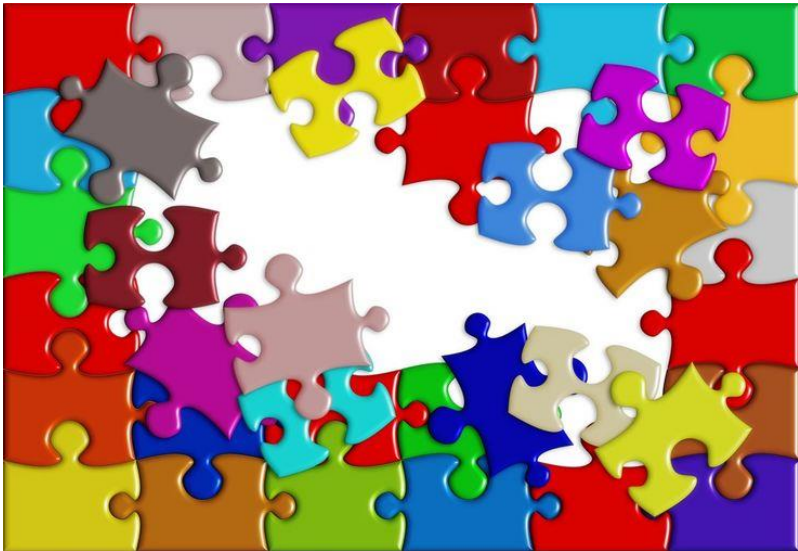


Atmosphere Stations

Tying in all together



Station 1 – Our Restless Planet

- **CHANGE** is the term used to sum up our atmosphere
- The term atmosphere is defined as the **LIFE SUSTAINING ENVELOPE OF GASES THAT SURROUNDS OUR PLANET**
- The term composition can mean **MIX**
- The main gases found in our atmosphere are **NITROGEN, OXYGEN**
- The rate of change of these gases is contributed to **THE BIRTH OF INDUSTRIALIZATION** because ever since there has been an **INCREASE** in **POLLUTION**

Station 1 - Atmosphere

- Our atmosphere is **INVISIBLE** and without it Earth would **NOT BE HABITABLE**
- **GRAVITY** holds the atmosphere in place
- The **CLOSER** gases are to the surface of Earth, **GREATER THEIR DENSITY**
- The higher you go in elevation, **MORE MOLECULES SPREAD OUT**; which means the air is less **DENSE** (thinner)
- Nitrogen = **78%** Oxygen = **21%**
- Clouds are a concentration of **WATER VAPOR**
- **WARM AIR** holds more moisture than **COLD AIR**
- All layers of the atmosphere are **ESSENTIAL TO MAKE EARTH A LIVABLE PLANET**

Station 2 – Earth's Atmosphere

- **ATMOSPHERE** a protective blanket of air; contains mainly **NITROGEN & OXYGEN**
- Nitrogen: important to living **ORGANISMS** (proteins & chemicals contain Nitrogen)
- Oxygen: take **DIRECTLY** from atmosphere & use it to release **ENERGY FROM FOOD**
- Atmosphere helps in many ways...
 - **TRAPS HEAT ENERGY FROM SUN; MAINTAINS SUITABLE TEMPERATURE**
 - **SHIELDS FROM HIGH LEVELS OF UV RADIATION**
 - **BURNS MOST METEOROS BEFORE THEY HIT EARTH**

Station 2 – Earth's Atmosphere

- The atmosphere is a **PROTECTIVE** shield
 - **25%** of UV Rays are **ABSORBED** by the atmosphere; **20%** of UV Rays are **REFLECTED** by clouds; **5%** of UV Rays are **REFLECTED** by oceans/land; **REMAINING** passes through
- The planet is warmed by the **GREENHOUSE EFFECT**
 - Gases such as **CARBON DIOXIDE, WATER VAPOR,** and **OZONE** absorb & trap heat
 - However, this can be TOO MUCH OF A GOOD THING...
 - **Human activities have increased levels of Greenhouse gases**
 - **Increase in Carbon Dioxide levels because of burning of fossil fuels; increase in Methane because of decomposing matter; use of CFC's = all cause global warming**
- If there is an **INCREASE** in pressure, the density **INCREASES**
- Air moves from **HIGH PRESSURE** to **LOW PRESSURE**
 - This movement creates **SURFACE WINDS**
 - **WIND** is defined as the **HORIZONTAL** movement of AIR over Earth's surface
 - Rising **WARM** air & sinking **COOL** air creates

Station 3 – Carbon in the Atmosphere

- **CARBON DIOXIDE** retains energy as heat
 - It warms **EARTH** = why it's called a **GREENHOUSE** gas
- Many think that Carbon Dioxide is responsible for **INCREASE** in **GLOBAL WARMING**
- Can we plant enough plants to absorb all the Carbon Dioxide we are releasing? Why? **NO**
 - Humans are **ADDING** more Carbon Dioxide at a **FASTER** rate than what occurs **NATURALLY**
- Too much Carbon Dioxide trapped in the atmosphere could contribute to **GLOBAL WARMING**

Station 3 – Problems with Fossil Fuels

1. FOSSIL FUELS (non-renewable)

1. Causes **POLLUTION**

2. **CARBON DIOXIDE** acts like a blanket, but when too much **CAUSES** blanketing effect

2. GLOBAL WARMING

1. As **GREENHOUSE EFFECT** has more effect on atmosphere, planet becomes **WARMER**

3. ACID RAIN

1. Chemicals combine with **WATER VAPOR**

2. Can harm **PLANTS, FISH, BUILDINGS**

Station 4 – “What is Air?”

- Air = mix of several different gases, particles, water & other materials
- Air = 78% Nitrogen; 21% Oxygen, 1% other gases (carbon dioxide, argon, helium, methane)
- Water found in air; continually cycling through air
- Dust in air – naturally occurring; helps form clouds
- Ash naturally occurring
- Pollutants in air (not naturally occurring)

Station 4 – “The Greenhouse Effect”

- Atmosphere helps warm Earth = known as Greenhouse Effect
- Most sunlight passes through atmosphere; heats Earth’s surface; some radiated back into atmosphere
- Different gases absorb heat & reradiate it back toward Earth’s surface (greenhouse gases)
- Absorption of heat by greenhouse gases results in higher temps. (blanket effect)
- Atmosphere most important factor in determining temp. of Earth
- Most important greenhouse gases = carbon dioxide, water, methane
- w/o greenhouse effect, avg. temp. = 0F (life could not exist)
- w/ greenhouse effect, avg. temp. = 57F
- Too high concentration of greenhouse gases can lead to accelerated global warming
- Pollution & emission of greenhouse gases have ability to increase greenhouse effect & cause global climate change

Station 5 – “A Molecule for Life”

- Temperature increases in stratosphere because of ozone layer
- Ozone = 3 atoms of Oxygen (O_3); why temp. increases in stratosphere
- Diatomic Oxygen (O_2) is breathable Oxygen
- Ozone (O_3) is a reactive molecule that filters out harmful radiation from sun
- Ozone absorbs sun's energy & captures heat
- Certain chemicals can break Ozone molecule
- Chlorofluorocarbons (CFC's) react w/ Ozone = destroys Ozone layer

Station 5 – “Ozone: The Good and the Bad”

- Ozone a gas; form of Oxygen
- Occurs naturally
- Single Oxygen atom (O) unstable, so bonds w/ O₂
- Sunlight breaks down Ozone (O₃) to O₂ & O
 - Single O will then bond w/ O₂ (natural cycle)
- O₃ helps block out radiation
- Maintains temperature on Earth's surface
- Ozone layer absorbs about 95% of UV Rays
- 10% of Ozone found in troposphere
 - Forms here when sunlight reacts w/ different pollutants
- In stratosphere = beneficial; in troposphere = harmful
 - Causes breathing problems, lung problems, increase issues w/ heart disease
 - Causes temps to increase = harms organisms

Station 6 – “Problems in the Atmosphere”

- Atmosphere protects planet (holds in gases, keeps moisture in, shields from strong UV Rays, burns up meteors)
- Human activities can create changes in atmosphere
 - Pollution, acid rain, holes in ozone disrupt how atmosphere normally functions
- Pollution -
 - Cars, industry, etc... add chemicals to air; get trapped near surface; create ozone near surface; causes respiratory probs, harms crops, smog develops
- Acid Rain –
 - Has lower than normal pH; chemicals in pollutants lower pH of rain; when falls below 5.6 considered acid rain; damages living things
- Ozone Holes –
 - CFC's react w/ ozone breaking it apart; forms “holes” in ozone layer; this can't protect from UV Rays

Station 6 – “The Clean Air Act”

- Onset of Industrialization, humans started adding other things into air
- 1955 Air Pollution Control Act passed
 - Allocated \$ to study impact of air pollution
- Additional acts passed in 1963 & 1967
 - More research & allowed for laws to ban transportation of some hazardous pollutants on highways
- Clean Air Act of 1970 –
 - Gave government power to control pollution sources; identified 6 harmful pollutants; new limits set; leaded gas outlawed; emission levels set for cars and factories; EPA created
 - Government & Public working together