

## THE WEATHER

### AIM 1: How does energy get into the atmosphere?

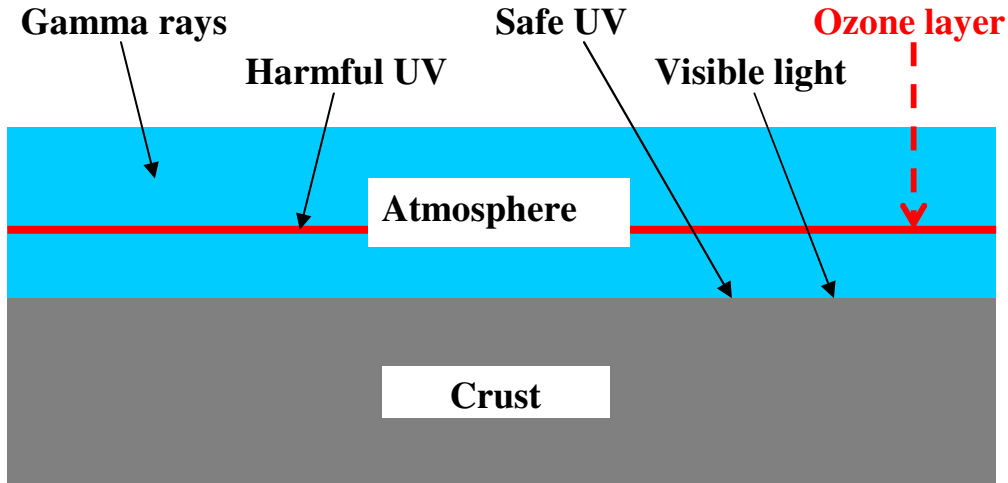
#### HW

- Read "How Does Energy Enter the Atmosphere?" p163-166
- Do all questions on Part A on p166&167

The sun gives off electromagnetic energy or wavelengths that make up the electromagnetic spectrum. See ESRT page 14

#### The atmosphere filters radiations

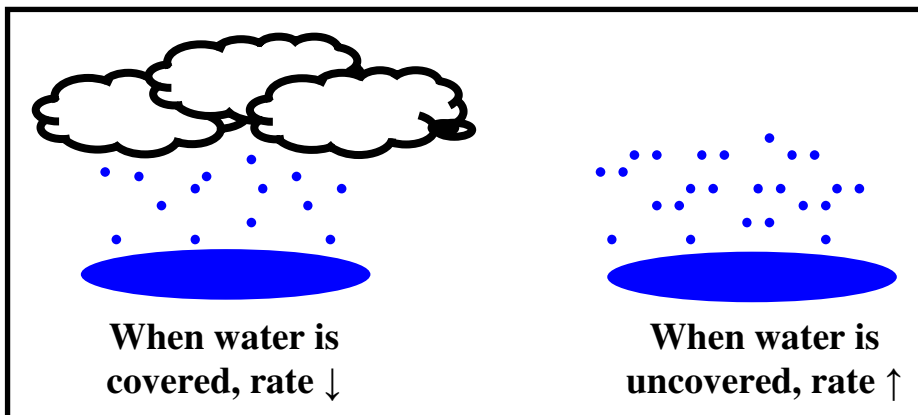
Short-wave radiations such as Gamma rays are mostly absorbed by the atmosphere. Some safe UV (Ultraviolet) rays pass through but harmful ones are blocked by the ozone layer. Most of the wavelengths reaching the Earth are visible light.

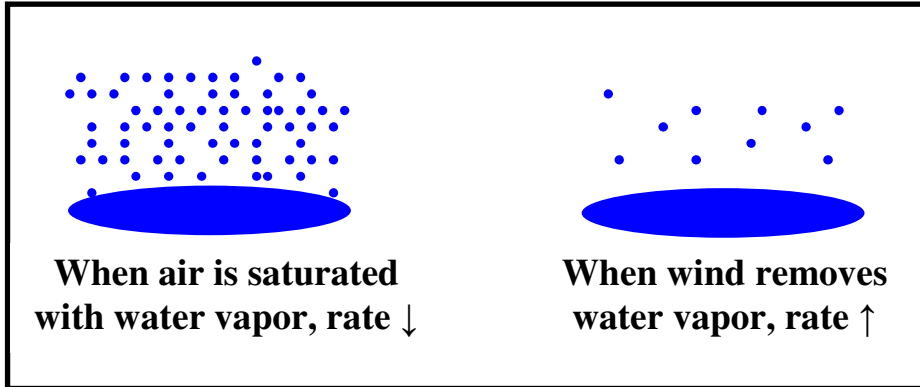
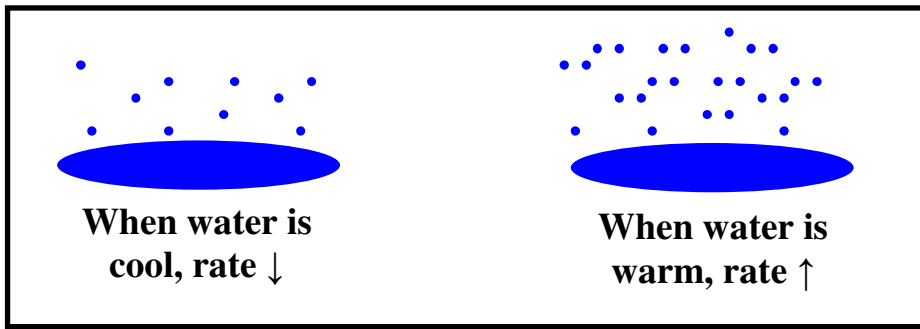


#### From the energy reaching Earth's surface about

75% is for evaporation (The change from liquid to gas)  
24% is for heating up materials. Heated materials radiate heat (infrared) back to the atmosphere.  
1% is for photosynthesis.

#### The rate of evaporation depends on several factors





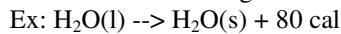
**Some physical properties of water are:**

See ESRT page 1

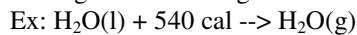
80 calories is gained when 1 gram of ice melts



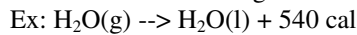
80 calories is released when 1 gram of water freezes



540 calories is gained when 1 gram of water vaporizes



540 calories is released when 1 gram of water vapor condenses



**Problems**

1. How many calories are required to melt 100 g of ice?
2. How many calories are released when 1 Kg of water vapor condenses?

**In the atmosphere**

Energy is gained or absorbed when water

- Evaporates from oceans, lakes, and other bodies of water
- Melts

Energy is released when water

- Condenses to form clouds
- Freezes

**Test your understanding**

8/07

7 How many calories are required to evaporate 1 gram of boiling water? (1) 1 (2) 80 (3) 540 (4) 620

10 Most of the solar radiation absorbed by Earth's surface is later radiated back into space as which type of electromagnetic radiation?

- (1) x ray (2) ultraviolet (3) infrared (4) radio wave

6/07

6 Which type of electromagnetic energy has the longest wavelength?

- (1) infrared radiation (2) radio wave radiation (3) ultraviolet radiation (4) x-ray radiation

7 Under which atmospheric conditions will water most likely evaporate at the fastest rate?

- (1) hot, humid, and calm (2) hot, dry, and windy (3) cold, humid, and windy (4) cold, dry, and calm

8/06

16 Which process transfers energy primarily by electromagnetic waves? (1) radiation (2) evaporation (3) conduction (4) convection

6/03

4 Which phase change requires water to gain 540 calories per gram?

- (1) solid ice melting (2) liquid water freezing (3) liquid water vaporizing (4) water vapor condensing

8/02

23 During which phase change of water is the most energy released into the environment?

- (1) water freezing (2) ice melting (3) water evaporating (4) water vapor condensing

1/02

20 Liquid water can store more heat energy than an equal amount of any other naturally occurring substance because liquid water

- (1) covers 71% of Earth's surface (2) has its greatest density at 4°C  
(3) has the higher specific heat (4) can be changed into a solid or a gas