

# CLOUD FACTORY SNAPSHOT

**DRIVING QUESTION: HOW CAN CLOUDS HELP US PREDICT THE WEATHER?**

Recommended Grades: K – 6; Adaptations for 6 – 12.

<i>Classroom or Center Activities</i>	<i>Outside or Larger Space Activities</i>	<i>Technology-Based Activities</i>	<i>Stem-to-Go Take Home</i>	<i>Field Work and/or Natural Area Needed</i>
X	X	X	X	X

**Materials:** Cloud in a Cup: Ice, warm water, a quart freezer bag, blue food coloring. Front in a Cup: one cup of very cold water with blue food coloring mixed in, one cup of hot water with red food coloring mixed in, one empty cup. One dropping pipet.

**Participant activity:** 15 minutes for each activity.

**Objectives:**

1. Explain how clouds are part of the hydrosphere.
2. Describe the types of energy transfer: convection, conduction, and radiation.
3. Classify clouds and use observations to make weather predictions.
4. Model fronts and air masses.

## STEM Skills

**S:** Classify clouds and make inferences about weather patterns.

**T:** Use interactive websites to identify clouds.

**E:** Build a model to explain how fronts form and air masses move.

**M:** Graph cloud cover and mood.

## Teacher Tips: Cloud Factory

**Plan ahead:** It is helpful to have ice on hand as well as warm or hot water. Dropping pipets can be purchased from Carolina Biological Supply.

**Total prep:** < 5 minutes to make copies and assemble materials.

**Safety:** Make sure to mop up any water from the floor to mitigate a slip hazard.

**Sensory Integration Issues:** Participants who are color blind may need assistance with interpreting their observations.

**Cost:** Minimal, <\$2 per person.

**What else do I need?** Paper towels/rags.

**Clean Up:** Hands, equipment, and surfaces can be washed with soap and water.

## NC CAP's Unit Planner

Classroom or Center Activities	Outside or Larger Space Activities	Technology-Based Activities	Stem To-Go	Field Work and/or Natural Area Needed
Cloud in a Cup	Energy Transfer Dance	A series of interactive labs on clouds <a href="https://www.pbs.org/wgbh/nova/labs/lab/cloud/research/intro/">https://www.pbs.org/wgbh/nova/labs/lab/cloud/research/intro/</a>	Weather Sing Along	Cloud Journal
Front in a Cup		Another Interactive Cloud identification: <a href="https://unctv.pbslearningmedia.org/resource/nvcl.sci.int.clotyp/cloud-lab-typing-interactive/">https://unctv.pbslearningmedia.org/resource/nvcl.sci.int.clotyp/cloud-lab-typing-interactive/</a>		

### NC Essential Standards Correlations: Cloud Factory

- K.P.1.1. Compare the relative position of various objects observed in the classroom and outside using position words such as: in front of, behind, between, on top of, under, above, below and beside.
- K.P.2.1: Classify objects by observable physical properties (including size, color, shape, texture, weight, and flexibility).
- K.E.1.2: Summarize daily weather conditions, noting changes that occur from day to day and throughout the year.
- 1.E.1.1: Recognize differences in the features of the day and night sky and apparent movement of objects across the sky as observed from Earth.
- 2.P.2.1: Give examples of matter the change from a solid to a liquid and from a liquid to a solid by heating and cooling.
- 2.E.1.1: Summarize how energy from the sun serves as a source of light that warms the land, air, and water.
- 2.E.1.2: Summarize weather conditions using qualitative and quantitative measures to describe Temperature, wind direction, wind speed, precipitation.
- 2.E.1.3: Compare weather patterns that occur over time and relate observable patterns to time of day and time of year.
- 2.E.1.4: Recognize the tools that scientists use for observing, recording, and predicting weather changes from day to day and during the seasons.
- 3.P.2.1: Recognize that air is a substance that surrounds us, takes up space, and has mass.
- 4.L.1.2: Explain how animals meet their needs by using behaviors in response to information received from the environment.
- 5.P.1.4: Predict the effect of a given force or a change in mass affects the motion of objects.
- 5.P.2.1: Explain how the sun's energy impacts the processes of the water cycle (including evaporation transpiration, condensation, precipitation, and runoff).
- 5.P.3.1: Explain the effects of the transfer of heat (either by direct contact of at a distance) that occurs between objects at different temperatures (conduction, convection, and radiation).
- 5.E.1.1: Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns.
- 5.E.1.2: Predict upcoming weather events from weather data collected through observation and measurements.
- 6.P.3.1: Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation, and convection and the effects that may result.
- 7.E.1.2: Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to weather patterns on Earth.
- 7.E.1.3: Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.
- 7.E.1.4: Predict weather conditions and patterns based on information obtained from: Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity, and air pressure), weather maps, satellites and radar, cloud shapes and types and associated elevation.
- 8.E.1.1: Explain structure of hydrosphere including water distribution on earth & local river basins and water availability.