

## **Keep Your Eye on the Sky - Clouds and Weather**

### **Student Worksheet #1: The Clouds Below**

**Name:**

How do meteorologists predict and forecast our weather? Meteorologists use weather instruments to measure weather factors such as temperature, humidity, wind speed and direction, and air pressure. All of these can be measured on the Earth's surface (Surface Readings), but how do they get the images from space? The answer is satellites! Use this Web site:

[http://cimss.ssec.wisc.edu/satmet/modules/sat\\_basics/orbits.html](http://cimss.ssec.wisc.edu/satmet/modules/sat_basics/orbits.html) to learn the two types of weather satellites used to produce the day and night cloud images that indicate the weather below.

1. Define satellite:
  
  
  
  
  
  
  
  
  
  
2. What does POES stand for?
  
  
  
  
  
  
  
  
  
  
3. What does GOES stand for?
  
  
  
  
  
  
  
  
  
  
4. What is the difference between POES and GOES?
  
  
  
  
  
  
  
  
  
  
5. How high above the Earth does each of these satellites orbit?

**Click "Continue" to go to the next page (Geostationary Orbit)**

6. Draw a diagram of a geostationary orbit:

7. Why is a geostationary satellite orbiting over the equator?

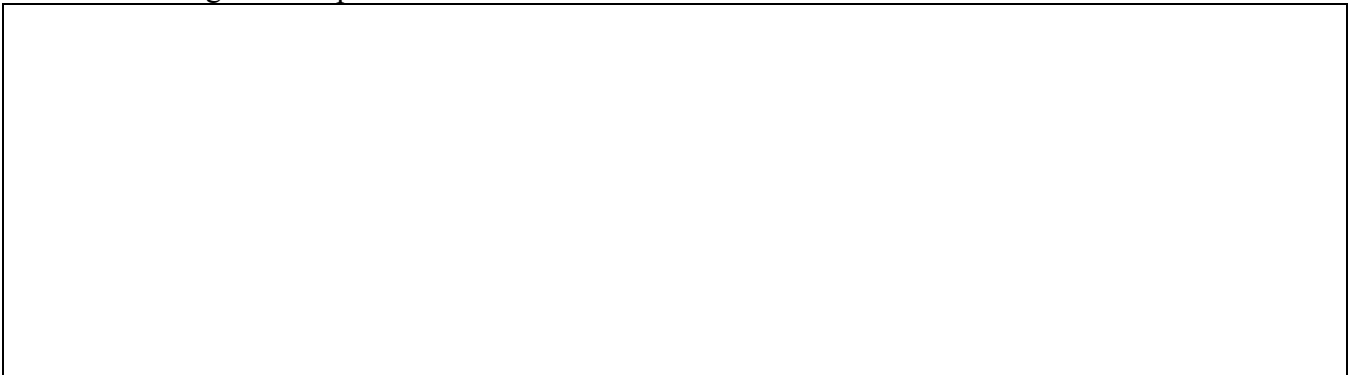
8. List the four geostationary satellites and their views of Earth:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

9. Why are four geostationary satellites needed?

**Click “Continue” to go to the next page (Polar Orbit)**

10. Draw a diagram of a polar orbit:



11. Explain the orbital path of polar satellites: Note: In reference to satellites, the term “swath” means the path covered by one satellite as it orbits from pole to pole.

**Click “Continue” to go to the next page (Satellite Remote Sensing Instruments)**

12. Define radiometer:

13. What is the function of the two imagers on weather satellites?

14. What is the advantage of having infrared images?

**Now go to this Web site to view GEOS and POES images:**

[http://cimss.ssec.wisc.edu/satmet/modules/sat\\_basics/images.html](http://cimss.ssec.wisc.edu/satmet/modules/sat_basics/images.html)

15. As you scrolled from left to right over the GEOS visual image, what changed?

16. Think about how satellites view clouds from above, what are the advantages of satellite images?



4. Describe how fog forms:

5. Have you ever wondered how jet airplanes make those white streaks across the sky? These are called “contrails”. Complete the paragraph below:

Contrails form from \_\_\_\_\_ just as clouds do. The hot, \_\_\_\_\_ air of the jet’s exhaust, environmental air of low pressure, and low \_\_\_\_\_ mix to form these white streaks in the sky. What causes these things to mix?

**Keep Your Eye on the Sky - Clouds and Weather**  
**Student Worksheet #2: Partly Cloudy Skies?**

Name:

<b>Cloud Type</b>	<b>Colors?</b>	<b>High?, Middle, Low?</b>	<b>Weather?</b>
Alto cumulus			
Alto stratus			
Cirro cumulus			
Cirro stratus			
Cirrus			
Cumulonimbus			
Cumulus			
Strato cumulus			
Nimbo stratus			
Stratus			

If there is time, go to <http://archive.globe.gov/sda-bin/m2h?gl/clouds.men> to view a slide show of cloud types and then take the online quiz

# Keep Your Eye on the Sky - Clouds and Weather Recording Observations: Data Chart 1

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Cloud Observations: \_\_\_\_\_ Clear Sky – No Clouds Observed  
\_\_\_\_\_ Clouds/Contrails Present

\_\_\_\_\_ HIGH LEVEL: # of Persistent Contrails Present \_\_\_\_\_  
# of Short-Lived Contrails Present \_\_\_\_\_

Cloud Type:	Cloud Cover:
_____ Cirrus	_____ Clear (0-5%)
_____ Cirrocumulus	_____ Partly Cloudy (5%-50%)
_____ Cirrostratus	_____ Mostly Cloudy (50%-95%)
	_____ Overcast (95%-100%)

\_\_\_\_\_ MID LEVEL:

Cloud Type:	Cloud Cover:
_____ Altostratus	_____ Clear (0-5%)
_____ Altocumulus	_____ Partly Cloudy (5%-50%)
	_____ Mostly Cloudy (50%-95%)
	_____ Overcast (95%-100%)

\_\_\_\_\_ LOW LEVEL:

Cloud Type:	Cloud Cover:
_____ Fog	_____ Clear (0-5%)
_____ Nimbostratus	_____ Partly Cloudy (5%-50%)
_____ Cumulonimbus	_____ Mostly Cloudy (50%-95%)
_____ Stratus	_____ Overcast (95%-100%)
_____ Cumulus	
_____ Stratocumulus	

Temperature: \_\_\_\_\_

Adapted from NASA S'COOL Web site <http://asd-www.larc.nasa.gov/SCOOL/>

**Keep Your Eye on the Sky - Clouds and Weather  
Recording Observations: Data Chart 2**

[http://www.fsl.noaa.gov/outreach/education/samii/SAMII\\_Activity1.html](http://www.fsl.noaa.gov/outreach/education/samii/SAMII_Activity1.html)

**Name:**



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Recording Observations: Data Chart 2**

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**Name:**

# Keep Your Eye on the Sky - Clouds and Weather

## Student Worksheet #3: Predicting Weather

### Recording Cloud Observations: Questions

**Name:**

**Part 1:** Using the *Recording Observations: Data Chart* that your teacher gave you, go outside to observe the weather and fill in the information about clouds. Try to make your observations at the same time each day for at least one week. If you are using *Data Chart #2* Use the information tables at the bottom of your data table to guide your observations. For cloud height, you may be lucky enough to have a local geographic feature to help guide your observations. Otherwise, use "cloud groups" to help identify height. Note that the darker the cloud, the more water it probably contains.


Look for patterns and relationships among the data that you collect. For example, you can learn about the winds aloft by watching clouds move. Often, if there are clouds present at different heights, they may be moving in different directions as they drift with the winds at those heights.

*Note: Ideally, data should be collected twice daily. You are more likely to observe trends in the space of a few hours than over a 24-hour period. Therefore, try to arrange with classmates to share data if you cannot make your own observations.*

**Part 2:** When you have gathered all of your data, use the information to answer these questions:

1. What fraction/percentage of the sky was covered most often?
2. What cloud group did you observe most often?
3. When skies were cloudy, were there high, middle or low clouds most often?
4. From what direction did clouds come most often?
5. What relationship(s) did you notice among the observations that you made? (For example: Low clouds are usually darker gray).
6. How can you tell whether clouds might contain water droplets or ice crystals?

**Part 3:** Now use your data chart and questions to write a detailed lab report about “Watching Clouds!”  
Use the space below as your draft:



Adapted from NOAA’s “Anatomy of a Cloud” lesson at  
[http://www.fsl.noaa.gov/visitors/education/samii/SAMII\\_Activity1.html](http://www.fsl.noaa.gov/visitors/education/samii/SAMII_Activity1.html)