



Pacific Battleship Center
Educational Resource



Weather prediction Activity

Objective:

Students will be introduced to antique techniques mariners used to predict weather while at sea. Students will observe most of the natural phenomena sailors monitored in the past (wind, sky color, halo around the moon, and clouds) over a one to five day period to determine how accurately weather can be predicted relying on these techniques.

Grades: 2nd – 6th grades.

Supported NGSS Disciplinary Core Ideas: ESS2.D and ESS3.B

Vocabulary Words:

Weather

Cloud

Mariner

[Cloud classification terms.](#)

Materials:

- [Basic Cloud Spotter Wheel](#) or [Advanced Cloud Spotter Wheel](#)
- Data recording materials – paper, pen, paint, crayons, etc.
- Optional – [GLOBE Cloud Chart](#)

Background Information:

How did sailors predict the weather before the invention of weather monitoring equipment and tools? By observing the world around them! Sailors would look for patterns connecting certain observations to weather events. They would monitor:

- **Wind:** It was believed that a change in direction and strength of wind could indicate an oncoming change in weather. High pressure systems associated with cold, dry air produce winds rotating in the opposite direction of low pressure systems associated with warm, humid air. If the wind suddenly shifted, it could mean you're headed out of one type of system and into another.

- Ocean Swells: Mariners recorded height, shape, and time between swells to determine how close or far from high winds or storms their ship was located. If a sailor saw large, rounded swells with long periods of time between them, they were thought to be quite far from a storm. If a sailor saw smaller, steep peaked swells, they were thought to be closer to a storm. Watching swells for a long period of time, noting how their shape and timing changed, could tell them if they were headed towards or away from high winds or storms.
- Color of the sky: There is an old saying that states “Red sky in morning, sailors take warning. Red sky at night, sailors delight.” Sailors would predict rainy weather based on the color of the sky at sunrise and sunset. If red skies were observed in the morning, it was taken as a sign that poor weather was on the way.
- Halos around the moon: If a pale ring was seen in the sky around the moon, sailors took it as a sign that rain was coming. Today, we know this is caused by the moonlight shining through water droplets and ice crystals in the clouds.
- Amount and type of clouds: Cloud shape and height in the sky are signs of specific types of possible weather. For younger students using the Basic Cloud Spotter Wheel, refer to [The Four Core Types of Clouds](#). For older students using the Advanced Cloud Spotter, refer to the [Ten Basic Clouds](#). The direction the clouds (same as the direction the wind is blowing) are traveling could either carry this weather towards you or away from you.

Mariners would record their observations in a voyage logbook. This would allow them to make predictions based on data collected over multiple voyages through the same area.

Activity Instructions:

Record the same observations, minus ocean swells, as ancient mariners either every hour for a day **or** once a day for five days. See if you can correctly predict the weather after completing all observations from the data you have collected.

1. Either print out the [GLOBE Cloud Chart](#) or grab some paper and pencils/crayons to record your ancient mariner weather observations.
(If using GLOBE Cloud Chart, collect data for observations listed on that sheet. If making your own data sheet, follow steps 3 – 6)

2. Find your favorite safe space outside. Return to this same spot every time you make your observations.
3. Record the type of clouds you see using one of these tools as your guide - [Basic Cloud Spotter Wheel](#) or [Advanced Cloud Spotter Wheel](#). What kind of weather do these clouds suggest? This can be found on the spotter wheels.
4. Record if it is windy outside or not. Pick a reference point, like your back door, and note which way the wind is blowing.
5. Record the color of the sky. Did you see red early in the morning or at sunset?
6. Record if there is a halo around the moon, once it is visible. If going outside at night, take an adult with you.

Conclusion:

Were there any changes in clouds, wind, sky color, or occurrence of moon halos during your observations? Do you see any patterns? For example, did the wind continue to get stronger and stronger or did the clouds blow away or come in heavier every time you went out to record your observations?

Based on the patterns you saw, what do you think the weather will be like over the next two days?

After two days have passed, was your prediction based on the data collected correct? How accurate do you think ancient mariners were at predicting the weather using similar methods?

Further Investigations:

Could logbooks from long ago ocean voyages help shed light on climate change? Read National Geographic article "[Decades of detailed weather reports pulled from sailor's logs.](#)"

For more practice identifying clouds, try [The Cloud Lab \(PBS\)](#).

Sources:

Background Research:

http://archive.hokulea.com/ike/hookele/weather_forecasting.html

<https://www.nationalgeographic.org/encyclopedia/weather/>

<http://setsail.com/mwh.pdf>

Documents:

<https://www.globe.gov/documents/348614/782194b1-b5c3-4416-b3aa-b4a208ea5812>

[holeclouds1.pdf \(weather.gov\)](#)

[cloudwheel.pdf \(weather.gov\)](#)

Further Investigations:

<https://www.pbs.org/wgbh/nova/labs/lab/cloud/research/classification/>

<https://www.nationalgeographic.com/science/2019/10/old-sailors-logs-sharpen-picture-of-climate-change/>