

## **A.P. ENVIRONMENTAL SCIENCE**

### **BIG IDEAS**

#### **Ecology**

1. Earth Island concept:
  - . The Earth is like a lifeboat or island with limited resources in the middle of a “sea.”
  - . The Earth is a unique and special place with liquid water, the right distance from the sun, etc.
2. Tragedy of the commons: There is a tendency for private and individual greed to use up and destroy public resources.
3. Energy coming into ecosystems can't be recycled, but all matter in ecosystems is recycled.
4. All organisms need energy to stay alive. Gross primary productivity captures energy through photosynthesis. Living things then use this energy for growing and developing but lose 90 percent of it through heat. Net primary productivity is the actual biomass left after the loss of heat.  
$$\text{GPP} - \text{energy loss} = \text{NPP}$$
5. As you move up an energy pyramid, each trophic level loses about 90 percent of its energy through heat loss. That is why most food chains are short.
6. Wind and water transfer the sun's equatorial energy all over the earth.
7. Biomes are caused by climate (precipitation and temperature) and soil type.
8. Ecosystems are an interaction between abiotic and biotic factors.

#### **SPECIES**

1. Presently, the planet Earth is undergoing its sixth great mass extinction event which is being caused not by volcanoes or asteroids but by an exponentially growing human population.
2. It is impossible to determine the exact rate at which species are going extinct, but a ballpark figure which was arrived at by averaging the results of several studies

comes in at about 75 species per day or approximately 3 species per hour. This comes out to about 27,400 species per year.

3. If this extinction rate remains constant, we will lose somewhere between 10% to 15% of the world's twenty million species by the year 2100.
4. The leading causes of species extinction (in order) are habitat destruction, global warming, invasive species, and excessive harvesting (illegal poaching, illegal hunting, and commercial capture).
5. The three most biologically productive ecosystems on Earth are tropical and temperate forests, wetlands and estuaries, and coral reefs. These area should receive top priority when it comes to protection.

## **GEOLOGY AND SOILS**

1. The Earth's topography is created by its internal processes such as magma induced volcanoes and plate tectonics, while the external forces of weather, wind, water, and gravity erode and destroy this topography.
2. Soil is the foundation of all terrestrial ecosystems and of human civilization.
3. Soil is formed gradually over centuries and millennia but can be lost quickly through erosion.