

UNITED STATES MARINE CORPS

LESSON PLAN

AIR MASS CHARACTERISTICS

INTRODUCTION:

1. Gain Attention. On November 10, 1995, the Bixby, Oklahoma Mesonet site recorded an extreme change in temperatures. At 4:00 p.m. the temperature was 83°F. By 7:00 p.m., the temperature had plummeted to 46°F, and by 3:00 a.m. on November 11, the temperature was 25°F. The reason for such a drastic change is due to associated air masses and their transitioning effect throughout a widespread area.
2. Overview. During this period of instruction, the student(s) shall be introduced to the concept of an air mass and the characteristics that are associated with them.
3. Introduce Learning Objectives.
 - a. Terminal Learning Objective. Without the aid of references, but in accordance with the period of instruction, the student(s) shall physically determine possible location of air masses utilizing an analyzed surface chart for an area of interest.
 - b. Enabling Learning Objective(s). Without the aid of reference, but in accordance with the instruction, define each of the six (6) types of characteristics associated with air masses.
4. Method/Media. This period of instruction will be taught using the lecture method with the aid of a Macromedia Flash presentation "QMMPH1-Introduction to the Dynamics of the Earth's Atmosphere".
5. Evaluation. The student shall be evaluated by demonstrating successful completion of the terminal learning objective.

TRANSITION. The troposphere is a continuous body of various gases that surround the planet. However, it is by no means a uniform blanket of air. It is composed of many large bodies of air that are distinct from one another. The next topic introduces these larger bodies or air called air masses.

BODY:

1. Defining an Airmass. An air mass is a great body of still air whose temperature and humidity, level for level, are about the same over a wide area. Air masses can collect and build up only where the atmosphere has achieved stability over sections of the earth's surface having a fairly uniform nature and light winds. Air masses are classified according to their temperature and moisture characteristics and must meet three (3) requirements:
 - a. Size. A typical air mass is more than 1,000 miles wide and several miles deep.

b. Uniform Properties. The air mass must have homogenous uniform properties in the horizontal dimension. At any given altitude, its physical characteristics (temperature, humidity, and stability) are the same.

c. Travel as One. Once the air mass moves out of its region of origin, it must maintain its temperature, moisture and stability characteristics and not be destroyed from surrounding airflow.

TRANSITION. Once an air mass has formed or been identified, it is classified according to certain characteristics or properties. The next section introduces the characteristics of air masses.

2. Airmass Characteristics. Classification of an air mass depends on latitude and the surface area over which it forms.

a. Uniform Surface Area.

(1) Maritime (m). Maritime or oceanic air masses form over large bodies of water (usually oceans) where they acquire a very moist characteristic due to high water vapor content. High humidities are associated with this type of airmass.

(2) Continental (c). Continental air masses form over land where they acquire relatively drier characteristics than maritime air masses. Land is not able to retain as high water vapor content as oceans are, therefore continental air masses are relatively dry.

b. Latitude.

(1) Equatorial (E). A very warm body of air found along the portion of the Earth where heating occurs year round, the Equator.

(2) Tropical (T). A relatively warm body of air situated in between the very warm equatorial region and the cooler regions to the north.

(3) Polar (P). A relatively cool body of air situated between the warmer temperatures toward the Equator and the cold temperature of the frozen lands.

(4) Arctic (A). A very cold body of air found at the northern most extent of the Earth where solar heating (radiation) is at a minimum.

TRANSITION. A discussion of individual characteristics was just discussed, when in reality an air mass is classified according to both the region it forms over and the latitude of the formation.

OPPORTUNITY FOR QUESTIONS:

1. Questions from the Class. At this time, are there any questions

pertaining to the information that has just been presented?

2. Questions to the Class. There are no questions for the student(s) at this time.

SUMMARY: During this period of instruction, the student(s) were introduced to what an airmass consists of, as well, as the individual characteristics they may contain.

REFERENCES:

Frederick K. Lutgens and Edward J. Tarbuck. The Atmosphere: An Introduction to Meteorology 9th ed. New Jersey: Pearson Education Inc., 2004.