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 (O_3) in the Stratosphere
      - Oxygen that we breathe is O_2, two oxygen atoms bonded
      - Ozone, or O_3 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