47

The Impact of Vegetation (Pathfinders and Rangers): 48

Design a Heat Action Plan (Pathfinders and Rangers): 48

Building a Heat-Resilient City (Pathfinders and Rangers): 48

Urban Heat Island Effect (Pathfinders and Rangers): 49

WINTER STORM/COLD SNAP ACTIVITIES

Ice Melt (Sparks and Embers): 5

Build a Snow Fort (Indoor Version) (Sparks and Embers): 5

Warm Clothing Relay (Sparks and Embers): 6

Snowstorm in a Jar (Sparks and Embers): 6

Fake Snow (Sparks and Embers): 6

Snowflake Science (Guides): 19

Cold Air Density Experiment (Guides): 19

Weather Map Analysis (Guides): 20

First Aid for Cold Injuries (Guides): 20

Hand Warmers (Guides): 20

Snowball Relay Race (Guides): 21

Mini Blizzard (Guides): 22

What Keeps Ice Coldest? (Pathfinders and Rangers): 50

Frost in a Can (Pathfinders and Rangers): 51

The Science of Hypothermia (Pathfinders and Rangers): 51

Dress for Survival - Clothing and Insulation Experiment (Pathfinders and Rangers): 52

Cold Impact Investigation (Pathfinders and Rangers): 52

RAINSTORMS, ATMOSPHERIC RIVERS, AND FLOODING ACTIVITIES

Rain Cloud in a Jar (Sparks and Embers): 7

Build a Flood Barrier (Sparks and Embers): 7

Water Absorption Experiment (Sparks and Embers): 8

Make a Rain Gauge (Sparks and Embers): 7

Water Cycle in Action (Guides): 22

Building a Rain Gauge (Guides): 23

Floodplain in a Pan (Guides): 24

Flood Safety Relay Challenge (Guides): 25

Sparkling Lightening Jar (Pathfinders and Rangers): 53

Atmospheric River in a Bottle (Pathfinders and Rangers): 53

The Impact of Land Use (Pathfinders and Rangers): 54

Flood Mitigation (Pathfinders and Rangers): 54

Building Flood-Resistant Structures (Pathfinders and Rangers): 55

TORNADOES, HURRICANES, AND TYPHOONS ACTIVITIES

Tornado in a Bottle (Multiple): 9, 26, 59

Jellyfish Wind Sock (Sparks and Embers): 10

Wave in a Bottle (Sparks and Embers): 10

Hurricane in a Bowl (Pathfinders and Rangers): 26

Air Pressure Experiments (Guides): 27

Watch vs. Warning: Ready, Set, Go! (Guides): 28

Model Storm Shelter (Pathfinders and Rangers): 56

Hurricane Simulation (Pathfinders and Rangers): 57

DROUGHT ACTIVITIES

Plant a Drought-Tolerant Seed (Sparks and Embers): 10, 33

Make a Water Cycle Model (Sparks and Embers): 12

Water Cycle Revisited (Guides): 28

Soil Moisture Experiments (Guides): 29

Evaporation Race (Guides): 30

Drought Domino Effect (Guides): 31

Water Conservation (Guides): 32

Impact of Drought on Ecosystems (Pathfinders and Rangers): 59

Community Garden Project (Pathfinders and Rangers): 60

Rainwater Harvesting System (Pathfinders and Rangers): 61

Your Local Water Sources (Pathfinders and Rangers): 63

THUNDERSTORM ACTIVITIES

Indoor Lightening Safety (Sparks and Embers): 13

Demonstrate a Thunderstorm (Sparks and Embers): 13

Rain Cloud in a Jar (Guides): 34

Static Electricity Fun (Guides): 35

Sound and Light Experiment (Guides): 35

Thunderstorm Diagram (Guides): 36

“30-30 Rule” (Guides): 36

Lightening Photography (Guides): 37

Static Electricity (Pathfinders and Rangers): 64

Thunderstorm Sound Exploration (Pathfinders and Rangers): 64

Supercell Storm in a Jar (Pathfinders and Rangers): 64

Faraday Cage (Pathfinders and Rangers): 65

Thunderstorm Safety Public Service Announcement (Pathfinders and Rangers): 66

WILDFIRE ACTIVITIES

Fire Safety Role-Play (Guides): 14

Build a Fire Break (Guides): 14

The Fire Triangle (Pathfinders and Rangers): 37

Types of Wildfires (Pathfinders and Rangers): 38

Defensible Space (Pathfinders and Rangers): 38

Good Fire vs. Bad Fire - Controlled Burns (Pathfinders and Rangers): *38*

Guest Speakers (Guides): *38*

Wildfire Simulation (Pathfinders and Rangers): *66*

Wildfire Tracker (Pathfinders and Rangers): *67*

The Chemistry of Fire (Pathfinders and Rangers): *67*

Community Firesmart Challenge (Pathfinders and Rangers): *69*

AIR QUALITY ACTIVITIES

Bubble Chase (Sparks and Embers): *15*

Leaf Dust Test (Sparks and Embers): *15*

Lung Power Challenge (Sparks and Embers): *15*

Air Quality Detectives (Guides): *39*

Clean Air City (Guides): *39*

Air Quality Detectives (Pathfinders and Rangers): *69*

Clean Air City (Pathfinders and Rangers): *70*

WEATHER PREPAREDNESS ACTIVITIES

Weather Safety Kit (Sparks and Embers): *15*

Weather Emergency Plan (Sparks and Embers): *15*

Weather Safety Kit Scavenger Hunt (Guides): *39*

Build a Weather Shelter (Guides): *40*

Create a Weather Safety Plan (Guides): *41*

Emergency Kit (Pathfinders and Rangers): *70*

Family Emergency Plans (Pathfinders and Rangers): *70*

Researching Local Hazards (Pathfinders and Rangers): *70*

Guest Speakers (Pathfinders and Rangers): *70*

Community Risk Assessment (Pathfinders and Rangers): *70*

Disaster Relief Volunteering (Pathfinders and Rangers): *71*

THANK YOU

We'd love to see your youth in action! Send photos or your unit participating in the extreme weather activities to bc-program@girlguides.ca**.**