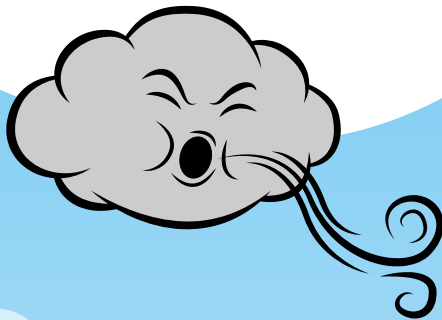
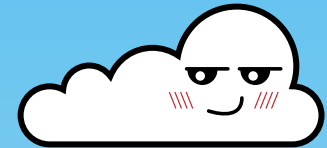




# The Science of Weather



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## WEATHER SCIENTISTS!

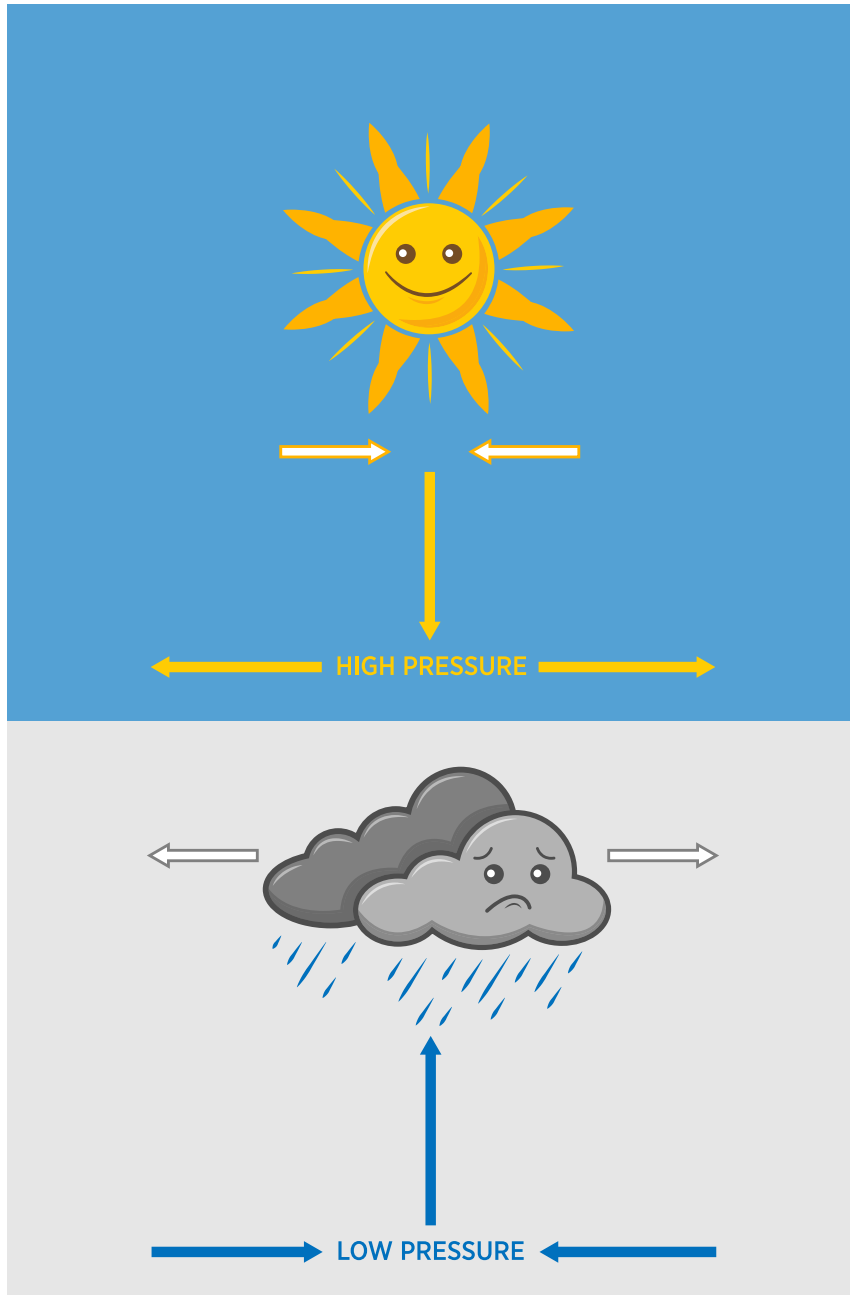
What's the weather today? To find out, we turn to Meteorologists—the Weather Scientists. They are able to forecast if it's going to be sunny, warm, windy or rainy today, and even several days from now. There's a lot of science that goes into forecasting the weather—let's learn more about it!

Meteorology is the study of the Earth's atmosphere—the layer of gases that surround the earth. Meteorologists, like CBC's Ryan Snoddon, use science to study the Earth's atmosphere and predict what the weather will be like today, tomorrow, or even next week. That's called "forecasting."

In order to forecast the weather accurately, Ryan looks at things like a **ridge of high pressure** and a **trough of low pressure**, and the boundaries between them. Those boundaries are called "weather fronts."

"Hi! I'm Ryan. I'm a Meteorologist at CBC Nova Scotia. Let's explore weather together."





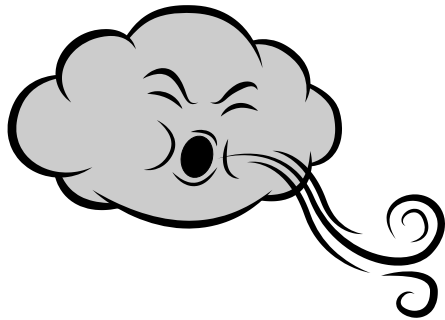
## LET'S EXPLORE THE SEASONS: The Basics

In Nova Scotia we have four seasons with their own unique weather: Spring, Summer, Fall and Winter. We have different seasons because of the way the earth is tilted toward or away from the sun. In summer, the Northern Hemisphere where we live is tilted **toward** the sun. In the winter, it is tilted **away** from the sun.

In this booklet we're going to explore Fall and Winter weather events and how you can use science to explore weather patterns, and even measure them. To learn more, follow along on Ryan's Facebook and Instagram pages (ask your parents first). You can ask weather questions, share your weather stories, and post pictures of your weather experiments!

## IT'S WINDY OUT THERE!

Wind is a constant in our lives. We've learned to use its power by building windmills and electrical turbines. It also has a big effect on our weather. It can even create things like tornadoes and hurricanes.

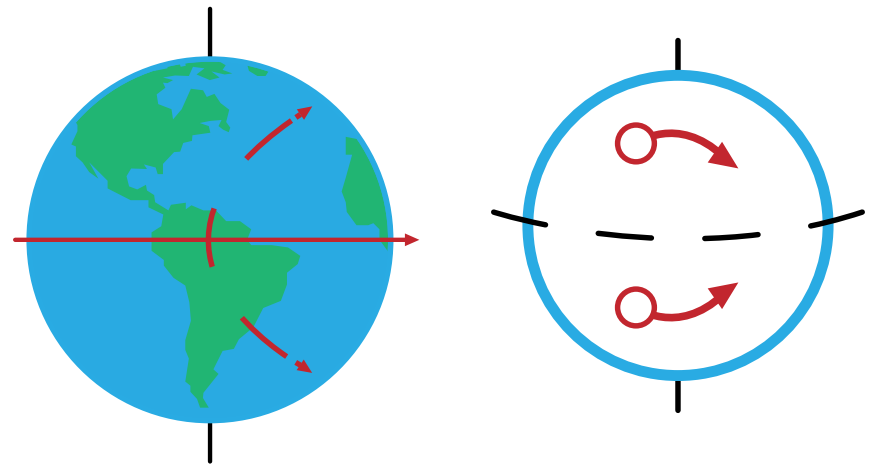


So where does the wind come from? One way wind is created is when cold air meets warm air. Cold air has a **higher pressure** because air contracts (gets smaller) when it is cold.

When that high pressure meets low pressure (warm, expanded air), the high pressure air quickly moves toward the low pressure air where there is room for it to expand.

The spinning of the earth deflects that air a bit, making it swirl around more—causing wind.

**FUN FACT!** The Coriolis Effect is the name for the effect the Earth's rotation has on wind.

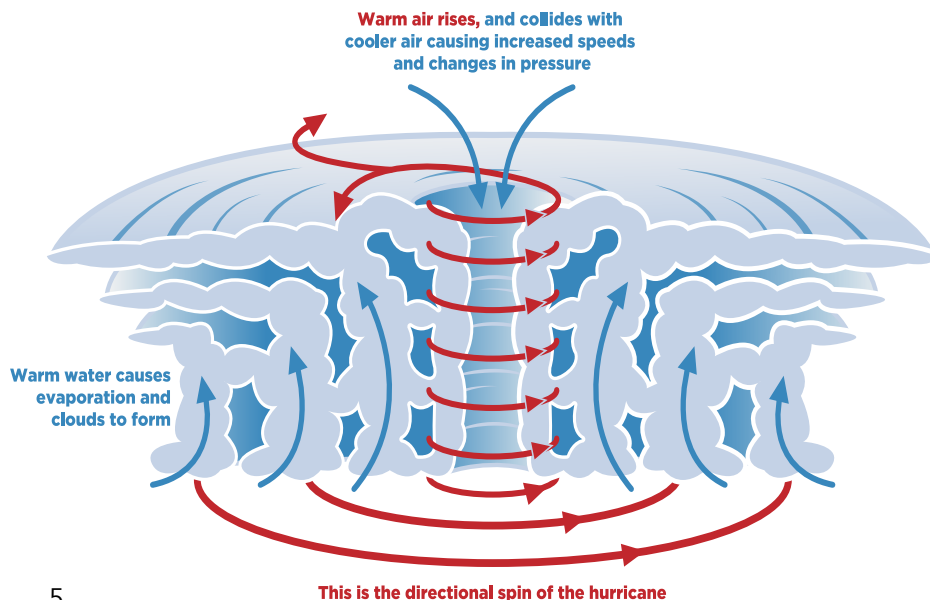


So how do we know how hard the wind is blowing and what that means for the weather? Meteorologists use two measurements: **direction** and **speed**. With these pieces, we can forecast storms coming in.

## HURRICANES AND TORNADOES!

Here in Nova Scotia, we talk a lot about hurricanes in the Fall—we call it **Hurricane Season!**

Hurricanes start out over the ocean where the water is nice and warm. These huge storms bring high winds, heavy rain, and sometimes even floods. They have wind speeds of more than 120 km/h—faster than a car on the highway—with the strongest winds around their centre, known as the **Eye of the Hurricane.**



**FUN FACT!** We call these hurricanes in Canada, but the same storm is called a cyclone in the Indian Ocean, and a typhoon in Southeast Asia.

Tornadoes are even faster. Tornadoes are storms that form under thunderstorms, over land (when they form over water, we call them Water Spouts). They are smaller in size than hurricanes, but much more powerful and concentrated, reaching speeds up to 500 km/h. More than twice as fast as the fastest race cars!

Tornadoes are one of the most powerful types of weather systems, but they are extremely rare in Atlantic Canada.



## SENSATIONAL SNOW!

When the snow falls, we bring out the shovels and sleds—but do you know how snow is made? In the Water Cycle, we have water evaporating from the earth and going up as vapour to the atmosphere. When it condenses it creates clouds, and when clouds become heavy it rains, and the cycle repeats. Snow happens when the water cycle skips a step: cold winter air freezes the water high in the atmosphere before it has a chance to fall as rain.



**SNOWFLAKES:** the whimsical part of our winters!



Snowflakes are made of ice crystals. Every snowflake that falls is six-sided and made of as many as 200 ice crystals. That's a lot of crystals in one tiny flake! Using a magnifying glass, you can see the crystals in snowflakes. Try it at home and share your findings on Facebook or Instagram with Ryan!

## LET'S BUILD A BAROMETER!

You can use science at home to understand and measure the weather! Here's a fun project to try: building your own Barometer. A Barometer is a tool Meteorologists use to measure high and low pressure and forecast if it will be sunny or rainy in the next few days!

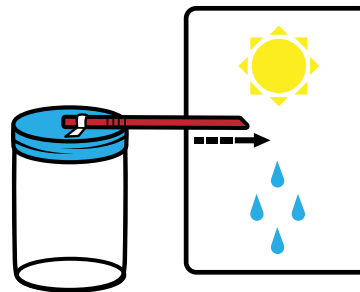
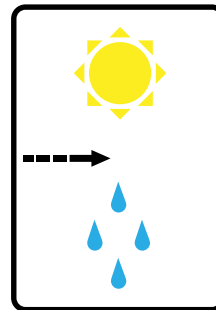
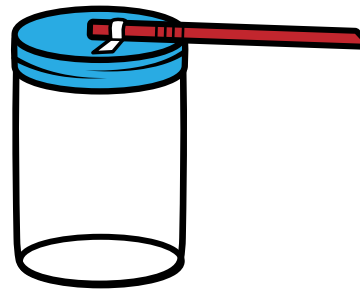
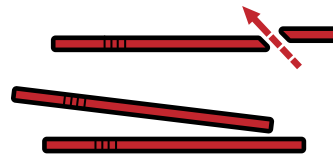
### Materials List:

- Glass jar (no lid)
- Drinking straw
- Balloon
- Markers and paper
- Scissors
- Tape
- Thick elastic band



### Step-by-Step Guide:

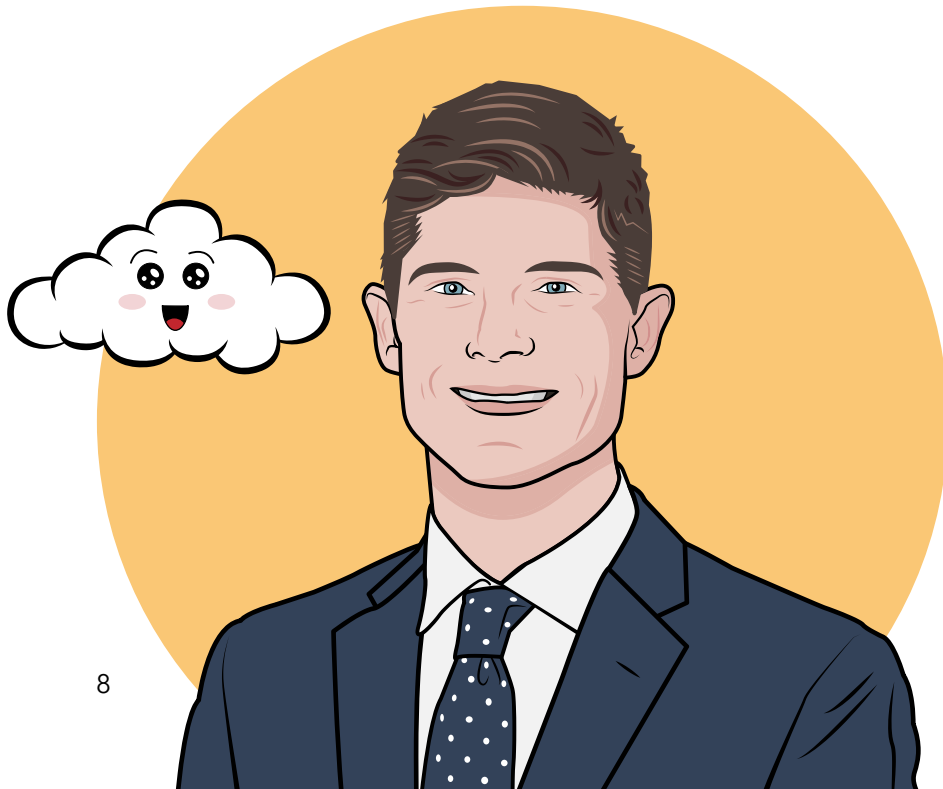
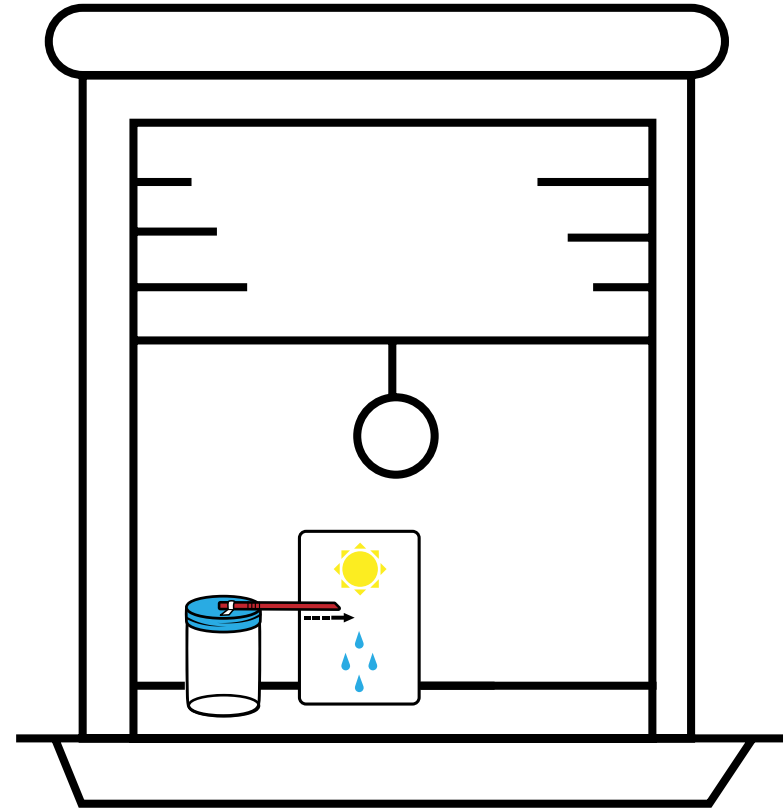
1. Carefully, cut the neck of the balloon off.
2. Take the bottom part of the balloon (the big part!) and stretch it over the opening of the jar. You want this to be tight.
3. Secure it with the elastic band.




4. Carefully, cut the end of the straw on an angle, making a pointer.
5. Tape the round end of the straw to the centre of the balloon lid.
6. Using the paper and markers, draw a sun on the upper part of the page, and drops on the lower part of the page, and mark the middle where the pointy end of the straw rests. Now, place that page behind the barometer so the straw lines up with your arrow.
7. You're set! Place your barometer on a window ledge and start monitoring the results!

## MONITORING YOUR BAROMETER

Watch what happens! When the pressure outside the jar is higher than inside it, it will push the balloon down, which will push the straw tip upwards, towards the sun on the page. When the pressure outside changes, so that it is lower than the pressure inside the jar, you'll see the balloon bubble up, and push the straw point down. This is an indication of rain!



Share your barometer and weather questions with Ryan on Facebook and Instagram! You could be featured on CBC Nova Scotia's evening news or on Ryan's social media channels!

 [facebook.com/ryan.snoddon](https://facebook.com/ryan.snoddon)

 [instagram.com/ryansnoddon](https://instagram.com/ryansnoddon)