



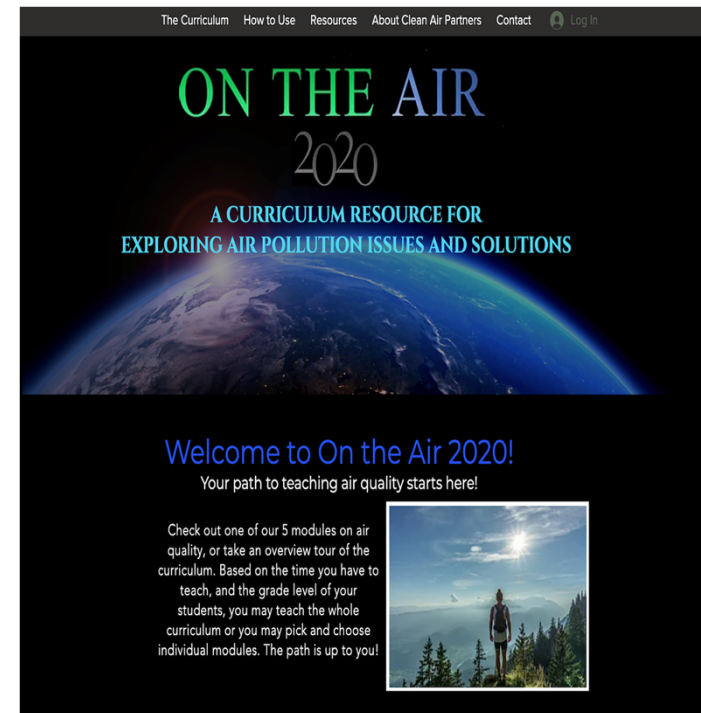
On the Air 2020

- Designed for middle-schools. Can be adapted to other grade levels.
- Interactive online and printable
- 5 modules
- 51 activities

Ontheair.cleanairpartners.net

Guiding Principles

- Phenomenon Based Science
- 5E Model
 - Engage
 - Explore
 - Explain
 - Elaborate
 - Evaluate
- Inquiry Based
- Student Centered
- Authentic Science



Modules

The Curriculum | How to Use | Resources | About Clean Air Partners | Contact Us

ON THE AIR 2020

A CURRICULUM RESOURCE FOR
EXPLORING AIR POLLUTION ISSUES AND SOLUTIONS

Welcome to *On the Air 2020!*
Your path to teaching air quality starts here!

Check out one of our 5 modules on air quality, or take an overview tour of the curriculum. Based on the time you have to teach, and the grade level of your students, you may teach the whole curriculum or you may pick and choose individual modules. The path is up to you!

Modules

Module 1: Our Lungs, Our Air, Our Health
We breathe approximately 3,000 gallons of air every day. Can that air make you sick? In this module, we'll meet two students who suffer from asthma, and investigate the respiratory and circulatory systems as we learn about how our bodies interact with the air we breathe.
Key content: Human Body Systems, Ozone Pollution

Module 2: What's the Air Forecast?
Washington, D.C. is shrouded in a misty haze. Is it natural or man-made? And where is it coming from? In this module, we'll investigate the 6 Criteria Pollutants defined by the Clean Air Act and how they have changed over time. We'll also explore how weather and air pollution interact in order to predict when the next "Code Red Day" will arrive.
Key content: Human Impacts on Earth Systems, Weather, Ozone Pollution

Air Pollution in the Community
Module 3: Air Pollution in the Community
Where is that smoke coming from? In this module, we'll investigate Particulate Matter, one of the 6 Criteria Pollutants. We'll do this using a community health and environmental justice lens in order to find community-based solutions for dealing with mobile pollution sources.
Key content: Human Impacts on Earth Systems, Human Health, Particulate Matter Pollution, Environmental Justice

Air & the Chesapeake Bay
Module 4: Air & the Chesapeake Bay
The Chesapeake Bay is a vital resource for both humans and the environment. We usually don't think that pollution in the air affects the Bay, but it does. In this MWEE-based module, we'll investigate how nutrient air pollution affects life in the Bay and how we can protect this vital natural resource.
Key content: Ecosystem Dynamics, Human Impacts on Earth Systems, Nitrogen Pollution

Air & Climate Change
Module 5: Air & Climate Change
Air pollution and climate change are often considered separate issues, but the greenhouse gases that contribute to climate change are just another part of our atmosphere. In this module, we'll consider the connection between air quality and climate change and how to combat both problems.
Key content: Climate Change, Sea Level Rise, Human Impacts on Earth Systems

Our Lungs, Our Air, Our Health

Effects of Ozone Pollution on Human Body Systems

Activity: We'll meet two students who suffer from asthma and investigate the respiratory and circulatory systems as we learn about how our bodies interact with the air we breathe.

The screenshot shows the top navigation bar with links: The Curriculum, How to Use, Resources, About Clean Air Partners, and Contact. Below the navigation is a header image featuring a human torso with glowing lungs and the text 'OUR LUNGS OUR AIR OUR HEALTH' and 'The Effects of Ozone Pollution on Human Body Systems'. There are buttons for 'Expand All', 'Collapse All', and 'Download all of Module 1 in pdf Format'. The main content area is titled 'Module Overview' and contains a detailed description of the module's focus on asthma, respiratory and circulatory systems, and air pollution. It includes an 'Anchor phenomenon' about two students with breathing difficulties, a 'Pacing' section with two bullet points, and two download buttons: 'Download Module 1 Overview Materials' and 'Download all of Module 1 in pdf Format'. At the bottom, there are two expandable sections: 'Activities' and 'When to Teach This Module'.

Our Lungs, Our Air, Our Health

Module Overview >

Activities >

- Activity 1
Introducing Tatiana and Calvin
- Activity 2
Breathing & Exercise
- Activity 3
The Respiratory & Circulatory Systems
- Activity 4
Modeling the Respiratory & Circulatory Systems
- Activity 5
Seeing Ozone's Effects on Living Things
- Activity 6
Air Pollution & Humans
- Activity 7
Asthma & the AQI
- Activity 8
Modeling Air Pollution & Human Health (Assessment)

When to Teach This Module >

NGSS Standards Alignment >

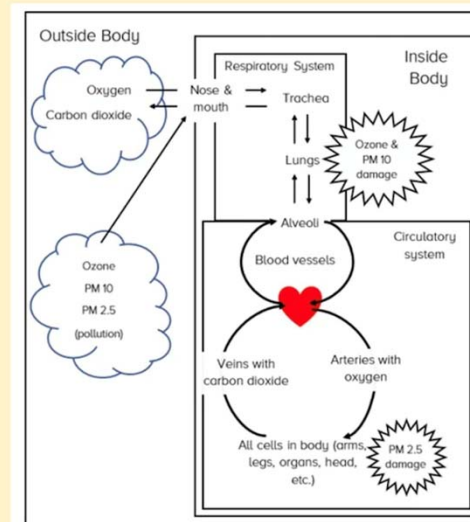
3. Modeling Air Pollution & Humans

Have students take out their models of how the lungs and respiratory system work. Have them add ozone, PM10, and PM2.5 to their models. Mention to them that these pollutants might need to go in more than one place on their models.

Teacher Tip: If students don't have their models from Activity 4, have some generic models on hand that they can start from for this Activity.

Differentiation: Provide students with slips of paper with the new parts to add to their model (as in Activity 4).

Their revised models might look something like this:



What's the Air Forecast

Human Impacts, Weather, and the Story of a Code Red Day

Activity: Washington, D.C. is shrouded in a misty haze. Is it natural or man-made? And where is it coming from? In this module, we'll investigate the 6 Criteria Pollutants defined by the Clean Air Act and how they have changed over time. We'll also explore how weather and air pollution interact in order to predict when the next "Code Red Day" will arrive.

Name _____

STUDENT
HANDOUT

I See, I Think, I Wonder...

I see...
I think...
I wonder...
Big questions:

What's the Air Forecast

Activity: The Clean Air Act and its impact on air quality over time.



Baltimore City, 1973

Name _____

STUDENT
HANDOUT

AQI Through the Years

Look at the calendars below that show the AQI for the month of July every five years starting in 1995:



Use the information in these calendars to fill in the table below:

Year	Green Days	Yellow Days	Orange Days	Red Days	Purple Days
1995					
2000					
2005					
2010					
2015					
2020					

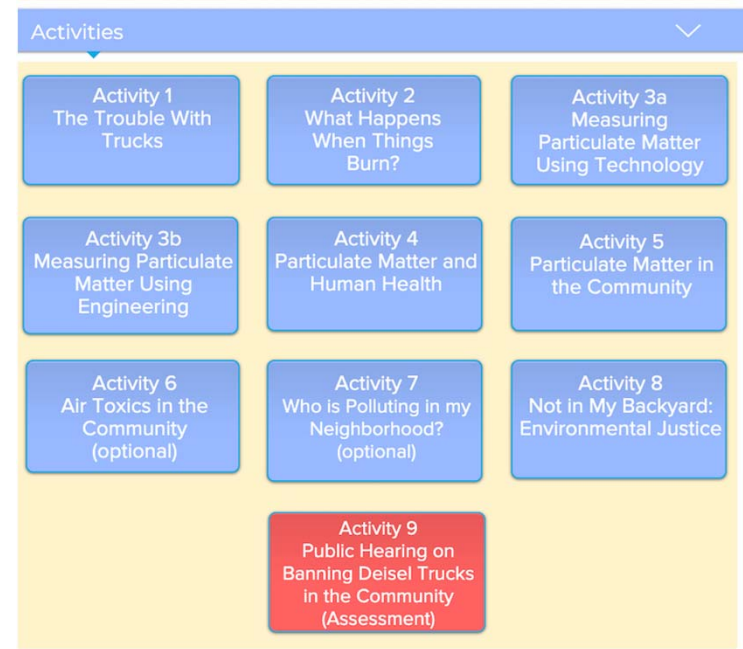
On the Air 2020

Module 2: What's the Air Forecast?

Air Pollution in the Community

Combustion, Particulate Matter, and Community Health

Activity: Where is that smoke coming from? In this module, we'll investigate Particulate Matter, one of the 6 Criteria Pollutants. We'll do this using a community health and environmental justice lens in order to find community-based solutions for dealing with mobile pollution sources.



Air and the Chesapeake Bay

Combustion, Particulate Matter, and Community Health

Activity: The Chesapeake Bay is a vital resource for both humans and the environment. We usually don't think that pollution in the air affects the Bay, but it does. In this MWEE-based module, we'll investigate how nutrient air pollution affects life in the Bay and how we can protect this vital natural resource.

Next, show students the picture of the menhaden fish kill below and tell them that this picture comes from the Chesapeake Bay:



4. Observations and Dissolved Oxygen Testing

At regular intervals (ex. every two days), have students make observations of their bottles. Halfway through the experiment, have students test for dissolved oxygen in each of the bottles and record the data on their data sheets. On the last day of the experiment, have them test the dissolved oxygen one more time.

By the end of 14 days, the bottles will look something like this:



5. Results

6. Analysis

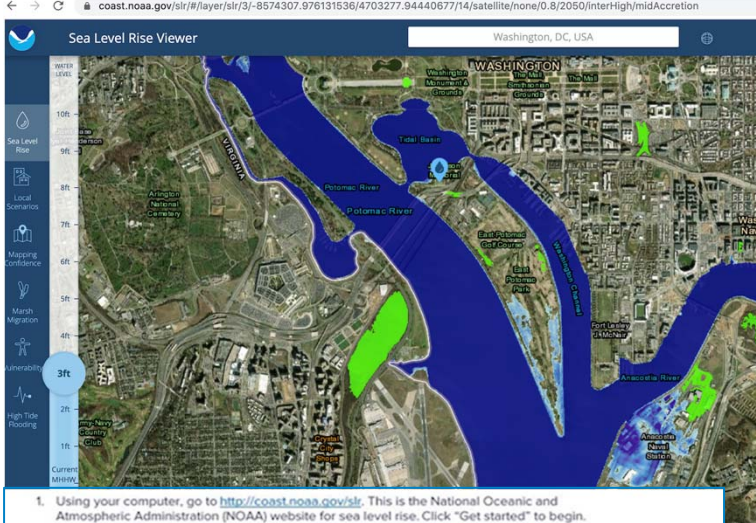
7. Sensemaking Discussion

8. Formative Assessment: Conclusion

Air and Climate Change

Rising Temperatures, Rising Tides

Activity: Air pollution and climate change are often considered separate issues, but the greenhouse gases that contribute to climate change are just another part of our atmosphere. In this module, we'll consider the connection between air quality and climate change and how to combat both problems.




1. Using your computer, go to <http://coast.noaa.gov/slr>. This is the National Oceanic and Atmospheric Administration (NOAA) website for sea level rise. Click "Get started" to begin.

2. At the top of the page, where it says, "Enter an address or city" type in Annapolis, MD and click on it when it pops up.

Look at where Annapolis is. What is the area around Annapolis like? _____

High Tide Flooding

3. On the left side of the map, click "High Tide Flooding." A little heartbeat icon will pop up next to Annapolis that looks like this: . Click on the icon to learn more about how much flooding happens in Annapolis. If you move your cursor over the graph, you can get information for specific years.

4. What year had the most flood days in Annapolis? _____ How many? _____

5. What is the greatest number of flood days in Annapolis in one year before 1983? _____

6. Look at the years 2010-2017. What is the range of the number of flood days per year (the range is the lowest amount to the highest amount) (lowest) _____ - _____ (highest)

7. What is the mean (average) number of flood days per year from 2010-2017? To find the mean, add up the total number of flood days from 2010-2017 and divide by the number of years. The average number of flood days from 2010-2017 is: _____

8. Do you think flooding in Annapolis is getting worse or not? Explain your answer using information from the graph. _____

Air Quality Champions in the Community



- How does your work relate to air quality?
- What motivates you to come to work every day?
- What education and career path did you pursue that led to the position you have today?
- What is your workspace like?
- What accomplishment are you most proud of?

Contact Information



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