🌞 Lesson Plan: Weather, Weather Patterns, and Climate

Grade Level: 5
Subject: Science
Duration: 45-60
NGSS 5-ESS2-1: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

🎯 Learning Objectives

By the end of this lesson, students will be able to:

- **Identify** different types of clouds and their relationship to weather conditions.
- **Describe** the four major air masses that affect North America and how they influence weather.

💼 Materials Needed: (all links are included in this PDF)

- Printed copies of the Study Guide (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-weather-weather-patterns-and-climate.pdf)
- Practice Worksheet 0 (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-weather-weather-patterns-and-climate-0.pdf)
- Practice Worksheet 1 (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-weather-weather-patterns-and-climate-1.pdf)

- Vocabulary Set 1 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-weather-weather-patterns-and-climate-1.pdf)
- Vocabulary Set 2 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-weather-weather-patterns-and-climate-2.pdf)

Lesson Procedure

Step 1: Introduction (5 minutes)

- Hook students by asking: "Have you ever wondered why it can be sunny one day and raining the next? What is the difference between daily weather and climate?"
- Show images of different cloud types (stratus, cumulus, cirrus) from the Study Guide and ask students to identify what they look like. (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-weather-weather-patterns-and-climate.pdf)

weather-patterns-and-climate-2.pdf)

Step 4: Independent Practice (15 minutes)

- Have students complete Practice Worksheet 0 independently to test their knowledge of clouds, humidity, and basic air pressure. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-weather-weather-patterns-and-climate-0.pdf)
- Circulate the room to assist students who may struggle with distinguishing between the different cloud types.

Step 5: Assessment (10 minutes)

- Use Practice Worksheet 1 as a formal assessment to evaluate students' understanding of air masses, fronts, and pressure systems. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-weather-weather-patterns-and-climate-1.pdf)
- Review the answers collectively or collect for grading to ensure mastery of the learning objectives.

Differentiation Strategies

For advanced learners:

- Have students track the local weather forecast for a week and identify which types of air masses and fronts are moving through the area.

Complete List of Available Resources:

- NewPathWorksheets: Weather, Weather Patterns, and Climate (https://newpathworksheets.com/science/grade-5/weather-weather-patterns-and-climate)
- Study Guide (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-weather-weather-patterns-and-climate.pdf)

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- Vocabulary Set 3 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-weather-weather-patterns-and-climate-3.pdf)
- Vocabulary Set 4 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-weather-weather-patterns-and-climate-4.pdf)
- Vocabulary Set 5 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-

WEATHER: PATTERNS AND CLIMATE

You often hear people say “it is humid out” but what exactly is humidity? **Humidity** is the amount of water vapor in the air. Now water vapor doesn’t just have to do with humidity; it also has something to do with how clouds are formed.

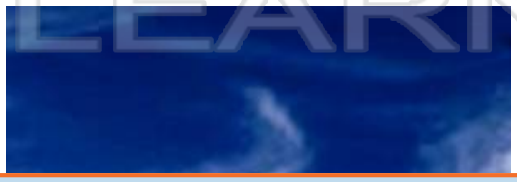
How do clouds form?

Water in the air is called water vapor (an invisible gas). Now, when warm air rises, it expands and cools. When it cools, it loses its ability to hold a lot of water vapor – SO some of the water vapor condenses onto tiny pieces of dust in the air. When the water vapor combines with the dust in the air, a cloud begins to form.

Lesson Checkpoint: How exactly do clouds form?

balls of cotton. These are the clouds that you look at in the sky and you can imagine them being in the shapes of different animals or objects.

Cirrus clouds are very high, wispy clouds. They often look like stretched out pieces of cotton.



As air gets close to the Earth's surface and **warms up**, the particles in the air move farther apart. The **warm air** then pushes down with less pressure and then rises forming an area of low pressure. **Low air pressure** results in a cloudy day. As air gets close to the Earth's surface and **cools**, the particles in the air move extremely close together, this thick, cooler air sinks forming an area of high pressure. **High air pressure** results in clear skies.

Lesson Checkpoint: What type of weather does high air pressure usually bring?

Wind

When air moves from an area of **high pressure** to a place with **low pressure**, WIND is created.

Air Masses

An **air mass** is a huge body of air that has basically the same temperature and amount of moisture. The movements and contents of **air masses** cause most weather conditions.

The temperature of and moisture in an air mass depend on the area over which it formed.

The Four Most Influential Air Masses that Affect the Weather in North America:

m	maritime
c	continental
P	polar
T	tropical

Key ingredient #1: Moisture

Moisture is needed for clouds to form, which is where rain falls from! Thunderstorms develop in cumulus clouds only. The more moisture in the air, the more clouds develop in the sky.

Key ingredient #2: Instability

When warm air rises, it cools. If the warm air is warmer than the air around it as it rises, it keeps rising higher and higher causing the air to be unstable. The warm air rises until it cools and becomes the same temperature as the air around it, causing the air to be stable again.

Key ingredient #3: Uplift
Warm air needs to rise for a thunderstorm to develop. Different things can make the warm air near the Earth's surface rise into the air. The heat from the Sun can cause the air to rise and wind can also cause warm air to rise.

Lesson Checkpoint: What is the recipe for a thunderstorm?

What is a hurricane?

A **hurricane** is a storm that forms over oceans that bring winds reaching **over** 74 miles/119 kilometers per hour.

Hurricanes build up over oceans. Water vapor from the oceans condenses in the air; this process releases energy. The energy that is released causes the powerful winds of a hurricane. Since hurricanes

stronger winds than hurricanes do.

How do tornadoes form?
A change in wind direction before a developing thunderstorm and an increase in wind speed and height cause a horizontal column of spinning (or rotating) air near the Earth's surface.
Air then causes this rotating air to move from being horizontal (parallel to ground) to becoming vertical (straight up and down). A tornado is now formed and when it touches ground, it causes destruction to anything in its path.

What is climate?

Climate is the typical yearly weather in a particular area. Two important factors that determine an area's climate are the area's air temperature and amount of precipitation.
The climate of an area determines what plants grow there and what animals will live there as well.

Climate Factors

Various landforms affect the climate of certain areas. For example, areas on top of mountains are cooler in temperature than the lower areas. Location of land in relation to landforms also plays a part in the area's climate. For example, land on one side of a mountain may be cool and moist while the other side may be hot and dry. Being closer to a large body of water (like the ocean) affects an area's climate as well. Air inland changes faster than land that is near an ocean. So,

- Meteoroid or asteroid impacts
- Carbon dioxide & other gases being constantly released into the atmosphere.

Weather, Weather patterns and climate

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Name_____ Class_____ Date_____

1 If you were to measure the amount of **water vapor** in the air, you would be able to determine the _____ in the atmosphere.

A temperature
B wind direction
C humidity level
D air pollution

2 Which of the following statements is true about **warm air**?

A It holds less water vapor than cool air.
B It holds more water vapor than cool air.
C It holds the same amount of water vapor as cool air.
D It is unable to rise into the atmosphere.

3 **Low clouds** that are usually **flat and layered** are called _____. In low pressure, they often cover much of the sky.

A cumulus clouds
C cumulus clouds
D cirrus clouds

4 Which **type of cloud** is pictured below?

A stratus clouds
B cumulus clouds
C cirrus clouds
D cumulonimbus

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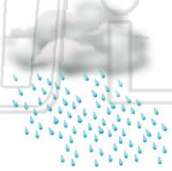
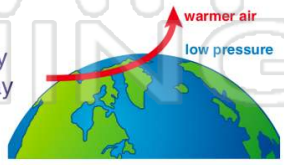
9 What results from water droplets becoming **too heavy** for the cloud to hold onto?



A humidity
B warm air masses
C cold front
D precipitation

10 **Low air pressure** usually results in what kind of weather?



A clear skies
B a sunny day
C a cloudy day
D a mostly sunny day

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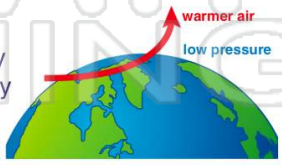

C

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Name_____ Class_____ Date_____

1 **High air pressure** usually results in what kind of weather?

A hailstorm
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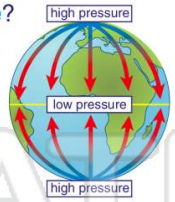
C rain
D clear skies

2 What is created when air moves from an area of **high pressure** to a place with **low pressure**?

A wind
B rain
C snow
D humidity



3 Which of the following **causes** most weather conditions?

A humidity levels
B low air pressure
C movement of air

4 This influential air mass is a **cool and moist** and develops over the North Pacific and North Atlantic Oceans.

A maritime tropical air mass

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B continental tropical air mass
C maritime polar air mass
D continental polar air mass

7

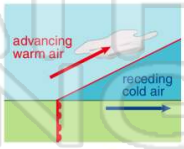
C east
D south

9 A **front** is an area where two air masses **meet**. When does a **warm front** form?

A when a warm air mass bumps into a cold air mass
B when a cold air mass bumps into a cold air mass
C when a warm air mass bumps into a warm air mass
D when a dry air mass bumps into a humid air mass

10 Which is true of **warm fronts**?

A they usually move faster than cold fronts
B they usually move more slowly than cold fronts
C they usually move the same speed as cold fronts
D they usually do not move at all



Weather, Weather patterns and climate

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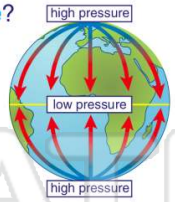

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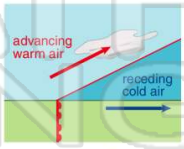

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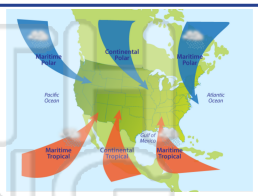
Name_____ Class_____ Date_____

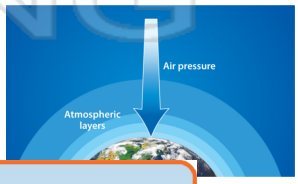
Match each of the following terms to its definition:

Climate	Cold front	Cirrus cloud	Chlorofluorocarbons
Continental polar air mass	Air mass	Atmospheric pressure	Continental tropical air mass

1. - a huge body of air that has basically the same temperature and amount of moisture throughout



2. - the force that gases in the atmosphere exert on a surface; also called air pressure



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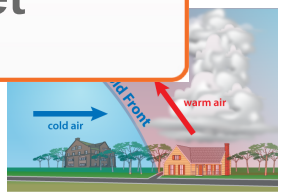

7. - a cold and dry air mass that develops over Northern Canada and affects North America

8. - hot, dry air masses that develop over the deserts of Northern Mexico and the Southwestern United States, and usually only affect the weather in the United States during the summer months

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Weather, Weather patterns and climate

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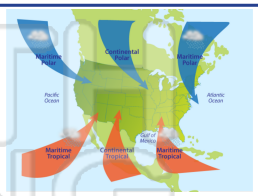
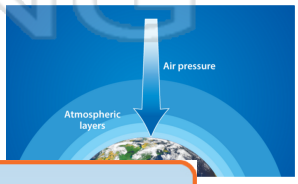


2. atmospheric pressure - the force that gases in the atmosphere exert on a surface; also called air pressure



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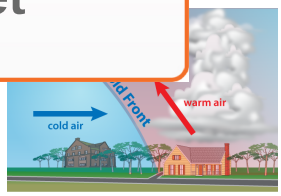

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Weather, Weather patterns and climate

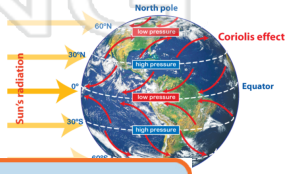
Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Doppler radar	Hurricane	Humidity	Front
Cumulus clouds	Cumulonimbus cloud	Continental tropical air mass	Coriolis effect

1. - hot, dry air masses that develop over the deserts of Northern Mexico and the Southwestern United States, and usually only affect the weather in the United States during the summer months

2. - the apparent curving motion of an object caused by the rotation of the surface on which it is moving; the curved direction of global winds caused by the Earth's rotation on its axis



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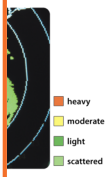

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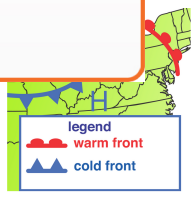

7. - amount of water vapor in the air

8. - an extremely large, tropical, rotating weather system that has winds of at least 119 km/h

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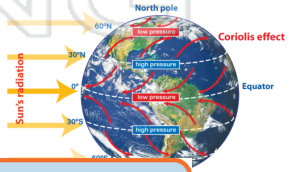

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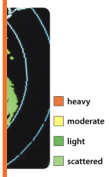

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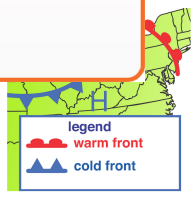

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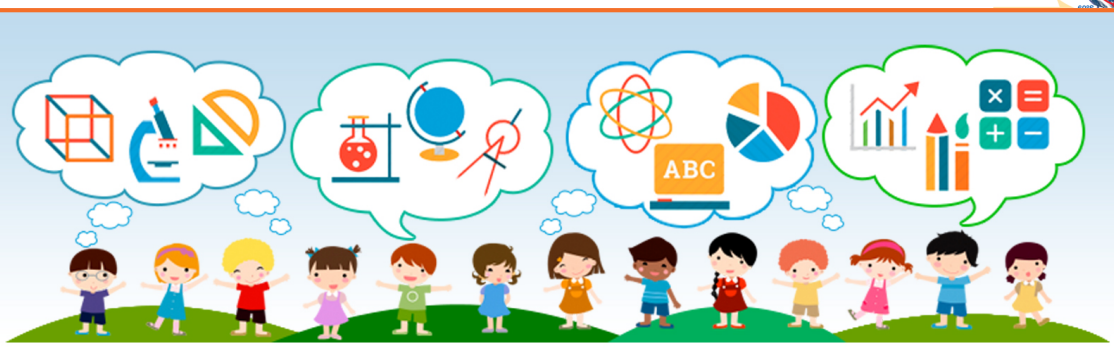

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