

Presentation Notes

Overall outline:

- The Ozone Layer
 - What is the Ozone Layer?
 - **ASK: Does anyone know what the ozone layer is?**
 - A layer of Ozone (O₃) in the Stratosphere
 - Oxygen that we breathe is O₂, two oxygen atoms bonded
 - Ozone, or O₃ is three oxygen atoms bonded
 - 20 to 30 kilometers (12 to 19 miles) above the earth
 - For comparison: Mount Everest is 9 km or 5.6 miles high
 - Planes fly at 12 km or 7.5 miles
 - Not very thick - 10ppm compared to 0.3 ppm near the surface
 - Parts per million - 1ppm is 1 molecule for every 1 million molecules
 - Means there's still a lot of everything else - Nitrogen, Oxygen, Carbon Dioxide, etc.
 - **IMAGE: a diagram showing the location of the ozone layer**
 - Why is it important to the Earth?
 - It's a very thin layer of gas very high up - **Why is it important?**
 - It's important because it absorbs harmful radiation from the sun.
 - **ASK: Does anyone know what radiation is?**
 - Energy such as light and heat, in this case, from the sun
 - The Ozone layer blocks 98% of UVB, or Ultraviolet-B, radiation from the sun.
 - UVB radiation is from 290 ~ 320nm
 - The Ozone layer also blocks 100% of UVC radiation.
 - UVC radiation is from 320 ~ 400nm
 - **RHETORICAL: Why is it important to block this radiation?**
 - UVB is harmful to life on Earth.
 - UVB is linked to skin cancer and cataracts in humans
 - UVB leads to damage to oceanic life.
 - UVB also impairs photosynthesis in plants.
 - **IMAGE: a diagram showing the ozone layer and radiation blocking**
 - NOTE: surface layer ozone is from SMOG and AIR POLLUTION, and is harmful to humans if inhaled.
 - The ozone layer is extremely important to life on Earth
 - Without it, most organisms, including humans, would suffer.
 - What happened to the ozone layer?

- **ASK: Does anyone know what happened to the ozone layer about 20 years ago?**
 - Beginning in the 1970s, the ozone layer began to be significantly affected by CFCs.
 - CFCs, or Chlorofluorocarbons, were used in aerosol cans.
 - Chlorine reacts with ozone and destroys it.
 - By the late 1980s, the ozone layer above the arctic was destroyed by up to 65 percent.
 - The Montreal Protocol was signed in 1989 to limit the use of CFCs.
 - It was the first UN treaty signed by all nations.
 - It will still take ~50 years for the ozone layer to recover.
 - **IMAGE: graphs showing ozone and radiation levels.**
 - COMPARE AND CONTRAST the future projection and the world we avoided.
- Weather Balloons
 - What are they?
 - A weather balloon is a large balloon made to reach high altitudes.
 - It is often filled with helium or hydrogen.
 - It can reach 120,000 ft (23 miles, 37 km) or even higher.
 - The balloon expands to be very large as it rises.
 - It has a lot of applications:
 - Weather research: NOAA
 - Hobbyist: Cameras
 - Special: Red bull
- The Experiment **INTERACTIVE**
 - The weather balloon mission
 - The Question
 - We provide this, tie back to the Ozone Layer section
 - The Hypothesis
 - Come up with a hypothesis with the group
 - The Experiment
 - Go through each aspect listed, discussing each one with the group.
 - Analysis
 - Go over the provided data plot, talk about what it means.
 - Discuss improvements that could be made to said plot and said data.
 - Conclusion
 - Go back to the hypothesis, discuss
 - Discuss any improvements on the experiment, as well as further experiments that could be done.
- Q&A about topics covered plus anything else about space