

I. The Atmosphere

A. The atmosphere today is comprised of 2 main gases: Nitrogen (N) at 78% and Oxygen (O) at 21%.

1. The remaining 1% is mainly Argon (Ar) at 0.934%.

2. 0.66% is made up of the following gases in order from most to least: water vapor, carbon dioxide (CO₂) at 0.039%, neon, helium, methane, krypton, & hydrogen.

a. Water vapor, CO₂ and methane are called _____.

What does this mean? _____

3. There are also small amounts of ozone, but this is an important gas in our atmosphere.

B. The atmosphere has several layers. Climate and weather occur in the lowest layer called the _____.

1. The troposphere extends up to about 11 miles above the Earth's surface at the equator, and 5 miles at the poles.

a. As you increase in altitude in the troposphere, the temperature _____.

C. The atmosphere also exerts _____ on the surface of the earth.

1. The highest air pressures are at _____ (100%) and the lowest is on Mt. Everest (30%).

2. Because of the _____ of the Earth by the Sun's rays, the atmosphere _____ and this also causes differences in air pressure.

II. Insolation & Temperature

A. Insolation AKA _____ comes from the Sun and because the earth's surface is curved, this radiation does not hit the earth evenly at all latitudes.

1. The tilt of the Earth also causes some areas to receive _____ radiation at different times of the year.

B. The type of radiation from the Sun the most impacts climate is _____ (IR) radiation.

1. Like the visible light from the Sun, IR can be _____.

a. The amount of reflected light can be measured and is called the Earth's _____.

2. Unlike visible light, IR can be _____ & reradiated back into the atmosphere as _____ energy.

a. This is how the atmosphere receives its heat, _____ from the Sun, but by way of conduction & convection.

(1) _____ is the way in which heat is transferred vertically throughout the atmosphere.

b. The rising and _____ air causes _____ and is the main way in which heat is transferred from the _____ towards higher latitudes.

(1) _____ of the heat transfer on Earth is caused by atmospheric circulation.

C. The main reason average temperatures on Earth are different in many places is due to _____.

1. The _____ in the sky determines how much insolation an area will receive (not really a fun fact: this is called the “angle of incidence”).
 - a. _____ latitudes receive much more daily insolation than polar latitudes and thus tend to be warmer.
 - b. However, _____ makes a difference. Even at the equator you can have mountains with snow caps all year. This affects vegetation at each elevation and is called _____.
2. _____ also contributes to these temperature differences. The tilt of the Earth causes day lengths increase or decrease as you move away from the equator.

D. Another contributor to variable earth temperatures is due to the differences in which _____ reflect & absorb solar radiation.

1. Water takes an enormous amount of energy to heat. Water needs _____ as much energy to heat than does land (not so fun fact: the amount of energy needed to raise a certain amount of a substance’s temperature is called specific heat).
 - a. This means that water both heats up very slowly, but also cools down very slowly. Land heats up and cools down much quicker (Fun Fact: this contrast causes the monsoons of Asia, and the sea breezes on Tybee Island!).
 - b. Because the Southern Hemisphere is mainly water compared to the Northern Hemisphere, summers and winters are _____ for this reason.

E. _____ ocean currents, circulated mainly by _____, can also affect local temperature & precipitation variations.

1. Warm water currents that originate near the _____ move poleward, thus transferring heat to higher latitudes.
2. Cold water currents that originate near the _____ move equatorward, thus transferring cooler water to lower latitudes.
3. This is called _____ and comprises 20% of the heat transfer on Earth.
4. The _____ is a warm-poleward moving current that affects the climate in _____ and along the east of coast of the U.S.

III. Climate

- A. Latitude, altitude, land/water temperature contrasts, atmospheric & oceanic heat transfer all contribute to the _____ of regions on Earth.
- B. These averages constitute the _____ weather patterns we call climate.
- C. The composition of the Earth’s atmosphere has changed over time, so the climate of the earth has not always been the same.
- D. There are many factors that contribute to the Earth’s overall climate and how it changes over time.
 1. The Earth’s overall climate has been cooling for the last 70 million years.