

## Topic VII

### Dew Point and Cloud Formation

**Introduction:** Cumulus clouds are our "puffy" fair weather clouds. They are often flat on the bottom and rounded on top. The distance from the surface to the bottom of these clouds is often the same for a group of them. Clouds can only form if a specific temperature called a dew point is reached. Since the air temperature decreases with altitude increase above the earth's surface, clouds may form if the air temperature is cold enough to be at the dew point at some altitude.

- A couple things to remember when calculating dew points
- Dry bulb temperature is also the air temperature
- Always makes sure you are using the difference between the two temperatures at the top of the diagram on page 12 in your ESRT.

**Objective:** In this lab you will study the relationship between the dew point temperature and the height above the earth's surface at which clouds form.

#### Vocabulary:

- Dew point
- Psychrometer

#### Procedure A:

Refer to the dew point temperature chart in the Earth Science Reference tables on page 12 to answer the following questions.

1. What is the difference in temperature if the dry-bulb temperature is  $20^{\circ}\text{C}$  the wet-bulb is  $16^{\circ}\text{C}$
2. What is the dew point temperature if the dry-bulb is  $16^{\circ}\text{C}$  and the difference in temperature of the dry-bulb and wet bulb is  $4^{\circ}\text{C}$
3. What is the dew point temperature if the dry-bulb temperature is  $26^{\circ}\text{C}$  and the wet-bulb temperature is  $20^{\circ}\text{C}$ .

Answers: 1. \_\_\_\_\_

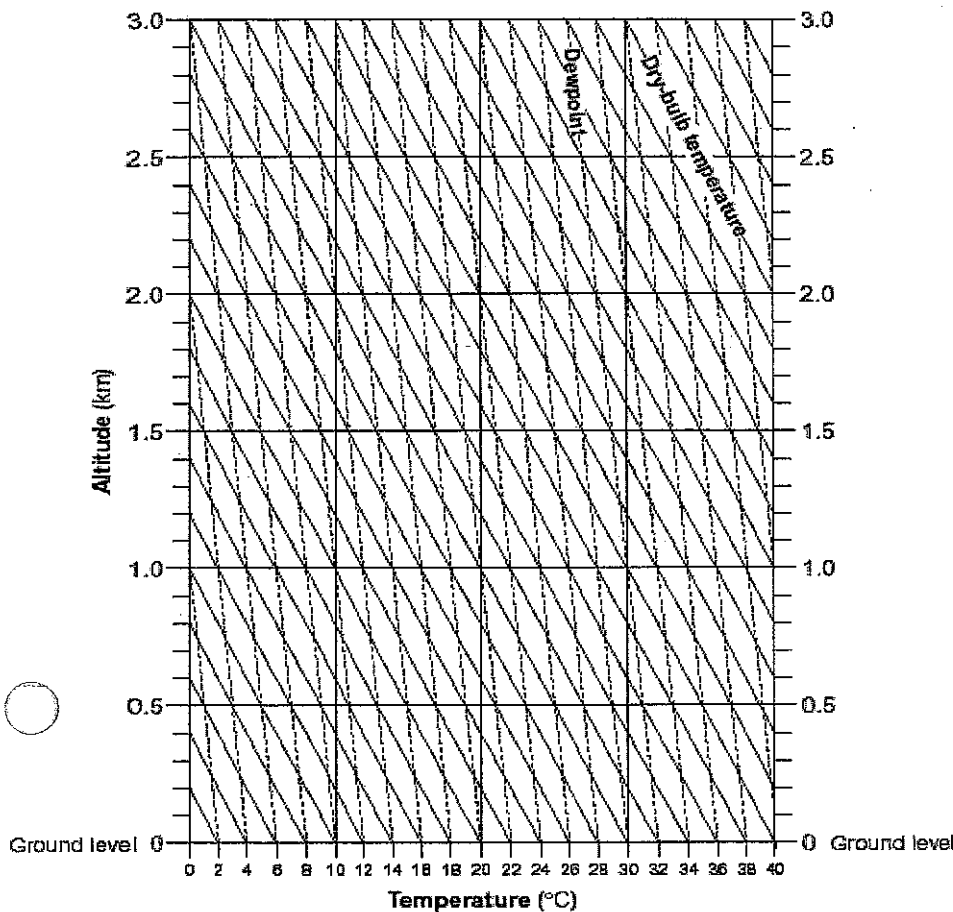
2. \_\_\_\_\_

3. \_\_\_\_\_

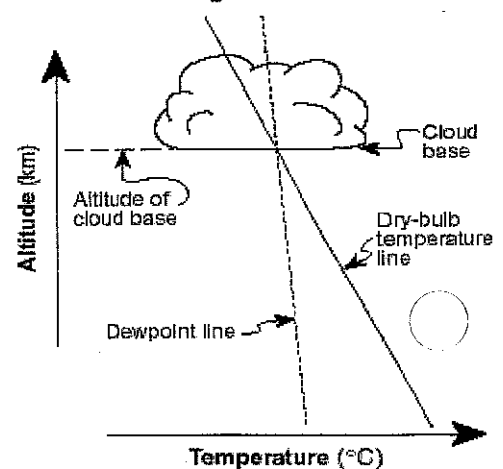
**Procedure B:**

- Refer to the chart below and answer questions one through five.

**Generalized Graph for  
Determining Cloud Base Altitude**



**How to Use the Graph for  
Determining Cloud Base Altitude**



1. According to the diagram does dew point increase or decrease with an increase with altitude?  
\_\_\_\_\_
2. According to the diagram does temperature increase or decrease with an increase with altitude?  
\_\_\_\_\_
3. Which changes more rapidly with increasing altitude, air temperature or dew point temperature?  
\_\_\_\_\_
4. At what altitude do the dew point and air temperature become the same if the surface air temperature is 40 °C and the dew point temp at the surface is 20 °C ?  
\_\_\_\_\_
5. What would be the altitude of the bottom of a cloud mass if the surface temperature is 28°C and the surface dew point temp is 10°C ?  
\_\_\_\_\_

Name \_\_\_\_\_

Period \_\_\_\_\_

**Procedure C:**

User the information given on report sheet 1 to determine the dew point temperatures and cloud base altitudes

Dry bulb temperature	30°C	22°C	26°C
Wet bulb temperature	26°C	14°C	16°C
Difference between wet bulb and dry bulb (subtract)			
Dew Point temperature (Page 12 ESRT)			
Cloud base Altitude (use chart on page 2)			

**Procedure D**

Out side if it is a nice day

Inside if it is bad day

1. Use a sling psychrometer to measure the wet and dry bulb temperature. Record this data on the report sheet
2. Complete the report sheet below by determining and entering the difference between wet bulb and the dry bulb, and the dewpoint temperatures.
3. Using the dry bulb and dew point temperatures determined below, use the chart on the next page to find the cloud base altitude for this day. Record this altitude on the report sheet below
4. **Draw the lines on the chart on the next page and also draw in clouds where they would form according to your numbers**

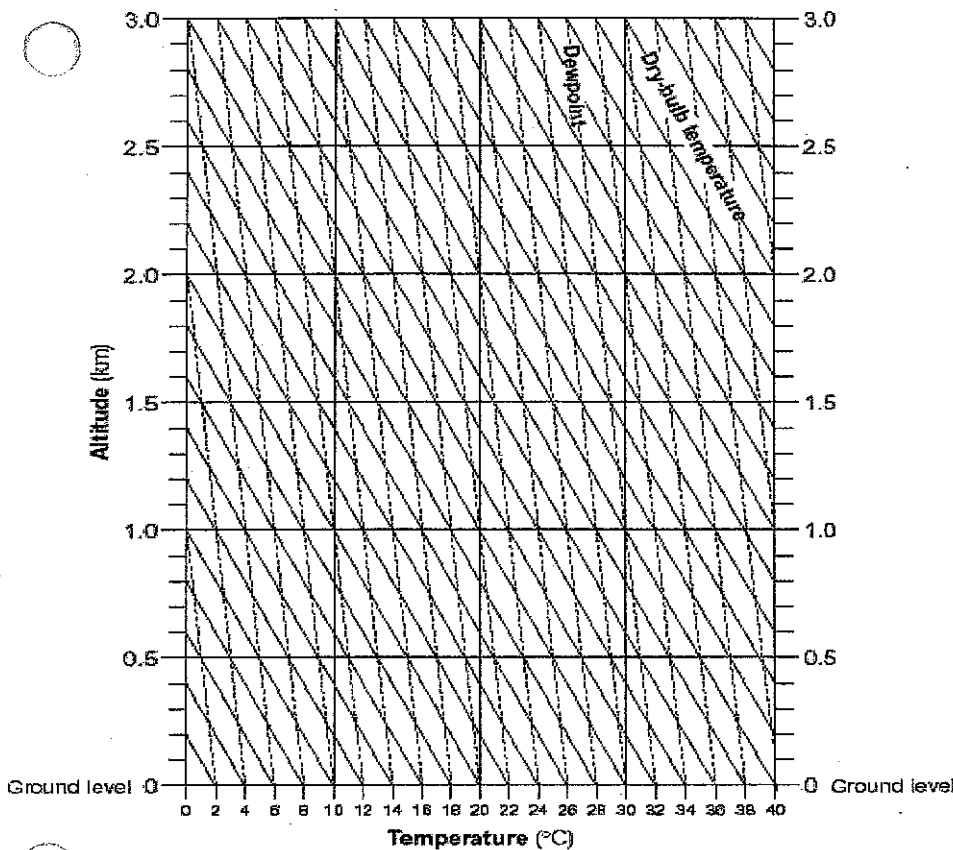
**Report Sheet**

Dry bulb temperature (before slinging it around)	
Wet bulb temperature (after slinging it around)	
Difference between wet bulb and dry bulb	
Dew Point temperature (Reference Table pg12)	
Cloud base Altitude (use chart on next page)	

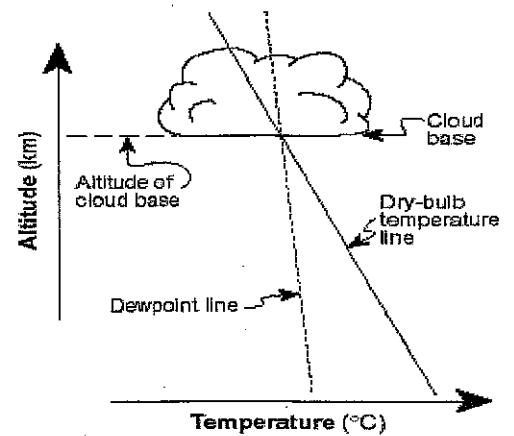
Name \_\_\_\_\_

Period \_\_\_\_\_

# Generalized Graph for Determining Cloud Base Altitude



## How to Use the Graph for Determining Cloud Base Altitude



### Discussion Questions:

1. Why does the height of the cumulus cloud base change from day to day?
2. What would happen to the height of the cloud base if the dew point temperature were lower?
3. How would it be possible to have a day without clouds?
4. What relationship would you expect to find between the air temperature and dew point temperature at ground level if the area is covered by fog?
5. What happens to the air temperature of a descending mass of air?
6. What happens to the dew point temperature of a descending mass of air?
7. As air temperature and dew point temperature approach one another what happens to your possibility percentage of precipitation?