

Name:

Date:

Class:

Internal Combustion Engine, EV & Air Quality Worksheet

How do internal combustion engines and electric vehicles (EV) affect our air?

Together, we are going to find out:

- Does vehicle transportation affect air quality?
- What type of air pollution comes from vehicles?
- How does air pollution affect our health?
- Can certain vehicles help make the air cleaner (healthy)?

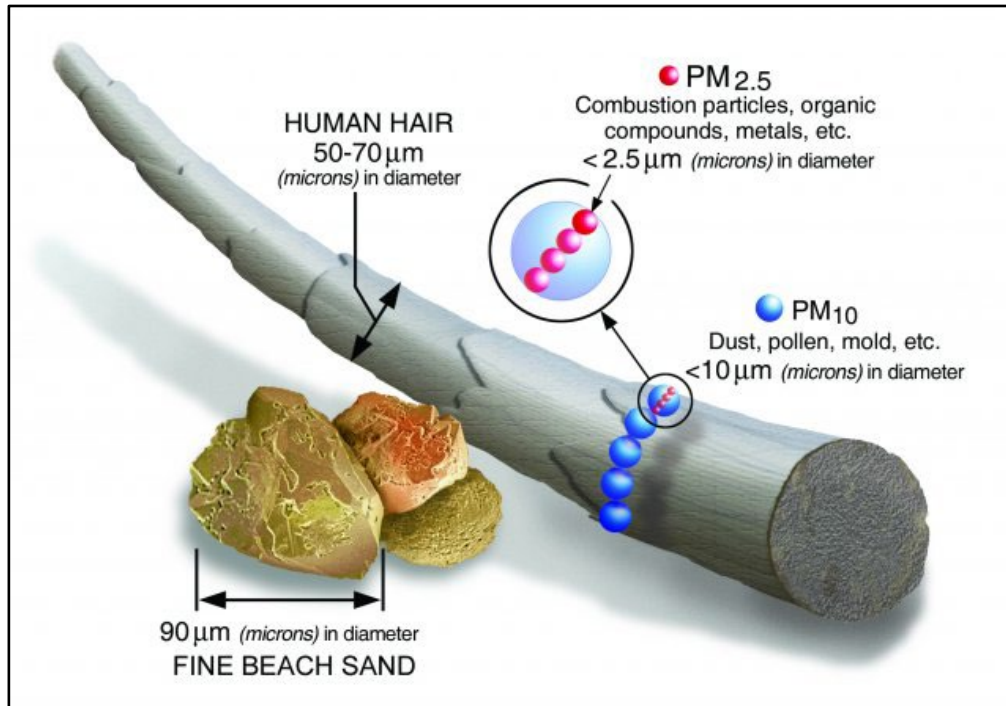
1. Watch the [video](#) about vehicles and air pollution. Write or draw what you observe:

Class Reflection: How do vehicles affect how healthy the air is? What solutions do you think could help reduce air pollution from vehicles? Share your thoughts as a class.

2. Particulate Matter (PM)

Particulate Matter (PM) is a **pollutant** made up of very **tiny particles** and **droplets** that **float** in the air.

- PM comes from **natural** sources like **dirt, dust,** and **wildfire smoke**.
- PM comes from **human-made** sources like **soot** from **burning fuels** for energy and heat.
- PM can make the air **hazy**.



Look at the image of the size of two types of particulate matter, PM 2.5 and PM 10, compared to other objects.

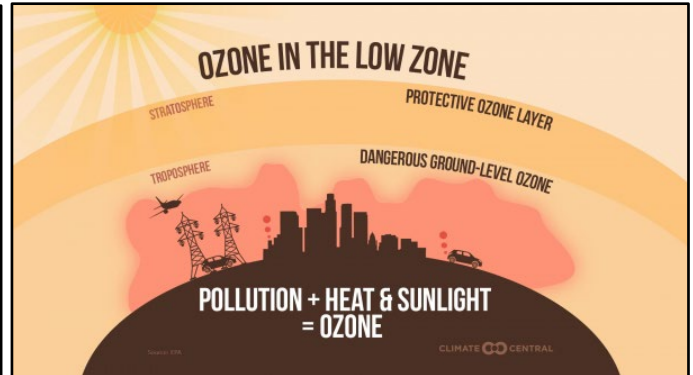
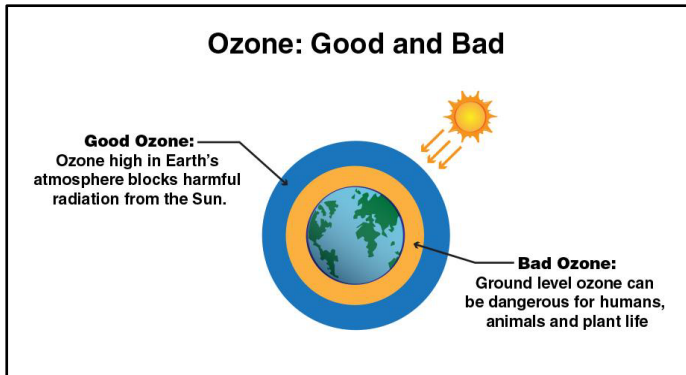
- How does the size of PM 2.5 compare to PM 10?
- What do you notice about the size of PM 2.5 and PM 10 compared to the size of a human hair and a grain of sand?

3. Ozone

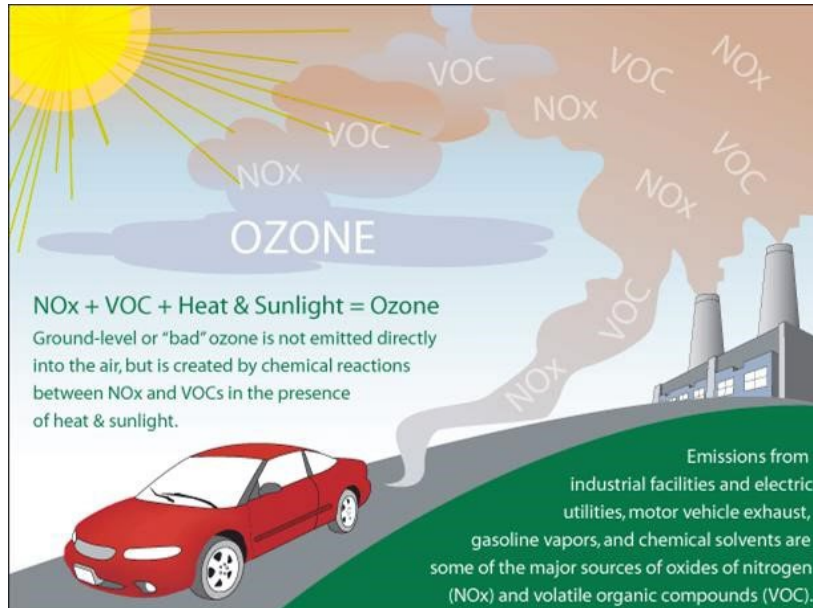
Ground-level ozone is a type of **air pollution** that is formed from emissions released into the atmosphere from burning fossil fuels for energy. Let us learn more about ozone air pollution in this [video](#).

Ozone: Good Up High, Bad Nearby!

- Ozone is an **invisible** gas, so a clear, blue sky can still have high ozone pollution.



- Look at the two images. With a partner, discuss the similarities and differences of ozone in the atmosphere. Next, share observations as a class.



- Label the image with the correct terms to explain how ozone is made.
Word bank: *emissions, warm air, sunlight, ground-level ozone*

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4. How does PM air pollution affect our health?

Draw a line to **match the words and pictures** to explain how **breathing PM affects our health**:

Health Effects of Breathing PM:

- **Premature death in people with heart or lung disease**
- **Non-fatal heart attacks**
- **Irregular heartbeat**
- **Aggravated asthma**
- **Decreased lung function**
- **Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.**

Draw an image of one health effect of breathing PM:

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5. How does ozone air pollution affect our health?

Draw a line to **match the words and pictures** to explain how **breathing ozone affects our health**:

Health Effects of Breathing Ozone:

- **Cause coughing and sore or scratchy throat.**
- **Make it more difficult to breathe deeply and vigorously and cause pain when taking a deep breath.**
- **Inflame and damage the airways.**
- **Make the lungs more susceptible to infection.**
- **Aggravate lung diseases such as asthma, emphysema, and chronic bronchitis.**
- **Increase the frequency of asthma attacks.**

Draw an image of one health effect of breathing ozone:

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6. How internal combustion engine vehicles and EVs work

Now, let's put together what we now know about **PM air pollution** and its **health effects** to learn how different types of **vehicles** affect how clean the air is.

- First, watch the [video](#) about how an **internal combustion engine vehicle** works.
- Now, watch the [video](#) about how an **electric vehicle (EV)** works.

How are **EVs** and **internal combustion engine vehicles** the **same**? Draw or write your answer:

How are **EVs** and **internal combustion engine vehicles** **different**? Draw or write your answer:

Class Reflection: Share your thoughts on the following questions as a class:

- Is **clean air** important? Explain your reasoning.
- Do **internal combustion engine** or **EVs** make our air **dirtier**? Explain with evidence.
- Do **internal combustion engine** or **EVs** make our air **cleaner**? Explain with evidence.