

7: READ THE SKIES: CLOUDS AND WEATHER AT SEA

Grade Level: K-5

Time: 30-45 min

SUMMARY:

In this lesson, students will learn how to identify different types of clouds, and make a model of each type using cotton balls on a poster board. Students will learn how recognizing cloud types can help them make predictions about the short-term weather, and how this ability is useful to mariners who must be able to make decisions about safety based on environmental observations. Students will then use the charts/posters they have made to identify cloud types outside in the sky!

OBJECTIVES:

Students will:

- Learn the names of different types of clouds and be able to recognize them by sight (in pictures and/or in the sky).
- Recognize these types of clouds will help students make predictions about the weather.
- Understand how being able to gather information about the weather through environmental observation is important to maintaining safety at sea.

STEM APPLICATIONS:

- **Science (meteorology)** - Students are introduced to the concept of using environmental clues to predict the weather, and specifically to the ways that mariners have traditionally used clouds to predict impending weather patterns.
- **Engineering** - Students will create models of different types of clouds.

NGSS ALIGNMENT:

- **Practice 2.** Developing and Using Models
 - **K-2** – Distinguish between a model and the actual object, process and/or events the model represents.
 - **K-2** – Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).
 - **3-5** – Develop and/or use models to describe and/or predict phenomena.
- **Practice 3.** Planning and Carrying Out Investigations
 - **K-2** – Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.
 - **K-2** – Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal.
 - **3-5** – Evaluate appropriate methods and/or tools for collecting data.

- **Practice 4.** Analyzing and Interpreting Data

- **K-2** – Record information (observations, thoughts, and ideas).
- **K-2** – Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.
- **3-5** – Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- **3-5** – Analyze data to refine a problem statement or the design of a proposed object, tool or process.

VOCABULARY:

Stratus – Stratus clouds are flat and horizontal.

Cumulus – Cumulus clouds are puffy and white, like cotton balls.

Altostratus or Altocumulus– Clouds with the prefix “alto-” hang in the middle of the sky, not too high up or low down. Altostratus clouds look flat, and altocumulus clouds look puffy.

Cirrus – Cirrus clouds are the highest in the sky, and are usually thin, wispy and streaky.

“Nimbo-” or “-nimbus” – When the prefix “nimbo-” or the suffix “-nimbus” is used to describe a cloud, it means “rain cloud.” A cumulonimbus cloud is a very long, tall, “puffy” cloud that means thunderstorms are on the way.

MATERIALS:

- Construction paper or poster board
- Cotton balls
- Elmer’s glue
- Markers
- Cloud Chart (see Figure 1)

BACKGROUND:

Long before humans had modern technology to make precise measurements, people had to rely on their eyes and ears to make predictions about the weather. Sailors in particular had to be very observant and become experts at weather prediction. If storms were on the way, it was wise to stay in a safe harbor until they passed. One way to predict short-term weather is to “read” the sky – more specifically, the clouds in it! Clouds form when moisture in the atmosphere evaporates from land and the oceans into the sky, condenses there, and then falls down toward earth again as rain, snow, or other precipitation. This is called the water cycle. There are many different types of clouds that form based on different temperature, wind and environmental conditions, and knowing how to “read” these differences can help to predict what kind of weather is likely on the way.

ACTIVITY:

1. Engage/Elicit

Begin this activity by asking students to tell you what they usually associate with cloudy skies. Is it rain? Snow? Fog? Ask them to describe the cloudy days they can remember, and if there are different conditions that exist. For example, you can talk about the difference between a sunny day with just a few clouds in a blue sky, and a gray, overcast day where the clouds cover most of the sky.

Ask the students why it might be important to be able to “read” the clouds to predict coming weather conditions. How would knowing what to expect from the weather help to keep sailors safe as they travel over the oceans?

2. Explore

During this part of the activity, students will be making their own cloud charts to learn about and identify the basic differences between types of clouds. Each student may use the materials to make their own individual cloud chart, or you may choose to divide the class up in pairs or groups.

Before students begin working on the charts, share some information about different cloud formations with the students. Visit <http://eo.ucar.edu/webweather/cloud3.html> for a great, age-appropriate overview of the basic types of clouds. Refer to Figure 1 at the end of this chapter for a visual representation of the named cloud types.

After a discussion about the different types of clouds and what they might indicate in terms of coming weather, allow the students to make their own cloud charts using the cotton balls and construction paper or poster board. Have the students glue the cotton balls in the appropriate shapes and “densities” – which can be altered by stretching out the cotton balls before gluing them, or gluing many close together – and help them place the clouds in the general vicinity that they would be found in the sky (high, mid-level, low). Help students label each type of cloud so they can be used to identify real clouds outside later.

3. Explain

After all students/groups have finished creating their cloud charts, bring the class outside to try to classify some real-life clouds! You can gather in a safe parking lot or lay down in the grass to get a good view of the clouds that are out that day. Using their cloud charts, ask students to make their best guesses about what kinds of clouds are in the sky, and to predict what kind of weather they should expect in the coming days.

4. Evaluate/ Wrap-up

After the students have had enough time to identify and talk about what kinds of clouds are in the sky outside, steer the discussion back to how they might use this information if they were sailors on a voyage. You can ask, based on what kind of weather might be coming from your cloud observations, would it be a



good idea to set sail today? If not, what kinds of clouds would you like to see before you would feel safe leaving the harbor?

5. Dive Deeper

To learn more about weather, the factors that interact to produce it, and the means by which we can predict it, visit the NOAA National Weather Service webpage at www.weather.gov/.

Learn How To Be a Storm Spotter by reading the clouds at sea at www.boatsafe.com/kids/weather1.htm.

For more lessons on the marine industry visit namapa.net/education.

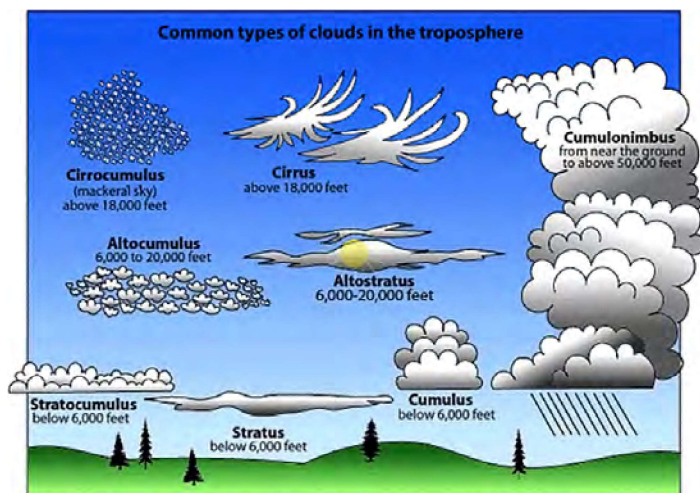


Figure 1. Common types of clouds in the troposphere

SOURCE: eo.ucar.edu