

Name:

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Class:

ICE, EV & Air Quality Connections Worksheet (3-5)

Do internal combustion engines (ICE) 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:

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

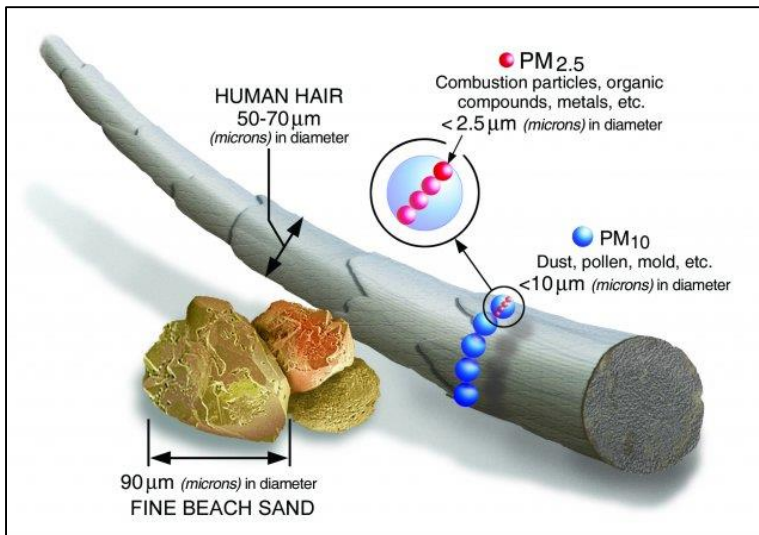
2. Let's find out about two types of air pollution that comes from vehicles.

Particulate Matter (PM)

Particulate Matter, also called **PM**, is a type of air pollution that is released from emissions, including vehicle exhaust. Let's learn more about PM air pollution in this [video](#).

Particulate Matter 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?

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- 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?

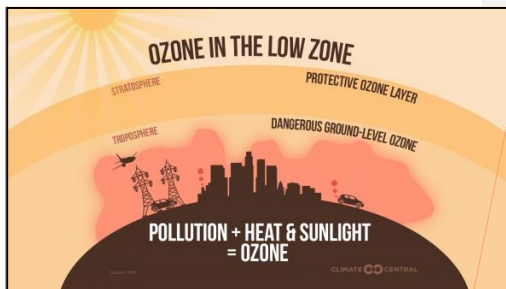
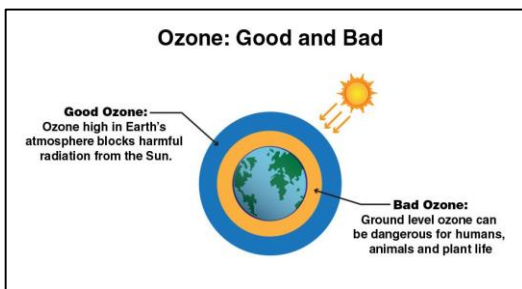
2. Let's find out about one type of air pollution that comes from vehicles.

Ground-Level 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's 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.



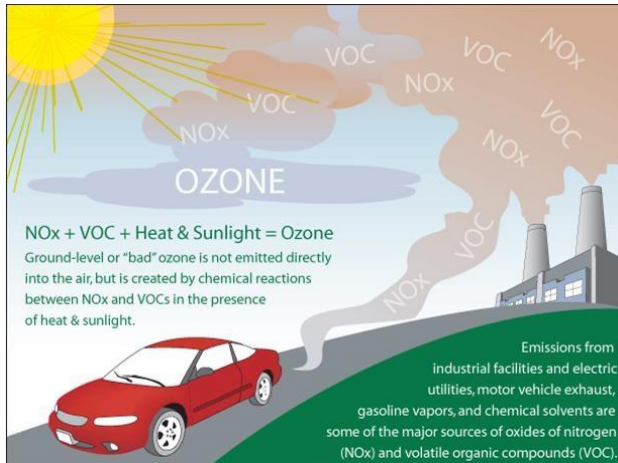
Commented [1]: Adapt images & take out ozone "recipe"

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

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Commented [2]: Insert adapted image with fill in the blanks with ozone formation terms.

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

3. How does 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

Draw an image of one health effect of breathing PM:

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<ul style="list-style-type: none">● Decreased lung function● Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.	
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3. How does 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.
- Inflammation 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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4. Let's figure out how ICE vehicles and electric vehicles 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 **ICE (internal combustion engine) vehicle** works.
- Now, watch the [video](#) about how an **electric vehicle (EV)** works.

How are **electric vehicles** and **ICE vehicles** the **same**? Draw or write your answer:

How are **electric vehicles** and **ICE 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 **ICE** or **electric vehicles** make our air **dirtier**? Explain with evidence.
- Do **ICE** or **electric vehicles** make our air **cleaner**? Explain with evidence.