

## **The Ionosphere is used in Radio Communication.**

When solar energy is absorbed in the lower thermosphere and upper mesosphere, electrically charged ions are formed. The area where this occurs is sometimes called the ionosphere. Electrons in the ionosphere reflect radio waves, allowing them to be received over long distances. Without the ionosphere, most radio signals would travel directly into space, and only locations very close to a transmitter could receive the signals. Because these ions require solar radiation in order to form, their number in the lower layers of the ionosphere decreases at night. This means the radio waves can travel higher into the atmosphere before being reflected. As a result, the radio waves return to Earth's surface farther from their source than they do in the daytime. Radio waves can be received from far away because they are reflected by the ionosphere. At night, when ion density decreases in the lower atmosphere, transmissions can be received farther away.

## **How does a Radio work?**

Radio signals are made up of two kinds of waves: Audio waves represent the sounds being sent to the audience and radio frequency waves travel with these sound waves to carry them to radios in homes and cars.

What is the difference between AM radio and FM radio? AM stands for amplitude modulation – a type of signal. With AM, the amplitude of the combined audio frequency and radio frequency waves varies to match the audio signal. AM radio can develop problems with interference. This makes it hard to hear the radio show.

FM stands for frequency modulation – where the frequencies of the combined waves change to reproduce the audio signal. FM waves do not have a problem with interference because the noise background does not modify the radio wave frequency. In addition, FM waves give better sound reproduction.

## **My Phone is a Radio?**

Basically, the mobile phone is a radio. Cellular (cell) phones operate with radio frequencies, a form of electromagnetic energy located on the electromagnetic spectrum between FM radio waves and the waves used in microwave ovens, radar, and satellite stations. It relies on a radio signal in order to transmit and receive voice and data information. Previously, the radio device can only receive a signal from a commercial station making it a one way communication apparatus. However, by integrating the principles behind Bell's telephone, the simple radio became a communication device which can also serve as a small transmitter thus giving it the capability to become a mobile phone.

Mobile phones are small radios imbedded with mini transmitters. This means that it actually transmits radio signals when powered on. This is a very important component because it readily gives up your electronic radio location so that calls can be diverted to you or so you can make them.

Cellular phone technology works on a system of geographically separated zones called "cells." Each cell has its own "base station" that both receives and emits radio waves. When a call is placed from a cellular phone, a signal is sent from the cell phone antenna to that cell's base station antenna. The base station responds to the cellular phone signal by assigning the phone an available radio frequency channel. When the RF channel is assigned, modulated radio signals are simultaneously received and transmitted, allowing voice information to be carried between the cell phone and the base. The base station transfers the call to a switching center, where the call can be transferred to a local telephone carrier or another cell phone.

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

Questions on Reading:

1. What is formed when solar energy is absorbed in the lower and upper mesosphere?
2. What reflects radio waves?
3. What does this allow them to do?
4. What would happen without the ionosphere?
5. What happens with the ion density at night? What does this allow?
6. EXPLAIN the two types of radio waves?
7. What is the difference between AM and FM radio?
8. What frequency has less interference? Why?
9. How do cellular phones operate?
10. What are mobile phones imbedded with?
11. Why is that important?
12. What is the importance of the base station?