TEACHER’S HANDBOOK

LESSON 3
WHY IT MATTERS

The ozone layer is an invisible shield that exists 15—35km above the earth’s surface, protecting us from harmful ultraviolet, or UV, radiation, and in doing so safeguarding all life on earth.

But in the 1980s, scientists discovered a huge and harmful hole in the ozone layer. The hole was caused by chemicals and gases known as ozone-depleting substances. At the time, these were found in almost everything – from aerosol cans to fridges, from computer equipment to the soles of your shoes!

Across the world, scientists, policy makers and governments worked together, taking urgent steps to control and phase out these ozone-depleting substances. Together they developed the Vienna Convention, and then the Montreal Protocol which became one of the most successful environmental treaties of all time, universally endorsed by 197 nations of the world and the European Union.

And it worked! Thanks to the Montreal Protocol, the hole in the ozone layer is healing, with ozone expected to return to 1980s levels by the 2060s.

But the story is not over. In fact, it might never be over. We have to make sure we keep monitoring the gases that enter our atmosphere and the impact that they have on the ozone layer.

The next generation of young people face many challenges. But the story of the ozone layer and how the world joined together to protect it, is a story of hope. A story that proves that it can be done. That when we act together, and are guided by science, we can solve major global crises.
Dear Teachers

In January 2022, the Ozone Secretariat of the United Nations Environment Programme launched a follow-up to the highly successful Reset Earth animated series and mobile game. This time round, the focus is on a new character, Apollo, and her adventure in the metaverse! She’s created a world in which people can learn about ozone layer protection and the environmental challenges our planet is facing.

To accompany Apollo’s Edition of Reset Earth, a teaching toolkit has been developed filled with ideas, activities, games, and discussions that will empower you to engage your students on the issues of ozone layer protection and environmental challenges. Using Apollo’s vlogs as a foundation, 3 unique lessons have been developed. An accompanying teacher toolkit to help navigate through the content has also been created, including a corresponding student workbook. These printable documents can be adapted and made your own to share with your students.

The lessons are diverse and varied. While we have tried to create content that appeal to learners across a broad range of age profiles, teachers are encouraged to use what will work best for their students, or adapt and make it their own. Whether the lessons run over three days, three weeks or three months; only one idea is used, or all of them, it is up to you, the teacher, to decide. Most of all, we at the Ozone Secretariat hope that through the animations, games, discussions, and activities, you can help us bring the story of the ozone layer to life, and inspire the next generation of young people to continue to protect the ozone layer and the global environment. If you’ve used any of our teacher resources, please send feedback, photos or any related learner artwork to stephanie.haysmith@un.org.

Lesson plans and workbooks are based on fictional animations and not entirely on scientific fact. For facts and accurate timelines, please visit https://ozone.unep.org/.
Get to know Apollo and Remi as they explain the environmental challenges we face and how protecting the ozone layer can save life on earth and underwater. Their goal is to inspire action from a generation of creative problem-solvers.

> **Intro activity:** Analyse and discuss the ‘Ozone Timeline’ on the UNEP website
> **Comparative reflection:** Ask questions students regarding the existing protocols to protect the ozone
> **Activity:** Identify the parallels between protecting the ozone layer and achieving the sustainable development goals
> **Video & reflection:** Rewatch Apollo’s video and consider effective means of scientific communication
> **Activity:** Ozone Day campaign
> **Conclusions:** Create a mind map and discuss final thoughts
THE BIG IDEA

Ozone layer recovery is high on the priorities of the UN’s Sustainable Development Goals (SDGs) and has seen success in recent years. The ozone layer is recovering and it’s proof that with international regulations and cooperation, global challenges can be overcome. Working together will be our key to growing and thriving in the future.

CRITICAL QUESTIONS

> What measures can be taken to help the ozone layer recover?
> What does ozone layer recovery teach us about the future of human development?

I CAN / I WILL OUTCOME STATEMENT FOR STUDENTS

> I can summarise the key events that contributed to ozone recovery.
> I can relate the importance of ozone recovery to the achievement of the Sustainable Development Goals (SDGs).
> I will design a campaign to raise awareness and create change in continued ozone recovery.
RESOURCE REFERENCES

Below you will find a list of the resource references. Because of the global audience, possible language barriers, and the age profile being quite broad (ranging from 13 to 18) we have included a range of resources as listed below. Please apply and utilise the references that best accommodate your learners, taking both age and learning ability into consideration.

The videos available as part of ‘Apollo’s Ozone Playlist’ are particularly useful to all ages and showcase a diverse range in skill level and comprehension. The playlist is graded according to skill levels: Level 1 - easy to understand, Level 2 - intermediate and Level 3 - containing more complex science.

Below is the full list of resources, you will also find specific resources referenced as part of the lesson plans. Please feel free to utilise those you feel are appropriate for your learners and their age.

> Apollo’s Ozone Playlist
> Lesson 1-3 Worksheet (colour)
> Lesson 1-3 Worksheet (print friendly)
> UNEP Ozone & You
> UNEP Q&A
> UNEP Country Profiles
> NOAA 20 Questions: Q14
> UNEP What you can do
> UNEP Montreal Protocol
> UNEP The Vienna Convention
> UNEP Ozone Timeline
> UNEP Ozone treaties and SDGs
> UNEP Sustainable Development Goals
> UNEP World Ozone Day
LESSON 3 GUIDE

The below suggested times of activities are a helpful guide for this lesson. Actual time can differ based on needs and interests of students, resources, and available time.

INTRO, PRIMER & DISCUSSION

LESSON TIME:
0—10 MINS

GLOBAL COMPETENCY:
N/A

LESSON DESCRIPTION:
This could be an individual or group activity, depending on resources available.

Explore the UNEP website and have students review the Ozone and Me and 20 Questions and Answers pages. Give students time to also review Apollo’s Ozone Playlist. Please refer to the Recource References page for grading.

The playlist is categorised as follows:
1. Climate 101- Level 1-2
2. WOD 2022 - Level 1
3. How we solved the problem - Level 3
4. Ozone 101 - Level 2-3
5. Antarctic ozone hole - Level 1-2
6. Ozone layer doomed - Level 1-2
7. Why you don’t hear about - Level 1-2
8. Reset Earth - Level 1
9. Precious ozone - Level 1-2
10. The Hole - Level 1-2
11. WOD 2021 - Level 1

GO TO Apollo’s Ozone Playlist

CLASS ACTIVITY

Have your students choose their favourite video from Apollo’s Ozone Playlist and comment on the video. Students must write down something new that they learnt and how they are going to share this content with their peers, etc.

Why is this video your favourite?
What is it about the video that support/promotes the protection of the ozone layer?
How would you use the information from the video to explain the concept to others?
Did anything in particular stand out for you. If so what and why?
What was your least favourite video and why?

LEARNER OBJECTIVES:
Knowledge

Impact
H3 - Appreciate that this challenge requires international regulations and cooperation.
H4 - Appreciate that individual personal behaviours and consumer choices have an impact on the ozone layer.

Long-term Progress
L4 - Understand continued progress relies on Assessment Panels.
L5 - Acknowledge ozone layer recovery is a source of hope for other global environmental challenges.
ACTIVITY - TIMELINE OF KEY EVENTS

LESSON TIME:  
10—20 MINS

GLOBAL COMPETENCY: N/A

LESSON DESCRIPTION:  
Analyze the Ozone Timeline on the UNEP website. Have students read through each of the key events and details that have happened between 1974 and 2020.

> Identify three events that you believe were the most important in ozone layer recovery.
> Why did you choose these three events?

What were the key outcomes of the Montreal Protocol, the Vienna Convention, and the Kigali Amendment?

> How did these key outcomes contribute to ozone layer recovery?

LEARNER OBJECTIVES:

Action

Impact

H3 - Appreciate that this challenge requires international regulations and cooperation.

H5 - Recognise the impact of the ozone layer on all life on earth and underwater.

Long-term Progress

L4 - Understand continued progress relies on Assessment Panels.

> Independent science assessment panels provide information and updates to the Montreal Protocol to aid governments in their decision making for environmental policies. How critical do you think this scientific information is?

EXTENSION ACTIVITIES

An outcome of the Montreal Protocol was the creation of the Assessment Panels, which work together to help with decision making about ozone layer protection, and ensure the Protocol achieves its mandate. The panels provide scientific, technological and financial information. Brainstorm two ideas, measurements, topics, etc. that each panel may bring to help with ozone protect.
ACTIVITY - COMPARATIVE REFLECTION

LESSON TIME:
20—25 MINS

GLOBAL COMPETENCY:
N/A

LESSON DESCRIPTION:
As there are many protocols in place to protect the ozone layer, ask students how they think their predictions from Lesson 1 will change.

> Do they think these measures are enough to protect ozone long-term?
> Will their communities and others improve, stay the same, or worsen?
> Will their communities and others improve, stay the same, or worsen?

LEARNER OBJECTIVES:

Combined

Science
S4 - Acknowledge ozone layer recovery and seasonal changes.

Long-term Progress
L5 - Acknowledge ozone layer recovery is a source of hope for other global environmental challenges.
ACTIVITY - OZONE AND THE SUSTAINABLE DEVELOPMENT GOALS

LESSON TIME:
25—35 MINS

GLOBAL COMPETENCY:
N/A

LESSON DESCRIPTION:
It would be amazing if all the best-case scenarios brainstormed by students were able to come true. However, many countries are facing barriers that prevent these visions, linked to poverty, access to education, freshwater resources, and more.

The Sustainable Development Goals (SDGs) are a shared blueprint for peace and prosperity for people and the planet, identifying 17 calls for action by all countries. We know that the ozone layer protects people and life on Earth and requires collaboration across the globe, but did you know that successfully protecting the ozone layer will also help deliver many of the Sustainable Development Goals (SDGs)?

CLASS ACTIVITY
Have students choose one of the 17 goals and identify how protecting the ozone layer will help achieve these goals. Break students up into small groups and have them analyse 1—4 goals each and share their key takeaways with the class.
VIDEO & REFLECTION

LESSON TIME:
35—40 MINS

GLOBAL COMPETENCY:
N/A

LESSON DESCRIPTION:
Rewatch the video of Apollo with your class. Have students think back to the activity in Lesson 2, where they brainstormed ideas on effective scientific communication.

LEARNER OBJECTIVES:

Reflection

Impact

H4 - Appreciate that individual personal behaviours and consumer choices have an impact on the ozone layer.

DISCUSSION:
How can they use their own social media platforms, like Apollo, to create change and inspire hope?
ACTIVITY - WORLD OZONE DAY CAMPAIGN

LESSON TIME:
40—55 MINS

GLOBAL COMPETENCY:
N/A

LESSON DESCRIPTION:
Review the past World Ozone Day events on the UNEP website. Using inspiration from past events and the knowledge gained throughout the lessons, have students create a campaign to celebrate the next World Ozone Day.

- Have students consider their strengths and weaknesses identified in Lesson 1 and refer to the engagement plan created in Lesson 2 to create the ideal campaign for themselves and their intended audience. Consider the personas developed in Lesson 2.
  Option: assign students a persona to create a campaign for.
- Encourage students to inspire hope, instead of fear, grief, or anxiety.
- Allow students to use whatever platform they have identified in Lesson 2, creating flexibility for a variety of audiences and preferences. Campaigns can be over social media, a town hall, lunch & learn, school workshop, game, poster, etc.
- Have students assess campaigns from other events, such as famine or natural disaster relief, WW2 propaganda, etc. What tactics from these efforts were appropriate and successful?
- This can be an ongoing project.

LEARNER OBJECTIVES:

Action

Impact

H4 - Appreciate that individual personal behaviours and consumer choices have an impact on the ozone layer.

Long-term Progress

L3 - Acknowledge that continued progress on ozone layer requires a broad base of awareness and support.

L5 - Acknowledge ozone layer recovery is a source of hope for other global environmental challenges.

LESSON EXTENSION

Create a class specific Instagram page where students can post stories, video or social media posts to market their Ozone Day campaign. Include #ResetEarth when sharing.

Platforms like Canva can be utilised to create the artwork.

If internet access is a problem consider making a presentation in your school’s assembly.
CONCLUSION

**LESSON TIME:**
55—60 MINS

**GLOBAL COMPETENCY:**
N/A

**LESSON DESCRIPTION:**
Personal Mind Maps

> Return the mind maps to students from the first lesson, and using a different coloured pen, have students add anything extra that they have learned about ozone to their mind map. This is a great visual representation of learning. Display around the class and use it as a prompt for discussion.

Answer questions and ask for final thoughts. Have students complete the post survey and compare their answers as a class to gauge level of learning.

**PREPARATION**

> Access to Apollo video
> Lesson 3 Worksheet
> Materials to draw on worksheet

**LEARNER OBJECTIVES:**

*Reflection*

*Impact*

H4 - Appreciate that individual personal behaviours and consumer choices have an impact on the ozone layer.

H5 - Recognise the impact of the ozone layer on all life on earth and underwater.

*Long-term Progress*

L3 - Acknowledge that continued progress on ozone layer requires a broad base of awareness and support.

**LESSON RESOURCES**

Click on the links below to download the lesson resources:

> Apollo’s Ozone Playlist
> Lesson 3 Worksheet (colour)
> Lesson 3 Worksheet (print friendly)
> UNEP Ozone & You
> UNEP Q&A
> UNEP What you can do
> UNEP Montreal Protocol
> UNEP The Vienna Convention
> UNEP Ozone Timeline
> UNEP Ozone Treaties and SDGs
> UNEP Sustainable Development Goals
> UNEP World Ozone Day