

EARTH'S OZONE LAYER

ozonosphere

10th GRADE
INQUIRY BASED LESSON PLAN

OZONOSPHERE

195 MINUTES

OZONOSPHERE

195 minutes

OVERVIEW

Students will explore the importance of ozone layer as well as the potential damage to the exposed life forms due to depletion of ozone layer using the Google Earth Creation tool.

SUBJECT/TOPIC Biology/ Effect of Human Activities on the Environment	AGE LEVEL 10 th Grade
<div data-bbox="56 905 121 968"></div> Learning Objectives <ul style="list-style-type: none"> Students will appreciate the importance of ozone layer. Students will research and identify the causes of depletion of ozone layer. Students will participate in collaborative discussions and identify the consequences of ozone depletion. Students will apply their learnings in the form of an educational campaign informing the people of the problem (ozone depletion), its impact on the living organisms and the actions needed to solve it. 	<div data-bbox="803 905 868 968"></div> Inquiry <p>What is the importance of ozone layer and how does its depletion impact the living organisms?</p>
<div data-bbox="56 1383 121 1446"></div> Materials Needed <ul style="list-style-type: none"> Access to Google Earth. Student internet access. 	<div data-bbox="803 1383 868 1446"></div> Lesson Summary <p>Engage: Locate Antarctica and Arctic on the Google Earth where ozone hole was found and draw conclusions from it</p> <p>Explore: Gather information from multiple sources about the importance of ozone layer and its depletion.</p> <p>Explain: Identify the consequences of ozone depletion, hypothesize the human activities that caused depletion of ozone layer.</p> <p>Revise: Adjust hypotheses based on additional evidence from class discussion.</p> <p>Apply: Make an impact by creating an educational campaign and an action plan that addresses the threats of ozone depletion due to human activities and the potential damage to the exposed life forms.</p>



Sustainable Development Goals



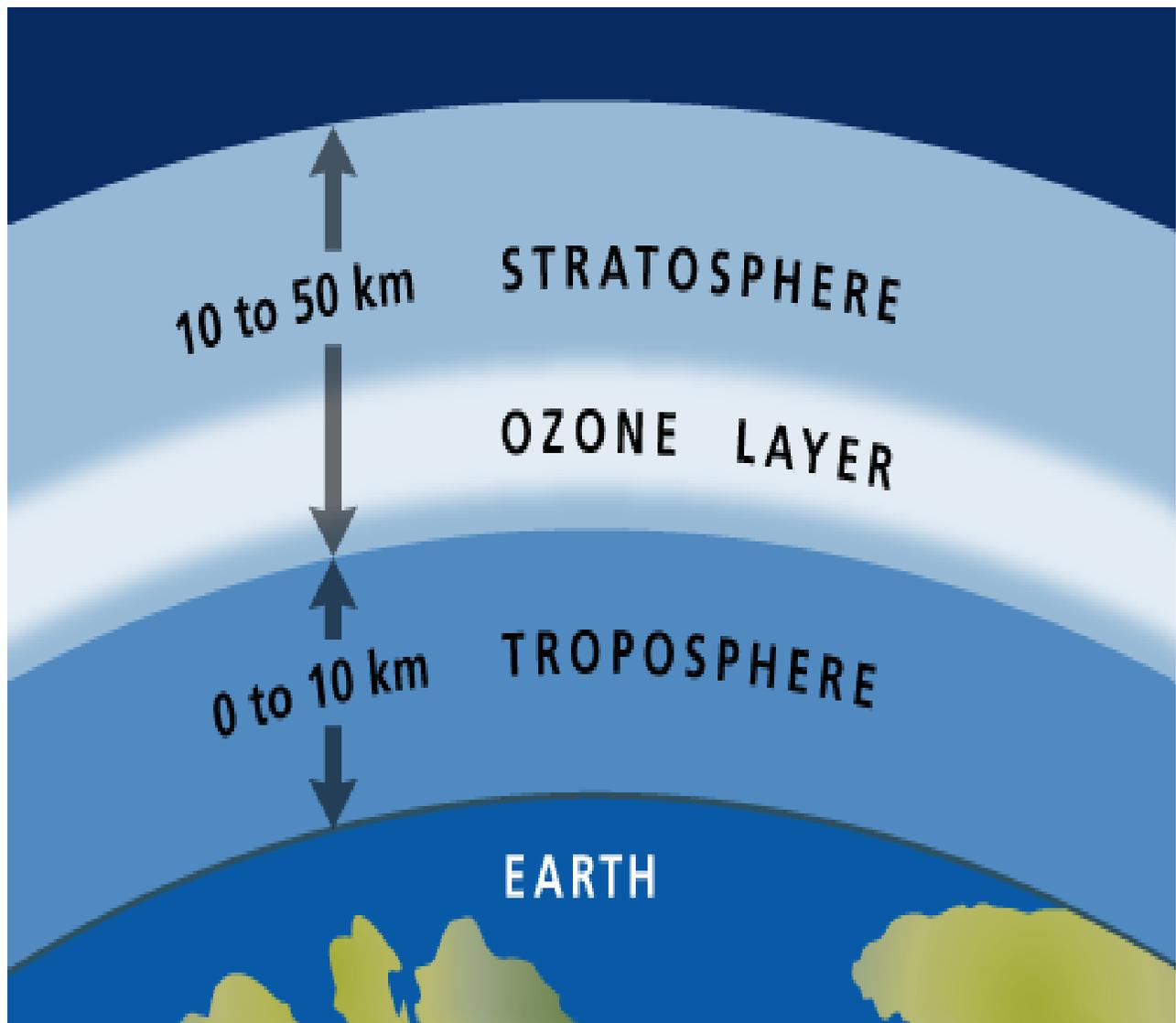
Culminating Task/Assessment

Students will work collaboratively to create an educational campaign about the causes of ozone depletion, impact it can have on exposed life forms and what activities humans can curb to prevent this loss.



Textbook Chapter

“Effect of Human Activities on the Environment” is a topic from the chapter “Our Environment” from Biology NCERT Textbook for Class 10



Engage (5 minutes)

1. Share the imagery of Antarctica and Arctic using Google Earth.
2. Ask the students to share their ideas about these places on what they see in the imagery. Document student responses.
3. Introduce the essential questions that will guide the inquiry investigation: What is the importance of ozone layer and how does its depletion impact the living organisms?

Explore (25 minutes)

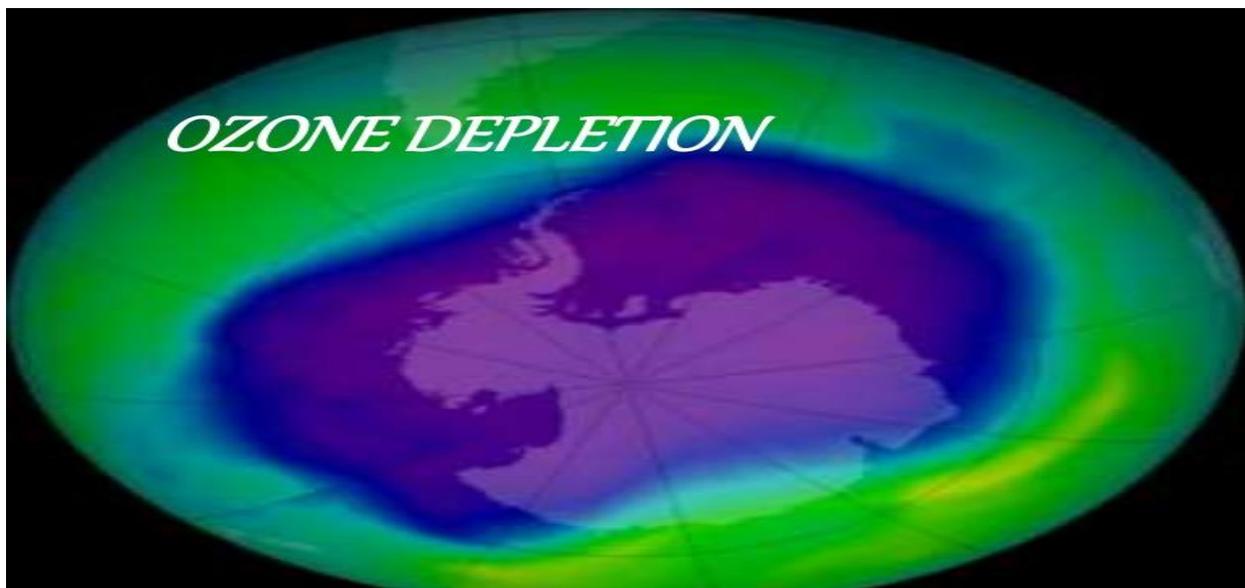
1. Present the first source of information on 'Ozonosphere' using a Google Earth story. Introduce the story, read the information on each slide and share the images and videos of the places shown on the Google Earth
2. Prompt the students to record their observations of the places shown on the Google Earth.
3. Students identify the common feature in the places shown and form a hypothesis based on information gained

Explain (20 minutes)

1. Organize students into partners. Ask each pair to share their observations from the images and videos featured in the Google Earth Story.
2. Ask partners to share their thoughts on the common thing they noticed about the places shown on the Google Earth (Possible student response: Depletion of ozone layer or Ozone Hole)
3. Facilitate whole group discussion in which students share their ideas about the causes of ozone depletion and its impact on living organisms with their classmates and ask questions about the ideas of others.
4. Students test hypotheses and record their findings

Revise (10 minutes)

1. Students add new ideas to their hypotheses based on information gained in discussion.
2. Students to record any questions they have about the ozone depletion and the impact it has on the living organisms



Next, repeat the process with a second source of information.

Explore (25 minutes)

1. Present the second source of information- Climate 101: Ozone Depletion by National Geographic
2. Prompt the students to record their observations.
3. Students identify the causes of ozone depletion and form a hypothesis based on information gained.

Explain (20 minutes)

1. Return students to partners. Ask each pair to share their observations from the Climate 101: Ozone Depletion
2. Ask students how they think that human activities have caused the depletion of ozone layer based on the source of evidence. Prompt them to record their thoughts.
3. Ask partners to share their thoughts. (Possible student response: Human activity is responsible for ozone layer depletion which can have impact on the living organisms)
4. Allow time for students to share their ideas with the class and ask questions about the ideas of others.
5. Students test hypotheses and record findings.

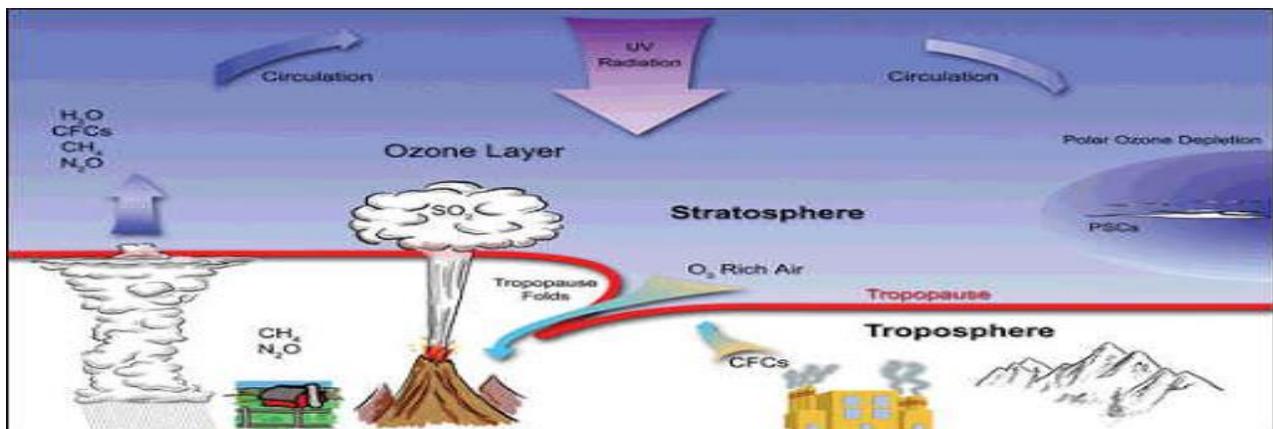
Revise (10 minutes)

1. Following the discussion, prompt students to note down their hypotheses on a sheet of paper.
2. Ask students to record any questions they have about the role of human activity in ozone layer depletion.

(Option to repeat this process with additional sources of information, each time resulting in an updated hypothesis.)

Apply (80 minutes)

1. Organize students into small groups. Each group will work collaboratively to create an educational campaign in the form of a poster, song, poem or slideshow.
2. Provide student access to the internet to research questions generated during the investigation and gather additional information about the role of human activity in the ozone depletion.
3. Educational campaigns should include the following:
 - Facts about the causes and effects of the ozone depletion.
 - Facts about the impacts of human activities on the ozone depletion.
 - Actions that humans can take to prevent ozone depletion and protect damage to the living forms on the Earth.
4. Allow time for each group to present their educational campaign to the class.



Evaluate: Rubric

	Exceeding	Meeting	Approaching	Beginning
Content knowledge	Student demonstrates mastery of key concepts such as the importance and formation of ozone layer; the causes of depletion of ozone layer and its impact on the living organisms.	Student demonstrates adequate understanding of key concepts such as the importance and formation of ozone layer; the causes of depletion of ozone layer and its impact on the living organisms.	Student demonstrates partial understanding of key concepts such as the importance and formation of ozone layer; the causes of depletion of ozone layer and its impact on the living organisms.	Student lacks understanding of key concepts such as the importance and formation of ozone layer; the causes of depletion of ozone layer and its impact on the living organisms.
Presentation	<p>Presentation clearly and creatively communicates the depletion of ozone layer; the causes of ozone depletion; the impact of ozone depletion on living organisms and what humans can do to help.</p> <p>Presentation draws on multiple sources of evidence from student research.</p>	<p>Presentation clearly communicates the the depletion of ozone layer; the causes of ozone depletion; the impact of ozone depletion on living organisms and what humans can do to help.</p> <p>Presentation draws on 1-2 sources of evidence from student research.</p>	<p>Presentation clearly communicates the the depletion of ozone layer and the causes of ozone depletion. BUT does not address the impact of ozone depletion on living organisms and what humans can do to help.</p> <p>Presentation is not supported by evidence from student research.</p>	<p>Presentation is lacking information about the depletion of ozone layer and the causes of ozone depletion AND does not address the impact of ozone depletion on living organisms and what humans can do to help.</p> <p>Presentation is not supported by evidence from student research.</p>
Participation	Student did an equal share of the work; shared with, listened to, and showed respect for group members; stayed on task.	Student did a fair share of the work, was respectful to group members most of the time, and/or used most of the class time wisely	Student did less than a fair share of the work, was sometimes disrespectful to group members, and/or wasted a lot of work time.	Student let others do most of the work, was rude or disrespectful, and wasted most of the work time.

Additional Resources

- The Ozone Hole- <http://www.theozonehole.org/ozonedestruction.htm>
- Ozone Depletion-Facts and information-National Geographic-
<https://www.nationalgeographic.com/environment/global-warming/ozone-depletion/>
- Protection of ozone Layer/ Climate action- https://ec.europa.eu/clima/policies/ozone_en
- Ozone Layer-Our World in Data- <https://ourworldindata.org/ozone-layer>
- NCERT Class 10- <http://www.ncert.nic.in/ncerts/l/kech207.pdf>
- Largest Ozone Hole Above Arctic Heals Itself – India Times-You Tube Video-
<https://www.youtube.com/watch?v=GJaBJKjYVLc>

Options for Differentiation

- Extension: Explore other examples of causes and effects of human activity on the environment and how living organisms are impacted.
- Introduce additional sources of information for students to gather evidence.

Credits

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