

Name: _____

Key

Key Concepts in Climate

Climate – average weather over a long period of time

Weather – Short term condition of the atmosphere

5 Major Factors Affecting Climate

1. **Altitude** – the higher you go, the colder it gets
2. **Latitude** – higher latitudes have colder temperatures due to low sun angle
3. **Proximity to water** – water moderates temperatures along the coast because of water's high specific heat (heat capacity); water affects climate mostly if the prevailing winds blow over the water just before reaching the land
4. **Ocean currents** – Warm ocean currents warm the coast, cold ocean currents cool the coast
5. **Mountain Ranges** – Windward side is wet, leeward side is dry

Insolation = Incoming Solar Radiation

Can be **Reflected** (bounced back),

Refracted (bent),

Scattered (bounced in all directions), or

Absorbed (taken in)

Reflectivity – percent of light that is reflected by a surface

- ☐ Light and smooth surfaces are good reflectors (have high albedo)
- ☐ Dark and rough surfaces are good absorbers

What causes seasons?

- ☐ Earth's rotation on its tilted axis as it revolves ~~around~~ around the Sun!

The Earth is actually farther from the Sun in our Summer, BUT at that time the Northern Hemisphere is tilted toward the Sun giving us more direct sunlight.

- ☐ June 21 – Summer Solstice; first day of Summer in Northern Hemisphere

- Dec 21 – Winter Solstice; first day of Winter in Northern Hemisphere
- March 21 – Spring Equinox; first day of Spring in Northern Hemisphere
↳ equal day + night
- Sept 21 – Fall Equinox; first day of Fall in Northern Hemisphere
- **Southern Hemisphere has opposite seasons to Northern Hemisphere**
- **In Summer/Spring, the North Pole has 24 hours of daylight for half the year; and 24 hours of darkness for the Winter/Fall**

I. Long Term Changes in Climate

1. Climatologist: Scientists that study past climates to make a prediction on how climates will change in the future.
2. How do scientists understand ancient climates?
 - 2a. Study plant and animal fossils
Fossils of palm trees found in Greenland (was once warm)
 - 2b. Look at tree rings
thin rings = cool/dry
 thick rings = warm/moist
 - 2c. Study pollen (collects in the bottom of lakes)

II. Causes of Climate Change

1. Scientists differ in their opinion of what causes a climate change. Some leading theories include:
 - 1a. A change in distance from Earth to the Sun.
 - 1b. A change in the amount of solar radiation that the Sun produces.

1c. Differences in positions of the continents.

III. Long Term Changes in Climate

1. Ice Ages: Describe any period in history in which precipitation falls as snow or ice. Accumulation exceeds melting.

1a. The last ice age in New York State occurred 10,000 years ago.

1b. Proof:

Hudson River/Tappan Zee Bridge

Gravel pit in Sparkill

Glacial Striations/erratics

1c. Interglacial periods:

Describe the periods between ice ages.

There have been 4 main ice ages (each lasting approximately 100,000 years)

Some scientists believe that the period between ice ages are actually periods of warming.

I. Long Term Changes in Climate

2. Global Warming: A gradual increase in the temperature of Earth's atmosphere.

2a. Global warming is a result of the Greenhouse Effect.

2b. Greenhouse Effect: The process by which gases in Earth's atmosphere trap solar energy.

2c. Gases in the atmosphere that trap solar energy are called **Greenhouse gases**.

EX: Carbon Dioxide water vapor, and methane.

2d. Cause of global warming...human activities.

2e. Potential impact as a result of global warming:

Higher Temperatures = more water evaporated.
(bad for farming a crop dependency)

Higher temperatures will heat up ocean water =
more hurricanes!

Higher temperatures will melt glaciers = the sea level will
rise and flood low laying coastal areas (Florida)

3. Ozone Depletion: The steady destruction of the ozone layer allowing more ultraviolet radiation (UV) to enter into Earth's atmosphere.

3a. When UV comes in, it can't get out!

3b. The ozone layer is found in the stratosphere.

FACT: The ozone layer is Earth's natural sunscreen!

3c. Cause of ozone depletion = human produced chemicals
such a chlorofluorocarbons (CFC's)