



What's Coming?

This activity is part of the **Water Science** theme

What's the purpose of this activity?

This activity is to help students learn the basics of weather prediction based on clouds and wind direction. Participants will learn how to identify basic cloud types, become familiar with weather patterns associated with these different clouds and how wind direction help predict weather.

Key Messages:

- Identify basic cloud types
- Weather systems are associated with different clouds
- Wind direction can help predict weather

Materials:

- 1 Cloud Wheel
- 1 Wind Direction Wheel (smaller compass like spinning wheel)
- Cloud Poster
 - Facilitator can use to show group where the different clouds are found, to make connection with elevation
 - Poster will also have other clouds that aren't on the wheel to let children know that there are other types of clouds
- What's Coming? Weather Chart
 - Summary of weather predictors and wind direction predictions
- 1 Rainmaker
- 1 Thunder Tube
 - Sets stage for discussion about reacting to thunderstorms.

What will I be doing?

In this activity, students become junior "meteorologists" by spinning a cloud wheel to become more familiar with different cloud types. Adding the additive effect of wind, students will learn that weather predictions can be made ... interpretations can be made about "What's Coming" based on looking up into our sky!

When students arrive ...

- Have them sit/stand around the large Cloud Wheel
- Have them look up into the sky ... do you see any clouds?
 - Ask them to describe them.
 - Ask if they can see any clouds on the Cloud Wheel that look the same?
- Cover briefly each cloud type on the wheel using information from the cloud poster and the background information provided in this document.
 - Go over possible predictors of weather associated with each cloud type using the What's Coming? Weather Chart (See background information)

Q: Does anyone know what a meteorologist is?

A: Someone who studies the weather!

Are you ready to become Junior Meteorologists?... let's predict some weather!

- Each section of the wheel represents a cloud and is colour-coded so that you can see where that cloud occurs in our sky (the elevation). (refer back to cloud poster)

Spin the Weather Wheel!

- Have a volunteer spin the spinner of the Weather Wheel to see what clouds are in our forecast.
- When the arrow stops, read aloud the selected cloud type.
 - Have another volunteer stand up and point to the cloud on the weather chart
- Now ask if anyone can remember what possible weather could be coming related to the cloud on the wheel.
- Spin 3-4 times depending on interest

Spin the Wind Wheel!

- Have another volunteer spin the wind wheel.
- Discuss how wind direction is a possible predictor of air temperature and potential weather (See background information)
 - Use What's Coming? Weather Chart

Sound the thunder when a change of pace is needed in the group!

- Have students identify the cloud types most connected to thunderstorms.

Q: What SHOULD YOU DO in a thunderstorm?

A:

- Seek shelter in a building or a car
- If none available, find a tree that is not the highest in the area to shelter under
- If possible, stand on any insulating material (lifejacket, back pack, log)
- Spread out so everyone is not huddling in the same spot
- Wait 30 minutes after the last heard clap of thunder before moving on

Q: What SHOULD YOU NOT DO in a thunderstorm?

A:

- A: Stand under the tallest tree in the area
- Stand by anything made of metal
- Stay in open areas (playing fields, meadows)
- Stand in water
- Huddle with everyone in your group in one spot
- Move on before the storm is completely past- 30 minutes after the last clap of thunder

(see background information about good and bad choices to create a discussion)

Wrap up.

Turn the weather wheel around so the group cannot see it. Ask if any student can identify one type of cloud, what elevation it is found at and type of weather often connected to that cloud.

Background Information

Cloud names are derived from Latin terms below:

Common suffixes and prefixes

1. Cumulus (heaps)
2. Stratus (layers)
3. Nimbo ("violent rain") - a rain cloud

Distance above surface

1. Cirrus (curl of hair) (above 20,000 feet)
2. Alto (6,500-20,000 feet)

Cirrus Clouds:

1. Cirrus:

Cirrus clouds are made of ice crystals and look like long, thin, wispy white streamers high in the sky.

- They are commonly known as "mare's tails" because they are shaped like the tail of a horse.
- Cirrus clouds are often seen during fair weather.
 - But if over time, they build up into larger formations and are followed by cirrostratus clouds then lower altostratus ... then rain could be predicted within 24 hours

2. Cirrocumulus:

Cirrocumulus clouds are small rounded puffs that usually appear in long rows high in the sky.

- Cirrocumulus are usually white, but sometimes appear gray.
- They are the same size or smaller than the width of your littlest finger when you hold up your hand at arm's length.
- When these clouds cover a lot of the sky, they can look like the scales of a fish, which is why it is called a "mackerel sky."
- Cirrocumulus clouds are common in winter and indicate fair, but cold, weather. (Source UCAR: Center for Science Education)

Alto Clouds:

3. Altostratus:

Altostratus clouds are mid-level, gray or blue-gray clouds that usually cover the whole sky.

- The Sun or moon may shine through an altostratus cloud, but will appear watery or fuzzy.
- If you see altostratus clouds, a storm with continuous rain or snow might be on its way.
- Occasionally, rain falls from an altostratus cloud.

- If the rain hits the ground, then the cloud has become a nimbostratus.

4. **Alto cumulus:**

Alto cumulus are mid-level clouds, grayish-white with one part darker than the other.

- Alto cumulus clouds usually form in groups and are about one kilometer thick.
- Alto cumulus clouds are about as wide as your thumb when you hold up your hand at arm's length.
- If you see alto cumulus clouds on a warm, humid morning, there might be a thunderstorm by late afternoon.

- However, these clouds are often seen at either the front or tail end of worse weather. Therefore, they may indicate storms to come, in the form of thunderheads or gusty winds.

- They are also often seen underneath the cirrostratus and altostratus sheets that often precede a warm front, as these higher clouds decrease the sun's heat and therefore convection causes any cumulus clouds to spread out into stratocumulus clouds.

Stratus Clouds:

5. **Stratus:**

Stratus clouds are low and have a uniform gray color .

- These clouds can cover most or all of the sky.
- Stratus clouds can look like a fog that doesn't reach the ground.
- Light mist or drizzle is sometimes falling when stratus clouds are in the sky.
- If stratus clouds are white, usually they result in just cloudy conditions.

Fog is a cloud on the ground. It is composed of billions of tiny water droplets floating in the air. Fog exists if the atmospheric visibility near the Earth's surface is reduced to 1 kilometer or less.

6. **Strato cumulus:**

Strato cumulus clouds are low, lumpy, and gray. Sometimes they line up in rows and other times they spread out.

- Only light rain (usually drizzle) falls from stratocumulus clouds.
- To distinguish between a stratocumulus and an alto cumulus cloud:
 - Point your hand toward the cloud.
 - If the cloud is about the size of your fist, then it is stratocumulus!
- Most often, stratocumulus do not produce precipitation.
 - When they do, it is generally only light rain or snow.

7. **Nimbostratus:**

Nimbostratus clouds are dark gray, with ragged bases and sit low in the sky.

- Nimbostratus clouds are associated with continuous rain or snow.
- Sometimes they cover the whole sky and you can't see the edges of the cloud.

Cumulus Clouds:

8. **Cumulus:**

Cumulus clouds grow vertically.

- They are puffy white or light gray clouds that look like floating cotton balls.
- Cumulus clouds have sharp outlines and a flat base at a height of 1000m.
- They are generally about one kilometer wide which is about the size of your fist or larger when you hold up your hand at arm's length to look at the cloud.
- Cumulus clouds can be associated with fair or stormy weather.
- Cumulus clouds are often called "fair-weather clouds". The base of each cloud is flat and the top of each cloud has rounded towers.
 - Cumulus clouds are not rain clouds but could precede a storm.
- Watch for rain showers when the cloud's tops look like cauliflower heads.
 - These clouds grow upward and they can develop into giant cumulonimbus clouds, which are thunderstorm clouds.

9. Cumulonimbus:

Cumulonimbus clouds also grow vertically and can grow up to 10 km high.

- At this height, high winds will flatten the top of the cloud out into an anvil-like shape.
 - The anvil usually points in the direction the storm is moving.
- Cumulonimbus clouds are thunderstorm clouds and are associated with heavy rain, snow, hail, lightning, and sometimes tornadoes.

Green Clouds are often associated with severe weather. The green color is not completely understood, but it is thought to have something to do with having a high amount of liquid water drops and hail inside the clouds. In the Great Plains region of the U.S. green clouds are associated with storms likely to produce hail and tornadoes.



Wind Direction

Some very general guidelines about weather can be drawn from wind direction in south central Ontario.

South:

- Winds from the south generally travel across portions of the Great Lakes picking up moisture and warmth from southern climates.
- Warm air can hold more moisture.
- Possible predictors- warmer air, humidity, rain or snow

North:

- Generally cooler, drier air

West:

- Prevailing wind (most common) can bring anything but usually weather that is occurring in the western provinces will be here within 48 hours

East:

- Veering wind (coming from the opposite direction of the prevailing wind).
- Often associated with low pressure system.
- Rain or snow- possible stormy weather if wind is brisk.
- Winds from the east, expect a beast!

Thunderstorm Safety:

Best to never get caught in a thunderstorm outside- watch the sky!

- **Notice wind changes** to give yourself some time to get to a safe spot before the storm is upon you.

DO!

- Seek shelter in a building or a car
 - If none available, find a tree that is not the highest in the area to shelter under
- If possible, stand on any insulating material (lifejacket, back pack, log)
- Spread out so everyone is not huddling in the same spot
- Wait 30 minutes after the last clap of thunder is heard before moving on

DO NOT!

- Stand under the tallest tree in the area
- Stand by anything made of metal
- Stay in open areas (playing fields, meadows)
- Stand in water
- Huddle with everyone in you group in one spot
- Move on before the storm is completely past.
 - You must wait 30 minutes after the last clap of thunder is heard!

Clean Up procedures

- Leave the Cloud Wheel in place, unless otherwise advised
- Make sure all props are put away dry and clean into bin provided
- Bring Volunteer folder and any other material that was given to you at the Volunteer sign in, back to the Volunteer sign in area.