My NASA Data - Lesson Plans

What is Ozone?

Grade Band

- 6-8

Time

- 30 minutes

Overview

Students watch videos and review articles related to ozone as a pollutant at ground level, and how ozone impacts environment, then provide their understanding in groups.

Materials Required

Choose one of the following options to use with students.

- Google slides version
- Poster Paper
- Whiteboards

Procedure



Instructions: Use this lesson as an introduction or review for ozone. Students may work individually or with groups of 2 or more.

1. Students will access either a video or an article. These can be assigned, or the students can be given a choice from the resource links listed.
2. Students add details to the document of your choice that they have learned from the resource (Google slides, whiteboards, or poster paper). The videos are of a similar level of difficulty, while the articles would be more challenging. The expectation is a contribution to a document.
3. After students document their findings, lead a class discussion reviewing what was discovered from each resource.
    - What is similar?
    - What is different or new as you go through?
4. If using the slides, the box will expand as they type. If students are sharing their slides with other students, they need to be sure not to overwrite their contributions.

Exit Ticket: In your own words, explain what ozone is.

Videos:

- NASA eClips: Spotlites Ozone. Source: NASA eClips. (https://www.youtube.com/watch?v=maLRzINR4UY&t=1s)
- Tropospheric Ozone - Summers of smog. Source: National Science Foundation. (https://www.youtube.com/watch?v=fOOH1EMqhVY)
- Ground Level Ozone: What is it? Source: NCAR & UCAR Education and Outreach. (https://www.youtube.com/watch?v=THYoUULn_2U&t=4s)

Articles:

- Satellite Tracks Ozone Pollution by Monitoring Its Key Ingredients. Source: NASA Earth Observatory (https://earthobservatory.nasa.gov/images/91234/satellite-tracks-ozone-p…)
- Fires Increase Surface Ozone. Source: NASA Earth Observatory (https://earthobservatory.nasa.gov/images/35750/fires-increase-surface-o…)
- Ground-level Ozone Basics. Source: United States EPA (https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-bas…)

Answers:

Teachers who are interested in receiving the answer key, please complete the Teacher Key Request and Verification Form. We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

Sources:

1. NASA eClips Spotlites Ozone (2017, October 6). NASA eClips. retrieved September 6, 2022, from https://www.youtube.com/watch?v=maLRzINR4UY&t=1s
2. Tropospheric ozone - Summers of smog. (2014, August 27). YouTube. Retrieved September 6, 2022, from https://www.youtube.com/watch?v=fOOH1EMqhVY
3. Ground Level Ozone: What Is It? (2014, July 14). YouTube. Retrieved September 6, 2022, from https://www.youtube.com/watch?v=THYoUULn_2U&t=4s
4. Gray, E., & Carlowicz, M. (2017, November 6). Satellite Tracks Ozone Pollution by Monitoring Its Key Ingredients. NASA Earth Observatory. Retrieved September 6, 2022, from https://earthobservatory.nasa.gov/images/91234/satellite-tracks-ozone-p…
5. Riebeek, H. (2008, October 31). Fires Increase Surface Ozone. NASA Earth Observatory. Retrieved September 6, 2022, from https://earthobservatory.nasa.gov/images/35750/fires-increase-surface-o…
6. Ground-level Ozone Basics | US EPA. (2022, June 14). Environmental Protection Agency. Retrieved September 6, 2022, from https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-bas…

NGSS Three Dimensional Learning

NGSS Disciplinary Core Ideas

- ESS3C: Human Impacts on Earth Systems

NGSS Crosscutting Concepts

- Cause and Effect
- Stability and Change

NGSS Science and Engineering Practices

- Developing and Using Models
- Obtaining, Evaluating and Communicating Information

Learning Objectives

Students will be introduced to ozone and its impact on environment, then provide their understanding individually or in groups.

Essential Questions

What is ozone?

Why Does NASA Study This Phenomenon?

Depending on where ozone resides, it can protect or harm life on Earth. Most ozone resides in the stratosphere (a layer of the atmosphere between 10 and 40 km above us), where it acts as a shield to protect Earth's surface from the sun's harmful ultraviolet radiation. With a weakening of this shield, we would be more susceptible to skin cancer, cataracts and impaired immune systems. Closer to Earth in the troposphere (the atmospheric layer from the surface up to about 10 km), ozone is a harmful pollutant that causes damage to lung tissue and plants.

The amounts of "good" stratospheric and "bad" tropospheric ozone in the atmosphere depend on a balance between processes that create ozone and those that destroy it. An upset in the ozone balance can have serious consequences for life on Earth, as scientists are finding evidence that changes are occurring in ozone levels - the "bad" tropospheric ozone is increasing in the air we breathe, and the "good" stratospheric ozone is decreasing in our protective ozone layer.

Source: https://www.nasa.gov/audience/foreducators/postsecondary/features/F_Ozo…

Google Slide interactive Files

What is Ozone? Slides