Cloud and Contrail Cover
Field Guide

NEVER look directly at the Sun!

Task

Observe how much of the sky is covered by clouds, including contrails. Choosing between these categories is easy at the extremes, but harder where they meet. Estimate what fraction of the sky is covered by clouds. One good way to do this is to have everyone in the class make an estimate, and then average all the answers.

When multiple cloud layers are present, we would like this information for each cloud layer as well as a total cloud cover.

What You Need

- □ Cloud Data Sheet
- □ GLOBE Cloud Chart
- □ GLOBE Data Entry options

In the Field

1. Complete the top section of your Data Sheet.
2. Look at the sky in every direction (above 14 degrees).
3. Estimate how much of the sky is covered by clouds and contrails.
4. Record the cloud/contrail cover for the overall sky, as well as each level.

Cloud Cover Classifications
No Clouds The sky is cloudless; no clouds are visible.
Few Clouds are present but cover less than one-tenth (or 10%) of the sky.
Isolated Clouds cover between one-tenth (10%) and one-fourth (25%) of the sky.
Scattered Clouds cover between one-fourth (25%) and one-half (50%) of the sky.
Broken Clouds cover between one-half (50%) and nine-tenths (90%) of the sky.
Overcast Clouds cover more than nine-tenths (90%) of the sky.
Obscured Clouds and contrails cannot be observed because more than one-fourth (25%) of the sky cannot be seen clearly.

5. If the sky is Obscured, record what is blocking your view of the sky. Report as many of the following as you observe.
   - Fog • Smoke • Haze • Volcanic Ash • Dust
   - Sand • Spray • Heavy Rain • Heavy Snow • Blowing Snow

Sky Color and Sky Visibility
Field Guide

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Task

Classify sky color and sky visibility, the overall sky conditions. These parameters describe the sky itself; not any clouds that may be present.

Color and visibility help us understand the impact of aerosols in our atmosphere, parameters that also affect energy transport.

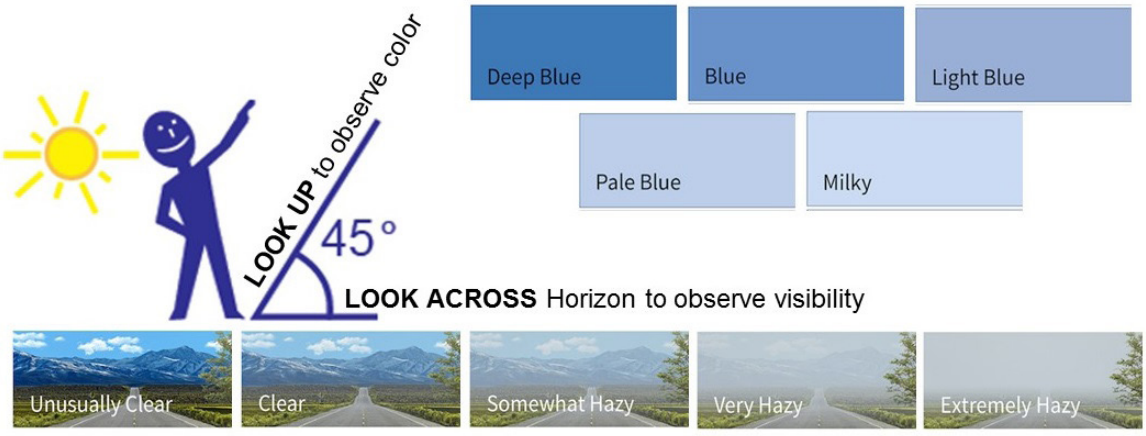
- These observations are only possible during the day, not at dusk or night.
- Sky color cannot be observed if view of the sky is obscured or if the sky has no clear patches (you cannot observe color if you have 50% cloud cover or greater).

What You Need

- □ Cloud Data Sheet
- □ Color and Visibility reference on Cloud ID Chart or within the GLOBE Observer app
- □ GLOBE Data Entry options

In the Field

1. Complete the top section of your Data Sheet.
2. Look at the sky in every direction (above 14 degrees).
3. **Look Up** to observe sky color, reporting the shade that most closely matches your sky.
   - Turn your back to the Sun.
   - Observe the bluest part of your sky, which is usually around 45 degrees above the horizon.
4. **Look Across** to observe sky visibility.
   - Look at a landmark in the distance and estimate how visible it is under current sky conditions.
   - Try to use the same landmark every time.
5. Record sky color and sky visibility for the overall sky. This observation will not be taken on each level.



Cloud and Contrail Type
Field Guide

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Task

To see which of the 12 types of clouds and how many of each of the three types of contrails are visible.

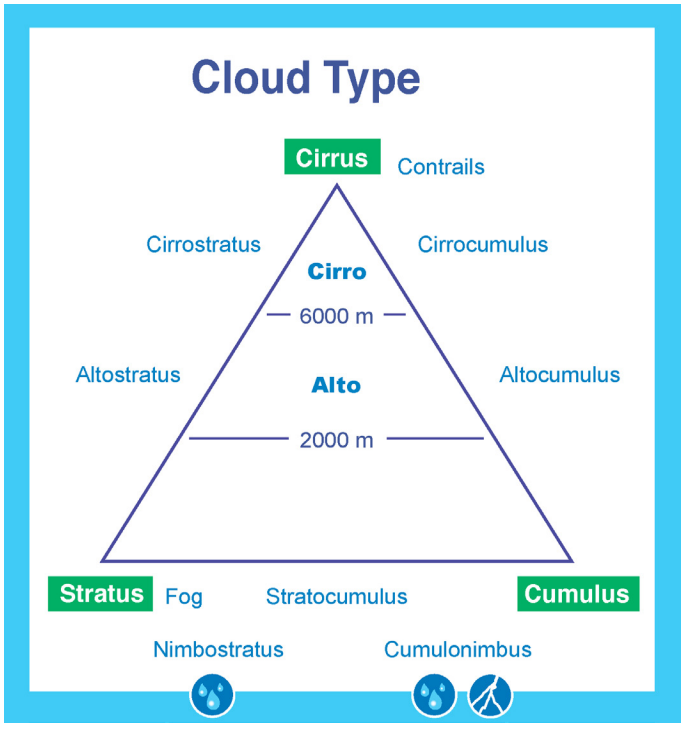
What You Need

- □ Cloud Data Sheet
- □ GLOBE Cloud Chart
- □ Observing Cloud Type Appendix
- □ Contrail Formation Guide
- □ GLOBE Data Entry options

In the Field

1. Look at all the clouds in the sky, in all directions.
2. Identify the types of clouds that you see using the GLOBE Cloud Chart and the definitions found in Observing Cloud Type (shape and height).
3. Check the box on your Data Sheet for each and every cloud type you see on each level (low, mid, and high).
4. There are three types of contrails. Record the number of each type you see.

CLOUDS



CONTRAILS

Short-lived

Persistent Non-Spreading

Persistent Spreading

Cloud and Contrail Visual Opacity
Field Guide

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Task

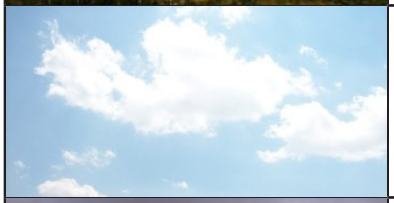
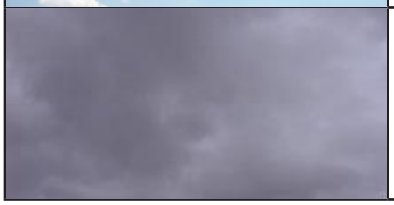
If clouds are present, observe how much sunlight they let through to the Earth surface, information on their opacity. Scientists use opacity rather than thickness because it means something different. When studying the radiative effects of clouds, we are interested in how much sunlight they let through (opacity), not in how much vertical space they take up (thickness).

What You Need

- □ Cloud Data Sheet
- □ GLOBE Cloud Chart
- □ GLOBE Data Entry options

In the Field

1. Estimate how much light the cloud is letting through to the Earth's surface.
2. Classify visual opacity for clouds on each level (low, mid, and high).
   - Reference your shadow for help:
     - Transparent clouds in front of the Sun - crisp shadow with clear edges
     - Translucent clouds in front of the Sun - less crisp shadow with edges starting to become fuzzy
     - Opaque clouds in front of the Sun - very fuzzy and difficult or impossible to see shadow
3. Record which opacity classification best matches what you observe on each level.

Visual Opacity Classification	
	**Transparent** This describes thin clouds through which light passes readily, and through which you can even see blue sky. Note the milky bluish-whitish appearance of the cirrus clouds (left).
	**Translucent** This describes medium-thickness clouds that let some sunlight through, but through which you cannot see blue sky. There may be some milky bluish-white near the edges, and bit of gray under the thickest parts, but these clouds are mostly bright white.
	**Opaque** This describes thick clouds which do not allow light to pass directly, although light can diffuse through them. Such thick clouds often look gray. When the sky is overcast, or when these clouds are in front of the Sun, it is impossible to tell the location of the Sun.