**The Atmosphere**

60 Minute Space Science Lesson Planetarium and Observatory

Program

Grades: 2

**TEACHER GUIDE**

**Ohio’s Learning Standards**

**Grade 2:** Earth and Space Science – The Atmosphere

* The atmosphere is made up of air
* Water is present in the air
* Long- and short-term weather changer occur due to changes in energy

**Description**

Learn about the remarkable and ever-active envelope of air surrounding our planet. We’ll discuss the daily and seasonal changes of weather and climate.

**Objectives**

* Following your visit to the Reinberger Hall of Earth and Planetary Science gallery, discuss the formation of the Earth and explain where the air and water in the Earth’s atmosphere came from including contributions from volcanic outgassing and comet impacts
* Visit the Dynamic Climate exhibit to discuss the effect the atmosphere has on landforms.
* In the planetarium discover the instruments for tracking weather and climate, ice ages, greenhouse effect, and other planetary atmospheres.
* Learn that the Sun is the source of energy driving the weather changes that can affect land, air and water.
* Explore how atmospheric air and water relate to weather and seasonal changes that can be observed and measured.

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**Before Your Museum Visit**

# If this will be your first trip to the Museum for your students you may want to review the following:

# What is a Museum?

# What is our purpose for visiting The Cleveland Museum of Natural History?

# How should we handle objects at the Museum?

# Introduce the vocabulary and additional resources provided below

**Vocabulary**

**air** – a mixture of nitrogen, oxygen, and other gases that surrounds the Earth

**atmosphere** - the gaseous mass or envelope surrounding a celestial body

**climate** - the generally prevailing weather conditions of a region (e.g. temperature, air pressure, humidity, precipitation, sunshine, cloudiness, and winds) throughout the year, averaged over long periods of time.

**cloud** - a visible collection of particles of water or ice suspended in an atmosphere

**condensation** – the act of reducing to another and denser form, as a gas or vapor to a liquid or solid state

**energy** – a source of power, such as heat or light, that can affect other objects.

**erosion** - the process by [which](http://dictionary.reference.com/browse/which) a surface is worn away by the action of water, glaciers, winds, waves, etc.

**equator** - the east/west line drawn around the Earth halfway between the North and South Poles. The equator divides the Earth’s surface into the Northern Hemisphere and Southern Hemisphere.

**equinox** - the precise time of year in March and September when the Sun is located directly over the Earth’s equator. Equal daylight and nighttime hours in both the Northern and Southern Hemispheres.

**evaporation** – to change from a liquid state to a gaseous state

**fog** - a cloudlike mass or layer of minute water droplets or ice crystals near the surface of the Earth

**force** - any influence that causes an object to undergo a certain change, either concerning its movement, direction, or shape

**gas (vapor)** - the state in which matter expands to occupy whatever volume is available

**glacier** - a large mass of ice and snow that forms in areas where the rate of snowfall exceeds the rate at which the snow melts.

**gravity** - the attraction between two masses, such as the earth and an object on its surface

**liquid** - the state in which matter maintains a fixed volume but adapts to the shape of its container

**moon** – a natural object that orbits around a planet. Our Moon takes about a month to orbit the Earth.

**North Star** - also called Polaris, the only star that doesn’t appear to move in the nighttime sky.

**planet** - a sizeable object that moves around a star in an orbit. Planets do not give off their own light and do not have to be solid.

**precipitation** - any form of water, such as rain, snow, sleet, or hail, that falls to the Earth's surface

**revolution** -the movement of an object in a path (orbit) around another object. Planets revolve around the Sun, and moons revolve around their parent planets.

**rotation** – the turning or spinning around a center or axis. The Earth rotates once a day.

**seasons** - each of the four divisions of the year (spring, summer, autumn, and winter) marked by particular weather patterns and daylight hours, resulting from the Earth's changing position with regard to the Sun.

**solid** - the state in which matter maintains a fixed volume and shape

**solstice -** the precise time of year in June and December when the Sun is located directly over the Tropic of Cancer and Tropic of Capricorn, successively. The solstices mark the beginning days of summer and winter, also the longest and shortest days of the year.

**star** - a luminous ball of hot of gas which produces its own light. The Sun is a star. (Stars in the nighttime look like tiny points of light because they are so far away.) – added for youngest students

**temperature** - the degree of hotness or coldness of a body or environment (corresponding to its molecular activity)

**water** – the liquid that descends from the clouds as rain, forms streams, lakes, and oceans. Pure water is odorless and tasteless. Water is a major constituent and essential for all living matter.

**weather** - the state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and pressure

**weather front** - zone of transition between two different (e.g. temperature, humidity, etc.) air masses

**weight** – the force with which a body is attracted toward the Earth or celestial body by gravity

1. Observe and ask questions about the weather for a specific period of time (day, week, month, etc.)

**Extension Activities**

1. Use simple equipment to gather weather data as a class project or homework assignment (thermometers, etc.)
2. Design and construct instruments that can be used to measure weather phenomena.
3. Discuss various factors that affect weather (seasons, etc.)
4. Identify places in the Solar System where atmospheres are present.

**Online Resources for Teachers and Students**

Click the link below to find additional online resources. These websites are recommended by our Museum Educators and provide additional content information.

CMNH Educators regularly review these links for quality. Web addresses often change so please notify us if any links have issues. Please note that aside from our own Museum website, the Museum is not affiliated with and does not endorse these online resources.

Cleveland Museum of Natural History https://[www.cmnh.org](http://www.cmnh.org/)/edlinks

**Materials for Loan**

If you’re interested in additional resources be sure to check out the following ERC materials or browse ERC materials online at

 <http://cmnh.hosting.l4u.com>

Related ERC kits for this topic include:

**Exploring Carbon Dioxide:** Students perform a series of experiments comparing the relative concentration of carbon dioxide in gas samples, and explore the amount of atmospheric carbon dioxide contributed by various countries.

**Greenhouse Effect:** Discuss the greenhouse effect, including what is present in the news and misconceptions. Students will be examining graphs of global temperature records from the past 130 years and the climate history of our planet for the past 450,000 years. Conduct experiments and play stimulation games representing the greenhouse effect.

The Educator Resource Center offers educator workshops, thematic teaching kits, animal dioramas, and more for loan to area teachers.

Contact the ERC at 216-231-2075 for information on individual or school membership.

Visit the Museum’s ERC website for more information on workshops https://[www.cmnh.org/ERC](http://www.cmnh.org/ERC)

**Hours**

* Monday through Friday, 1 to 5 PM
* Wednesday, 1 to 6 PM
* Saturday, 9 AM to 2 PM

**Educator Resource Center (ERC)**