



# Unit 1

*AP Environmental Science Test Review*



# Ecological Footprints

- What is an Ecological Footprint?
- An ecological footprint allows us to calculate **human pressure** on the planet, which measures how much **land and water area** a human population requires to produce the resource it consumes and to absorb its carbon dioxide emissions.
- Did you know it takes the earth **1 year and 6 months** to replace what we use in one year?
- The Average American uses **5 earths** to keep up with their lifestyle



# Effects of Deforestation

- Deforestation effects the water cycle and the soil resources
- Water Cycle: dries up freshwater resources, decreases humidity and no more lumber is produced
- Soil: The soil cannot hold as much water



# Notes in a Nutshell

- A Country's economic growth is measured by **GDP**
- Changes in economic growth is measured by **per Capita GDP**
- **Sustainable yield** is when you take just what you need
- **Global warming** is the degradation of renewable natural resources and services
- **The Tragedy of the Commons** is a book written to warn of the overexploiting of shared renewable resources and its solutions are the following:
  - Limits
  - Laws
  - Make Common or Open Access Resources Private



## Notes in a Nutshell (contd.)

- There were three major cultural events
  - The Agricultural Revolution
  - The Industrial-Medical Revolution
  - The Information-Globalization Revolution



# Notes in a Nutshell (contd.)

- Point pollution is detectable
- Nonpoint pollution is not detectable
- Nature will break substances down if it is biodegradable, it will not if it is nondegradable
- Pollution is damaging to wildlife, the environment, human health, and substances made of stone and metals, it is a nuisance and disrupts life support systems
- Pollution cleanup is output, while prevention is input



# Notes in a Nutshell (contd.)

- The Five Basic Causes of Environmental Problems
  - Population growth
  - Wasting resources
  - Poverty
  - Market prices don't include environmental cost
  - People don't know how nature works



## Notes in a Nutshell (contd.)

- *Affluence*, the great quantities that are taken from natural capital, offers *high levels of consumption and waste*
- Companies often *don't pay* for the environmental cost of resource use, the taxpayers pay for it (Economy may be stimulated, but degradation is the long term loss)



## Notes in a Nutshell (contd.)

- 5% - 10% of the population can bring a major social change
- We have to (1) rely on solar energy, (2) have biodiversity, (3) maintain population control and (4) actively participate in nutrient cycling (The Four Scientific Principles of Sustainability)



# Notes in a Nutshell (contd.)

- Atmosphere: The Air
- Hydrosphere: The Water
- Lithosphere: The Land/Rock
- Biosphere: Life



# Notes in a Nutshell (contd.)

- Water Cycle, Evaporation, precipitation and transpiration
- The atmosphere from bottom to top, troposphere (weather), stratosphere (ozone), mesosphere (meteor burning), Thermosphere or Ionosphere (aurora borealis)
- Greenhouse Gases, which heat up the lower atmosphere,  $H_2O$ ,  $CO_2$ ,  $CH_4$ ,  $N_2O$
- Nitrogen and Oxygen are not Greenhouse gases



## Notes in a Nutshell (contd.)

- *weather* is short term conditions, but *climate* is long term conditions (trends of hundreds of years) [most important for climate: *temperature and precipitation*]
- The *seasons* are caused by the tilt of the earth's axis and the intensity of the sun's rays at a particular angle at a particular side of the earth

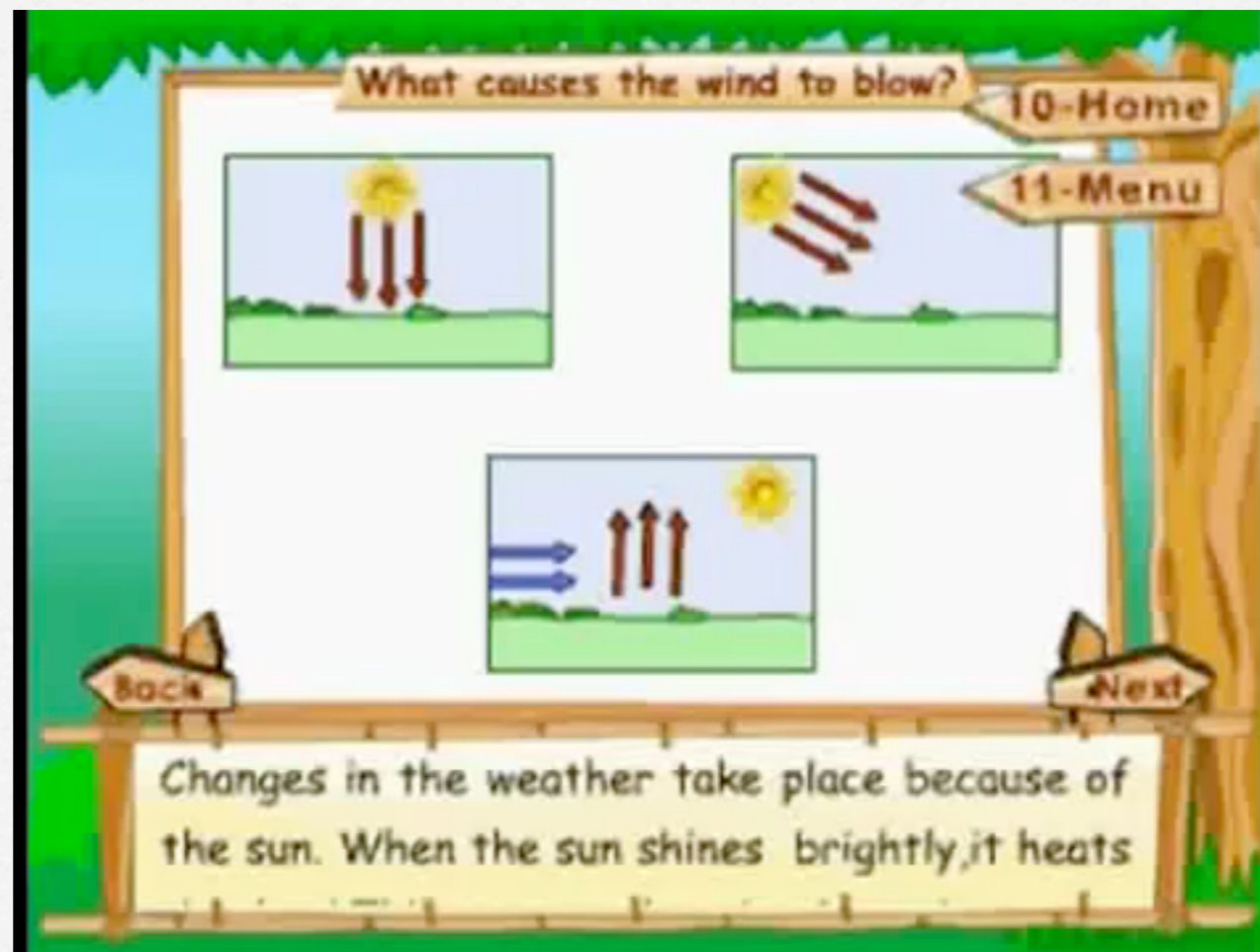






# Two reasons the wind blows

- Uneven heating of the earth's surface.  
Confused? Take a look.





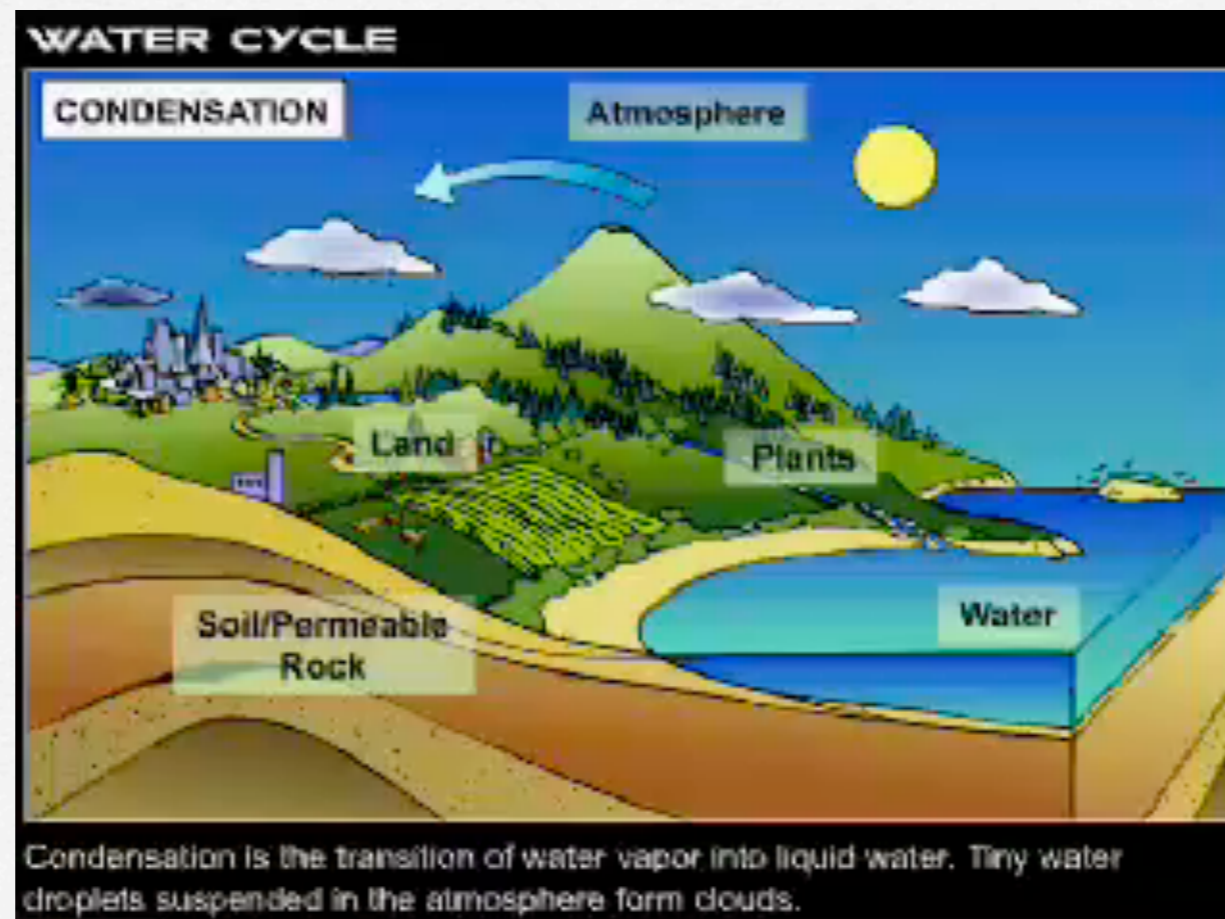
# Two reasons the wind blows

- *Rotation of the earth on its axis. Huh?  
See video below. Coriolis effect*



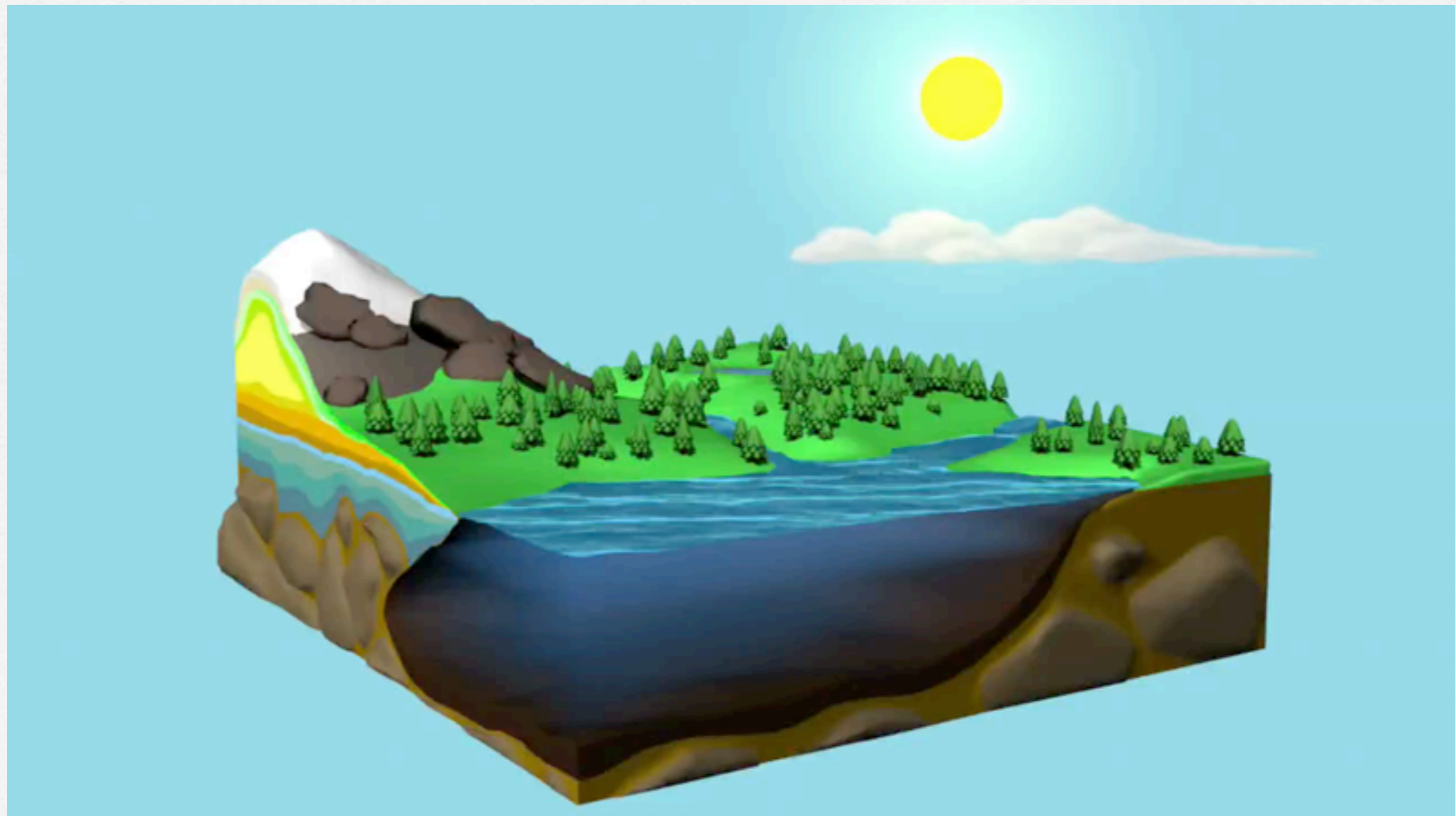


# Water Cycle



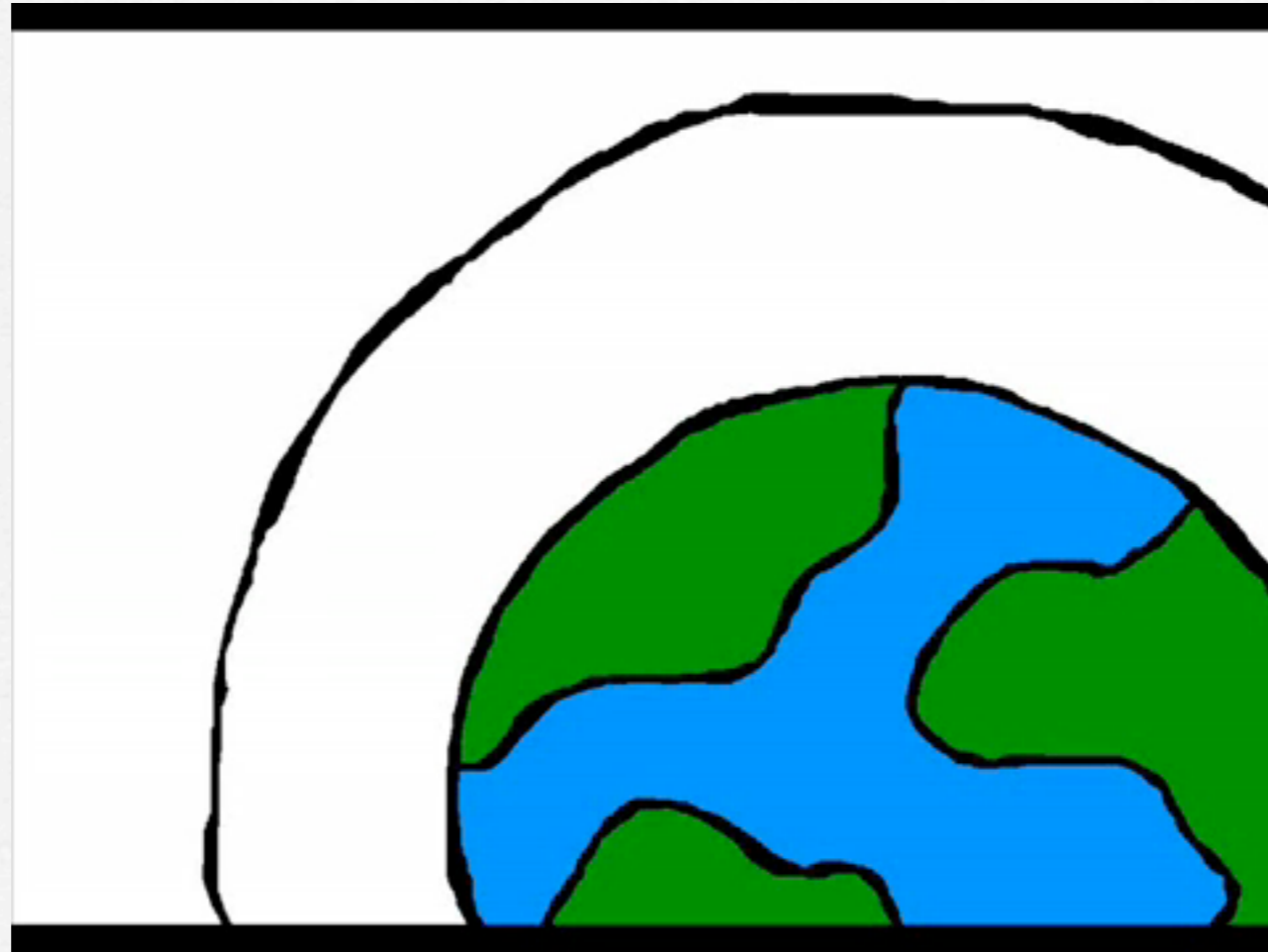


# Water Cycle





# Greenhouse Effect





# Ocean Currents

- Driven by prevailing winds, the earth's rotation and redistribution of heat from the sun





# Air

- The windward side of a mountain is rainy
- The leeward side of a mountain is dry



# El Nino

- El Niño are unusually warm ocean temperatures in the Equatorial Pacific.
- Storms, diseases and halted upwelling result





# Earth Systems

- **Core:** A dense mass largely made of nickel and some iron
- **Mantle:** Contains molten rock of magma that slowly circulates in convection cells
- **Asthenosphere:** Is located in the outer part of the mantle, is composed of semi-molten, ductile rock
- **Lithosphere:** A brittle outmost layer of the planet that is approximately 100 km thick (60 mi) which includes solid upper mantle and the crust. They are made of plates, which over tile convection cells and there is soil at the top



# Earth Systems

- **Hot spots** form from radioactive decay of various isotopes, which produce heat from mantle
- 3 Major processes of the earth's geologic cycle
  - Tectonic Cycle
  - Rock Cycle
  - Soil Formation



# Earth Systems

- **Plate Tectonics**: The earth's lithosphere is divided into plates, most of which are in constant motion
- **Subduction** is the process of one plate passing under another
- **Volcanoes** are formed when a plate moves over a geologic hot spot, then heat from the rising mantle plume melts the crust, which is a vent in the earth's surface



# Plate Boundaries

- **Divergent**: Plates move away from each other, like a conveyor belt
- **Convergent**: Plates move towards each other. Creates mountains when more dense plates move onto lighter plates
- **Transform**: Plates move past each other, which causes continental movement



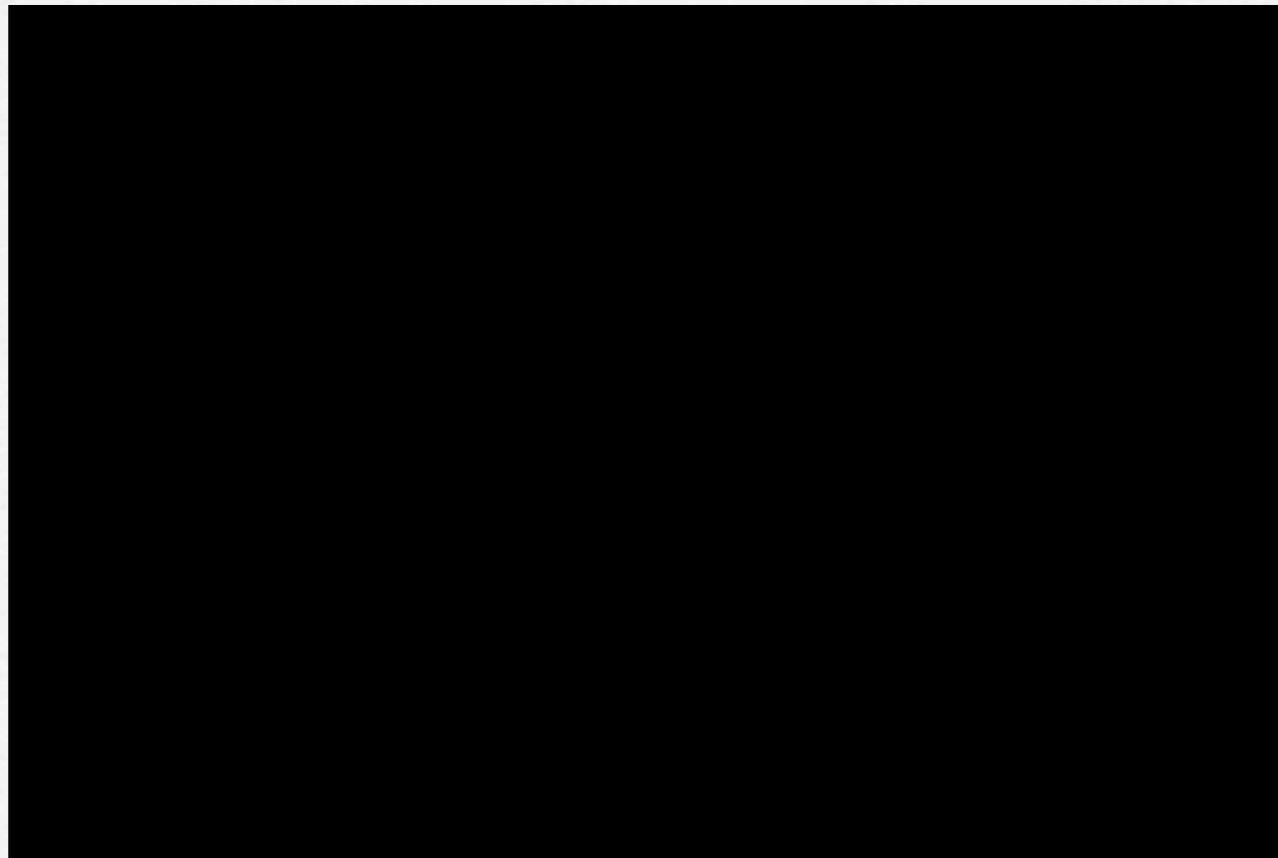
# Earth Systems

- **Earthquakes** happen among fault lines, which is a fracture in rock where movement occurred, and the epicenter of an earthquake is the exact point on the surface of earth directly above the location where the rock ruptures
- Did you know 20% of power plants operate near places with seismic activity?



# Earth Systems

- Rock Cycle: constant formation and destruction of rock





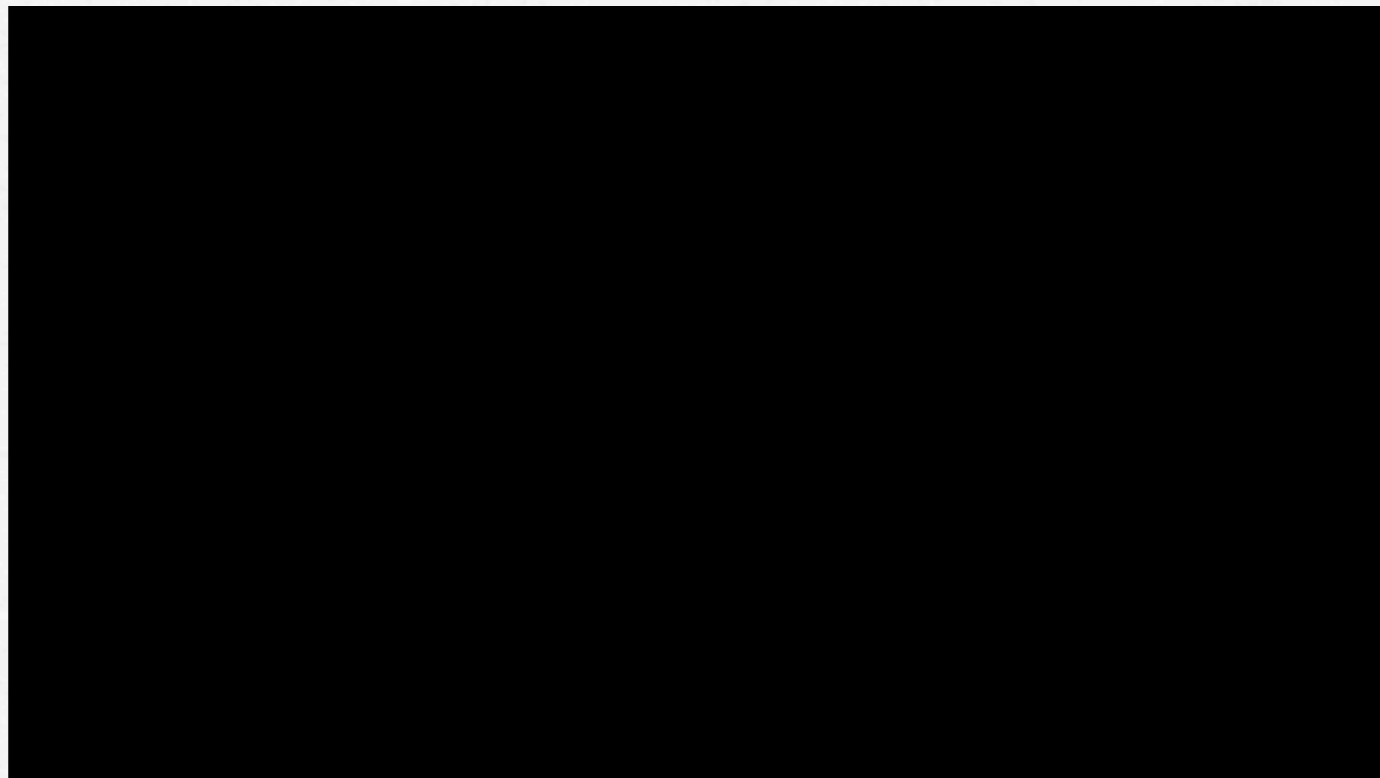
# Rocks Rock!

- Igneous: Rocks that form directly from magma
- Sedimentary: They form when sediments such as muds, sands, or gravels are compressed by overlying sediments
- Metamorphic They form when sedimentary rocks, igneous rocks, or other metamorphic rocks are subjected to high temperatures and pressures



# Rocks Rock!

- *See video on rock types*





# Erosion

- **Erosion** is the physical removal of rock fragments. Wind, water and ice causes it as well as living organisms. Humans contribute by deforestation, overgrazing, unmanaged construction activity and road building



# GEOCYCLE

- Topsoil provides support, water, air and nutrients
- Three types of weathering, both chemical, physical/mechanical and the organic processes



# Soil

- Soil type is determined by climate, vegetation, drainage, time and parent material
- Soil is made up of 25% air, 25% water, 45% mineral matter, and 5% organic matter
- Organic matter is also called humus
- A layer is rich and dark while the B layer is white and lighter in color
- The main physical properties are texture, porosity, permeability and humus
- The main chemical properties are pH, nitrogen, phosphorus, and potassium



# Soil Conservation

- **Terracing**: cutting steps into the side of a hill
- **Contour planting**: planting perpendicular to the slope
- **Strip cropping**: use two types of crops
- **Agroforestry** (alley cropping): strips of trees around strips of crop
- **Windbreaks**: a fence of trees around the crops
- **Conservation tillage**: Some of the remains of the cultivation for the last year is left on the ground