

30/30

Period 5
8-16-06

THE CLOUDS BELOW

Student Worksheet #1: Satellite Technology and Clouds

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 the printout from this website:

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:

object that orbits around a bigger object

2. What is the difference between POES and GOES?

GOES satellites orbit earth above the equator at the same speed as earth rotates so it takes continuous pics. POES takes snapshots and is lower and shorter.

3. How high above the Earth does each of these satellites orbit?

They are about 36,000 kilometers or 22,300 miles

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

So it can stay up and maintain its height

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

- ◆ GOES has a view of the East Coast
- ◆ POES - view of West Coast
- ◆ METEOSAT - eastern Atlantic Ocean, Africa, Europe
- ◆ GMS - view of Asia, Australia, western Pacific Ocean

6. Why are four geostationary satellites needed?

So you can have a constant view of earth at all times and able to collect the data

7. 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.

It's closer to Earth about 500 miles, so it takes one hour and 42 minutes to complete an orbit from pole to pole.

8. Define radiometer:

an instrument that measures electromagnetic energy

9. What is the advantage of having infrared images?

That you have the capability to monitor the weather system both day and night.

Name: _____

Directions: Go to the Weather Wiz website to answer the questions and complete the cloud chart: <http://weatherwizkids.com/cloud.htm>

Read the cloud information with your group to answer the questions and complete the Cloud Chart:

Part 1:

1. List the steps of a cloud's formation (you may want to go to the "Climate" link in the left navigation bar of the "Clouds" for an explanation and diagram about the Earth's Water Cycle):

- warm air rises
- it expands + cools
- water vapor condenses into tiny pieces of dust
- a tiny droplet is formed around each dust particles
- when billions of these droplets come together a cloud is formed

2. Explain how "condensation" and clouds are alike:

Condensation is when all the water comes together + a cloud is a group of tiny droplets of water.

3. One of your friends has just learned about clouds and insists that clouds do not float or move. Is your friend right or wrong? Write an explanation that supports your answer:

wrong. When the cloud is warmer than the outside air around it, it floats. clouds also move with the wind. They can move as fast as 100mph.

4. Describe how fog forms:

southerly winds bring warm, moist air into a region, possibly ending in a cold outbreak

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 condensation just as clouds do. The hot, humid air of the jet's exhaust, environmental air of low pressure, and low temperature mix to form these white streaks in the sky. What causes these things to mix?

turbulence generated by the engine exhaust

Part 2: CLOUD CHART

CLOUD TYPE	COLORS?	HIGH? MIDDLE? LOW?	WEATHER?
Altostratus	gray	Middle	Form ahead of storms w/ continuous rain or snow
Altostratus	gray or blue-gray	Middle	Seen on a warm sticky morning. Will see thunderstorms late in the afternoon
Cirrocumulus	white puffs that appear in long rows	high	Seen in the winter indicate fair, but cold weather. may indicate an approaching hurricane
Cirrostratus	thin, sheetlike	high	come 12-24 hrs B4 a rain or snow storm
Cirrus	white	high	a change in the weather will occur w/in 24 hrs.
Cumulonimbus	dark gray	high	heavy rain, snow, hail, lightning, & tornadoes
Cumulus	white	Low	can develop into thunderstorms (cumulonimbus clouds.)
Stratocumulus	gray	Low	Rain rarely occurs, however they can turn into nimbostratus clouds
Nimbostratus	dark gray	Low or middle	continuously falling rain or snow
Stratus	grayish	Low	light mist or drizzle sometimes falls out of these clouds