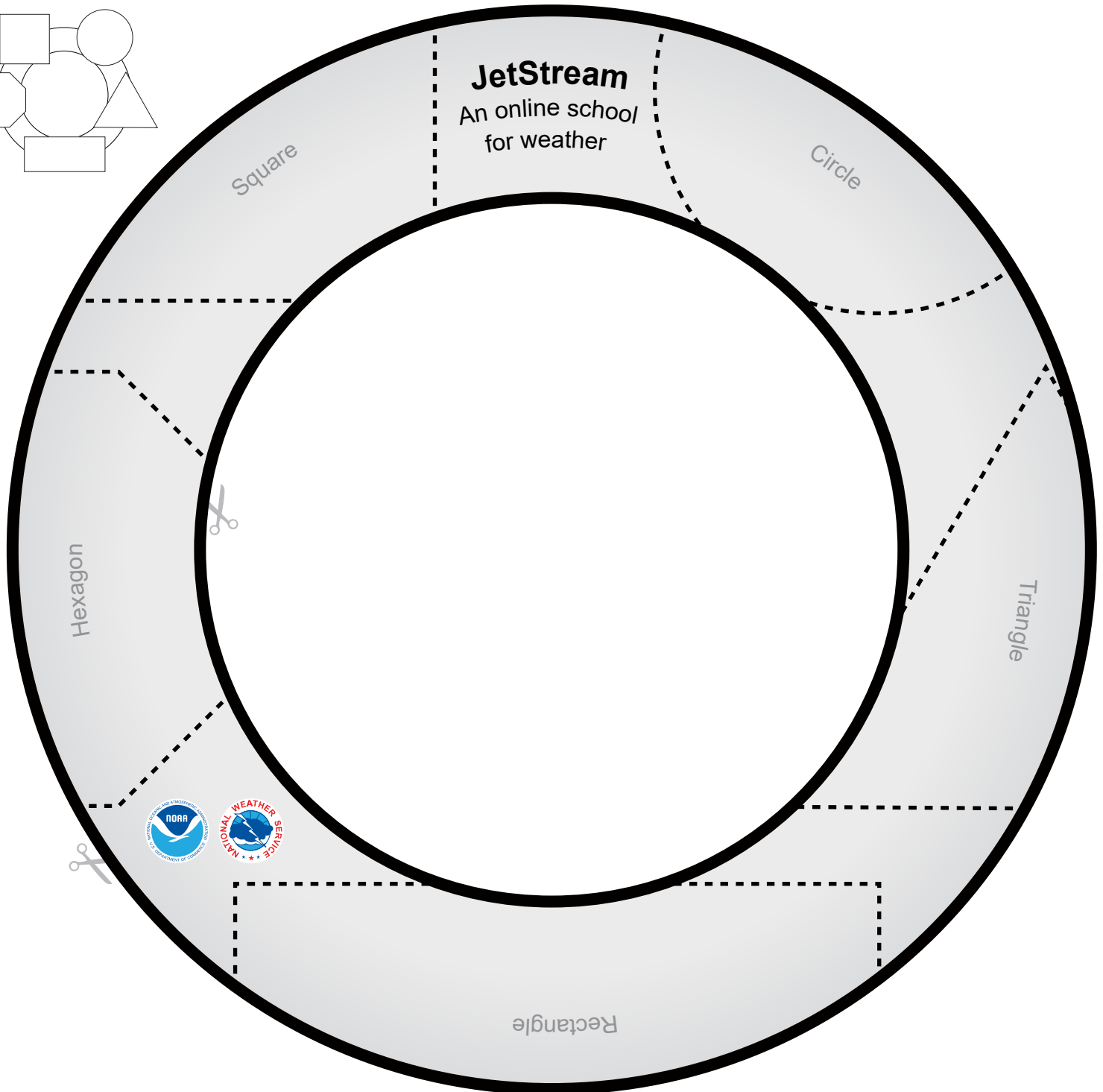
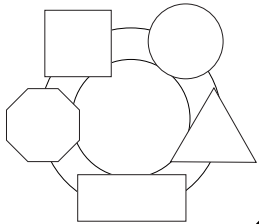


Lesson Plan: A 'Hole' Lot of Clouds (K-3)

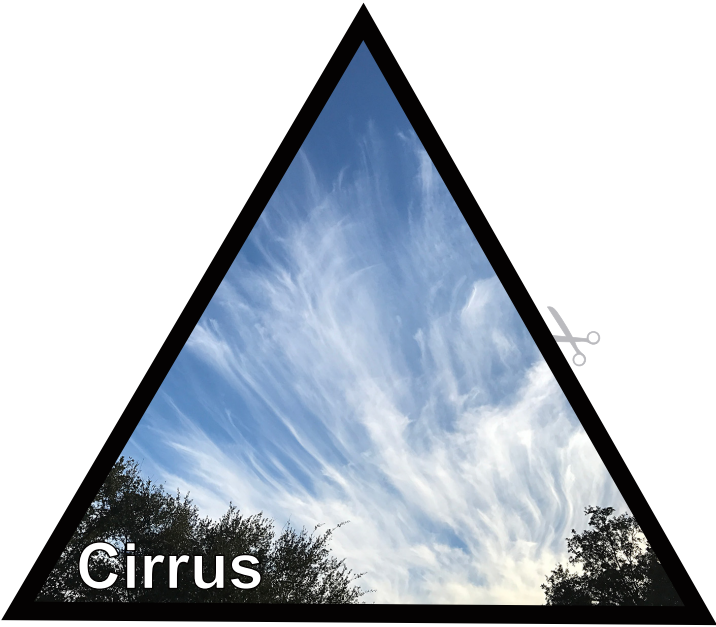
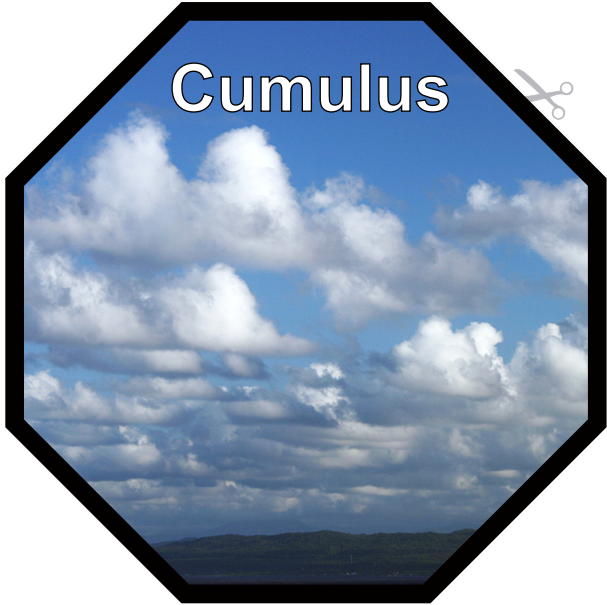
Cut out ring. There are two sets of five cloud images; one with a descriptive term and the other with the scientific name of the cloud. Cut out either set then, matching dashed lines, paste each shape onto the disc. Look through the hole and identify the cloud types.

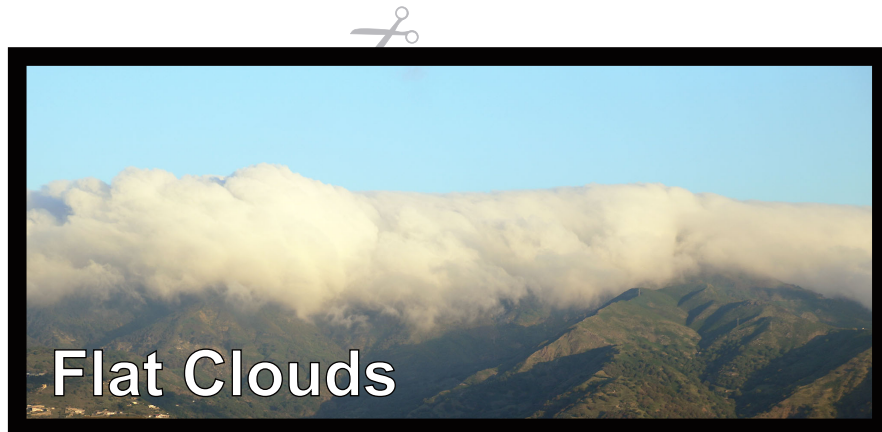
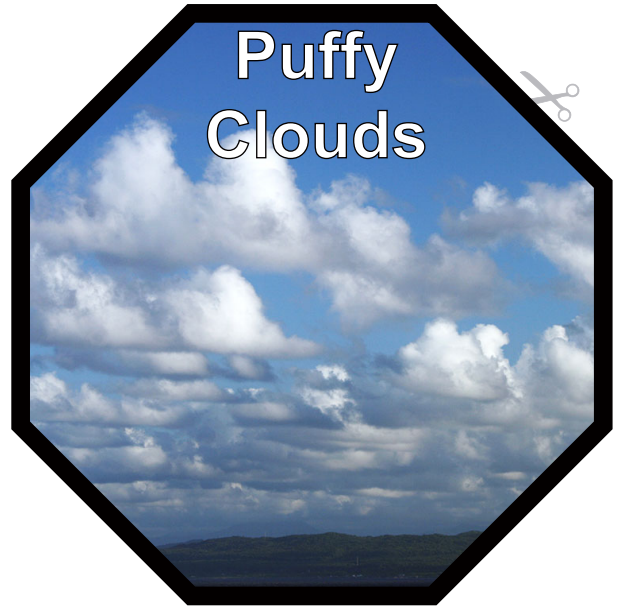


National Weather Service

www.weather.gov/jetstream

JetStream - An online school for Weather

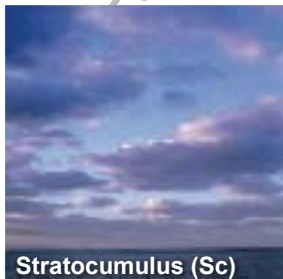
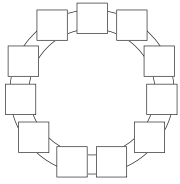




Lesson Plan: A 'Hole' Lot of Clouds

Cut out the eleven clouds and ring. Paste cloud images onto the disc. Looking through the hole identify the cloud types and record cloud observations onto a cloud observation form. Complete lesson plan and PDF versions of disc/forms are located at...

https://www.weather.gov/jetstream/11_holeclouds2



There are over 35 lesson plans in the National Weather Service education website JetStream - An Online School for Weather, a free resource at www.weather.gov/jetstream.



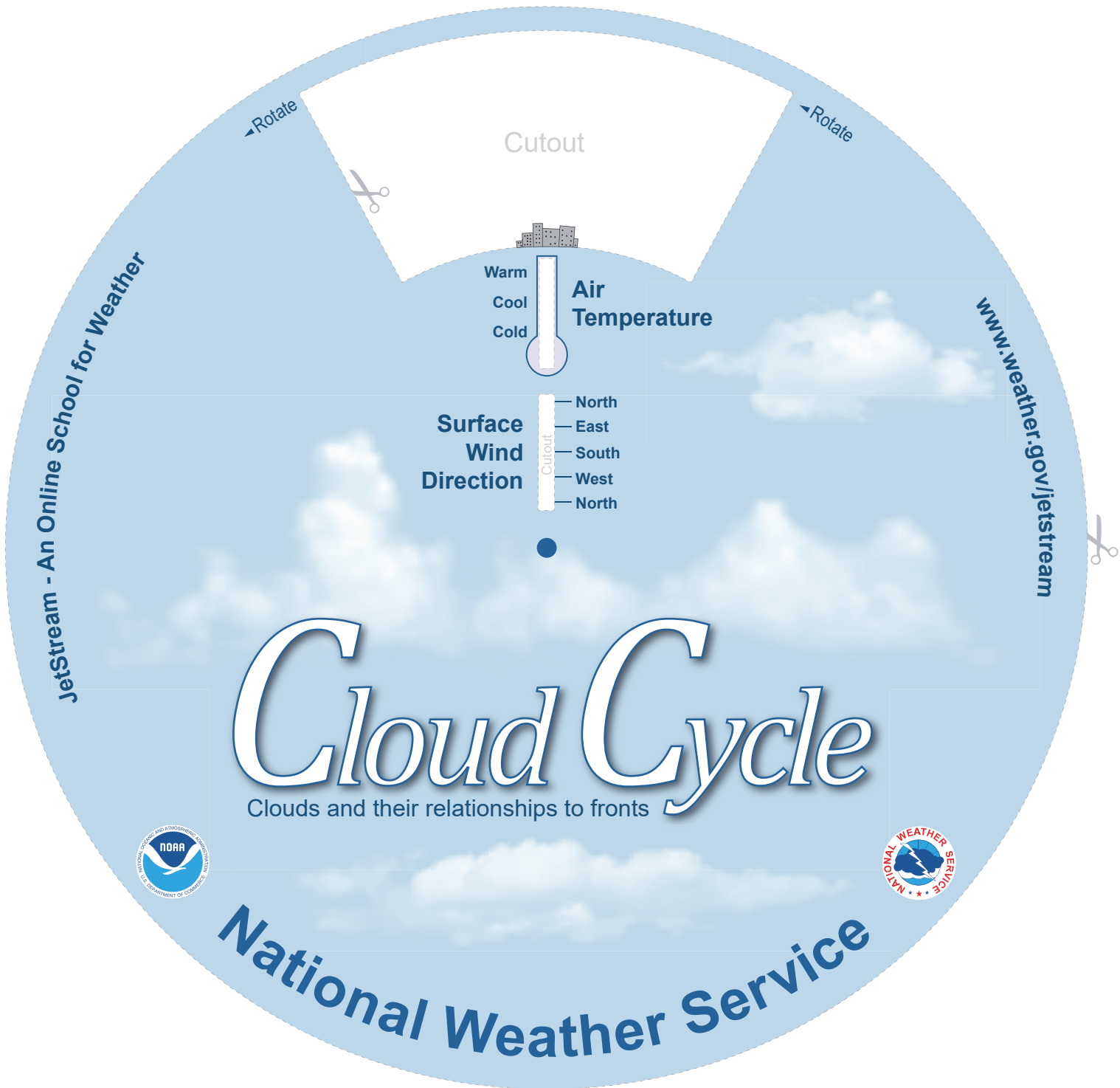


National Weather Service



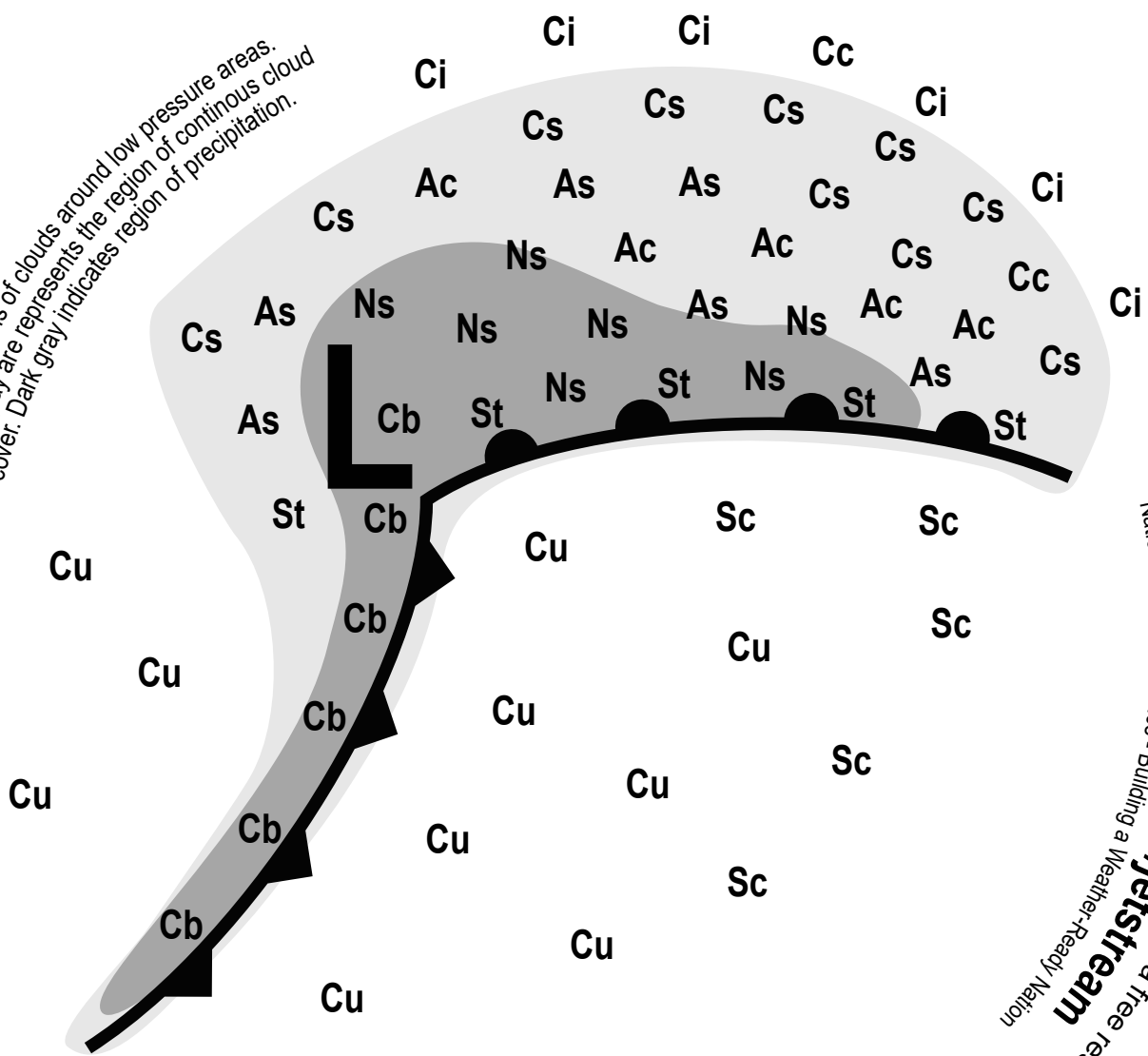
www.weather.gov/jetstream/ll_holeclouds2

A 'Hole' Lot of Clouds 2 lesson plan located at JETSTREAM - An Online School for Weather





Typical locations of clouds around low pressure areas.
 Light gray are represents the region of continuous cloud cover. Dark gray indicates region of precipitation.






- | | | |
|--|---|---|
| <p>Low Clouds</p> <ul style="list-style-type: none"> Cu - Cumulus Sc - Stratocumulus St - Stratus Cb - Cumulonimbus | <p>Middle Clouds</p> <ul style="list-style-type: none"> As - Altostratus Ns - Nimbostratus Ac - Altocumulus | <p>High Clouds</p> <ul style="list-style-type: none"> Ci - Cirrus Cs - Cirrostratus Cc - Cirrocumulus |
|--|---|---|

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National Weather Service



-  High Clouds
16,500 - 60,000 feet
-  Middle Clouds
6,500 - 25,000 feet
-  Low Clouds
Up to 6,500 feet

Cutout



CloudSpotter

National Weather Service

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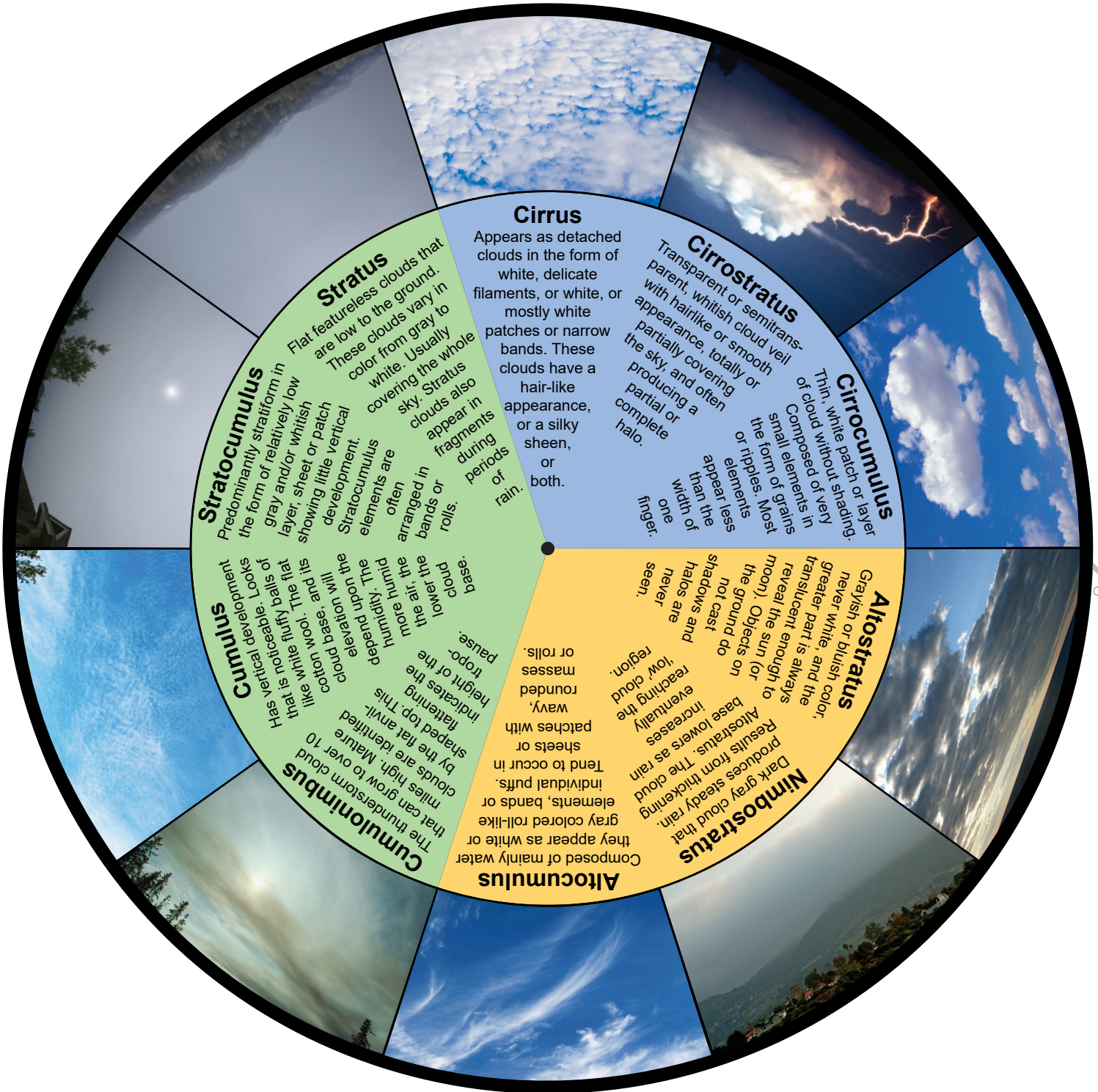
Cutout



Lesson plan: Head in the clouds. Cut along dotted lines and make a small hole in the center of both wheels. Attach wheels together using a brass fastener. Record cloud observations onto a cloud observation form. Complete lesson plan and PDF versions of wheels/forms are located at...

https://www.weather.gov/jetstream/ll_headclouds

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Cirrus

Appears as detached clouds in the form of white, delicate filaments, or white, or mostly white patches or narrow bands. These clouds have a hair-like appearance, or a silky sheen, or both.

Cirrostratus

Transparent or semitransparent, whitish cloud veil with hairlike or smooth appearance, totally or partially covering the sky, and often producing a partial or complete halo.

Cirrocumulus

Thin, white patch or layer of cloud without shading. Composed of very small elements in the form of grains or ripples. Most appear less than the width of one finger.

Altostratus

Grayish or bluish color, never white, and the greater part is always translucent enough to reveal the sun (or moon). Objects on the ground do not cast shadows and halos are never seen.

Nimbostratus

Dark gray cloud that produces steady rain. Results from thickening Altostratus. The cloud base lowers as rain increases eventually reaching the low cloud region. Wavy, rounded masses or rolls.

Alto cumulus

Composed of mainly water they appear as white or gray colored roll-like elements, bands or sheets or rounded patches with wavy, rounded masses or rolls.

Stratus

Flat featureless clouds that are low to the ground. These clouds vary in color from gray to white. Usually covering the whole sky. Stratus clouds also appear in fragments during periods of rain.

Stratocumulus

Predominantly stratiform in the form of relatively low layer, sheet or patch showing little vertical development. Stratocumulus elements are often arranged in bands or rolls.

Cumulus

Has vertical development that is noticeable. Look like white fluffy balls of cotton wool. The flat top is not above the cloud base, and the elevation will depend upon the humidity. The more humid the air, the lower the cloud base. Indicates the height of the tropopause. Flattening by the flat anvil-shaped top. This indicates the height of the tropopause.

Cumulonimbus

The thunderstorm cloud that can grow to over 10 miles high. Mature clouds are identified by the flat anvil-shaped top. This indicates the height of the tropopause.

Lesson plan: Head in the Clouds

Cut along dotted lines and make a small hole in the center of both wheels. Attach wheels together using a brass fastener.

Record cloud observations onto a cloud observation form. Complete lesson plan and PDF versions of wheels/forms are located at...

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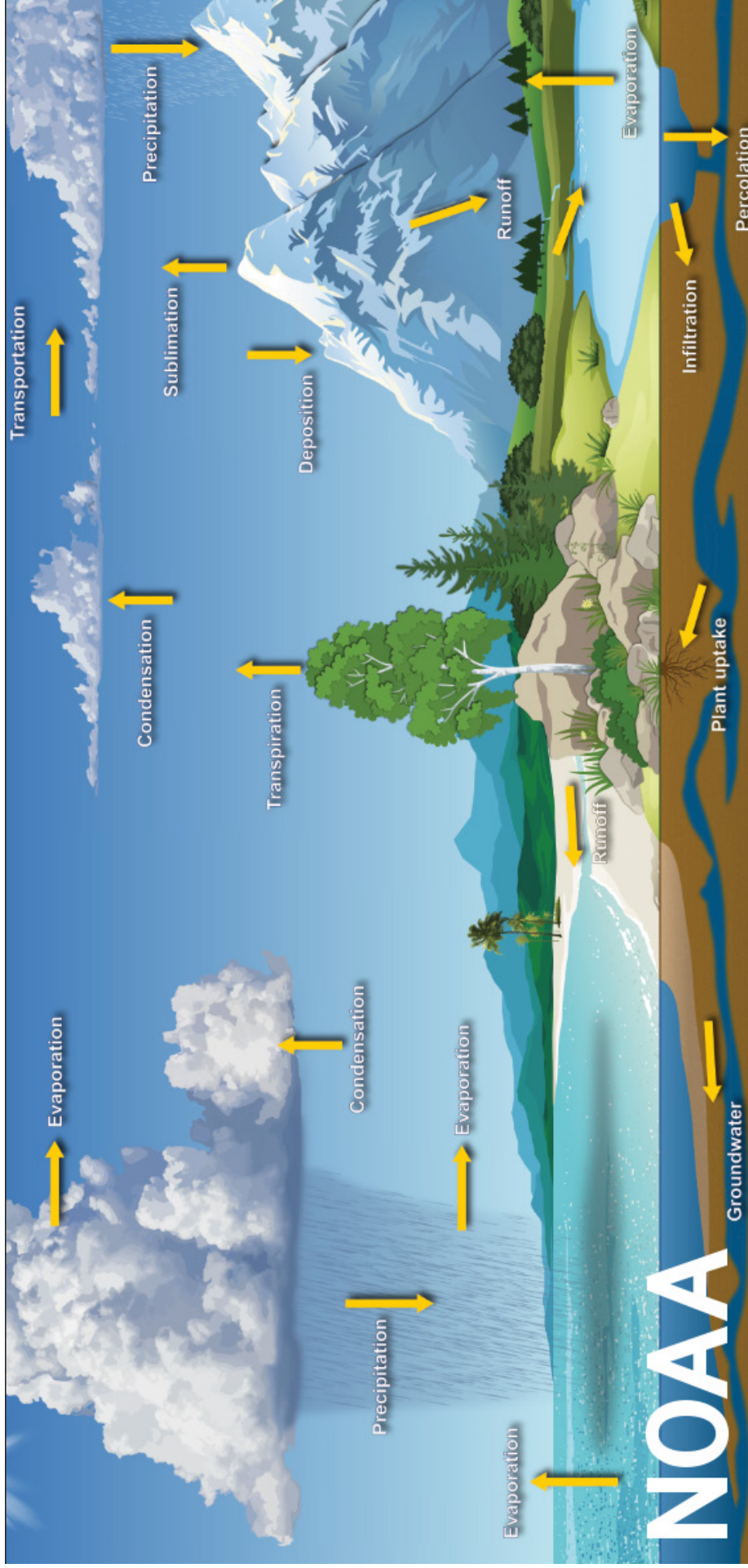
National Weather Service
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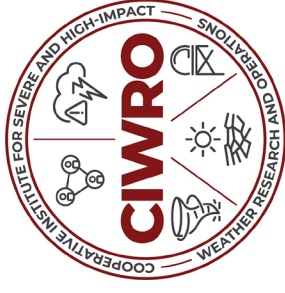
The water cycle is often taught as a simple circular cycle of evaporation, condensation, and precipitation. Although this can be a useful model, the reality is much more complicated. The paths and influences of water through Earth's ecosystems are extremely complex and not completely understood. NOAA is striving to expand understanding of the water cycle at global to local scales to improve our ability to forecast weather, climate, water resources, and ecosystem health.

The water cycle on Earth

Water is essential to life on Earth. In its three phases (solid, liquid, and gas), water ties together the major parts of the Earth's climate system — air, clouds, the ocean, lakes, vegetation, snowpack, and glaciers. The water cycle shows the continuous movement of water within the Earth and atmosphere. It is a complex system that includes many different processes. Liquid water evaporates into water vapor, condenses to form clouds, and precipitates back to earth in the form of rain and snow. Water in different phases moves through the atmosphere (transportation). Liquid water flows across land (runoff), into the ground (infiltration and percolation), and through the ground (groundwater). Groundwater moves into plants (plant uptake) and evaporates from plants into the atmosphere (transpiration). Solid ice and snow can turn directly into gas (sublimation). The opposite can also take place when water vapor becomes solid (deposition).



Cloud Observation Form



Name _____

Class _____

DATE	CLOUD TYPES OBSERVED	AVERAGE AIR TEMPERATURE	PRECIPITATION IN INCHES	AVERAGE WIND SPEED	RELATIVE HUMIDITY	SKY COVER

To record data in the gray columns, retrieve daily reports for your area from the Oklahoma Mesonet at https://www.mesonet.org/index.php/past_data/daily_data_retrieval

Introduction to Clouds

Clouds are a visible cluster of tiny particles of water and/or ice that form when water vapor condenses onto aerosols in the atmosphere.

Clouds can grow very tall or appear flat as a pancake. They are typically white in color but can also be different shades of gray or brilliant yellow, orange, or red. They can have a mass of thousands of kilograms yet float in the atmosphere.

Clouds can be harbingers of good weather or bad. Their absence can be a good thing after a flooding rain or bad during a drought. They provide relief from the heat of direct sunlight but can also act like a blanket when the ground is experiencing higher temperatures. Without clouds reflecting incoming sunlight, the temperature of the Earth would be much warmer.

Precipitation from clouds helps crops to grow but can reduce visibility and make travel dangerous. Clouds come in many shapes and sizes, and we often recognize more familiar objects or animals in their shapes.

Clouds can be carried along by winds of up to 150 mph (240 km/h) or can remain relatively stationary when winds are weak.

Clouds can form behind high flying aircraft or can dissipate as planes fly through them. Clouds are not confined to Earth but are found on other planets too.

Content for this handout is adapted from <https://www.noaa.gov/jetstream/clouds/four-core-types-of-clouds>



Cumulonimbus cloud seen from 38,000 feet. (NOAA)

The Core Four

While clouds appear in many shapes and sizes, they fall into some basic forms. Clouds are divided into four core categories.



Cirro-form

The Latin word “cirro” means curl of hair. Composed of ice crystals, cirro-form clouds are whitish and hair-like. They are the high, wispy clouds to first appear in advance of a low-pressure area such as a mid-latitude storm system or a tropical system such as a hurricane.



Cumulo-form

Generally detached clouds, they look like white fluffy cotton balls. They show vertical motion or thermal uplift of air taking place in the atmosphere. They are usually dense in appearance with sharp outlines.

The base of cumulus clouds are generally flat and occurs at the altitude where the moisture in rising air condenses.



Strato-form

From the Latin word for “layer”, these clouds are usually broad and fairly wide spread, appearing like a blanket. They result from non-convective rising air and tend to occur along and to the north of warm fronts. The edges of strato-form clouds are diffuse.



Nimbo-form

This special raincloud category combines the three forms cumulo + cirro + stratus. Nimbus is the Latin word for “rain.” The vast majority of precipitation occurs from nimbo-form clouds; therefore, these clouds are generally the thickest.