








Station 1: Air Quality Demonstration

We are often unaware of how our everyday activities contribute to air pollution. The purpose of this demonstration is to make you aware of the air pollution you create every day. The cup of clean water in front of you represents unpolluted air. You'll add drops of food coloring to the cup to represent the different types of air pollutants caused by the everyday activities that I'll describe to you. We'll use the following colors to represent these pollutants:

Color Key	
	Blue—pollutants from consumer products and paints (VOCs)
	Green—pollutants from lawn, garden, and construction machinery (CO, NO ₂ , PM10, SO ₂ , and VOCs)
	Red—pollutants from cars and trucks (CO, NO ₂ , PM10, SO ₂ , and VOCs)
	Yellow—pollutants from power plants and industrial processes (CO, NO ₂ , PM10, SO ₂ , and VOCs)

<p>Particulate matter (PM10)—Particulate matter consists of airborne solids less than 10 micrometers in diameter. These tiny particles are easily inhaled into the lungs, where they can cause damage to lung tissue. Diesel fumes from busses and trucks are a source of airborne particulate matter.</p>	<p>Sulfur dioxide (SO₂)—Sulfur dioxide is a toxic gas with a pungent odor. Electric power plants fueled by coal or oil are the primary source of sulfur dioxide pollution. Sulfur dioxide emissions can cause respiratory diseases and are a key factor in acid rain formation.</p>	<p>Nitrogen dioxide (NO₂)—Nitrogen dioxide is a toxic, reddish brown gas by product of the combustion of fossil fuels (e.g., coal, diesel fuel, and gasoline). Nitrogen dioxide can irritate airways and increase susceptibility to respiratory diseases. It is also a factor in the formation of acid rain.</p>
<p>Carbon monoxide (CO)—Carbon monoxide is a colorless, odorless toxic gas. Motor vehicles are the primary source of carbon monoxide pollution. CO is highly toxic. At low concentrations it causes drowsiness and headache; it is lethal in high concentrations.</p>	<p>Volatile organic compounds (VOCs)—Volatile organic compounds are toxic gases made of carbon, hydrogen, oxygen, and other atoms that form gases easily. They are found in nature as well as in glue, paint, gasoline, tobacco smoke, and clothes that have been dry-cleaned. VOCs form ground level ozone, a main component of smog.</p>	

If you participated in the activity **during the past week**, add one drop of the appropriate color of food coloring to your cup of water. Some activities may not apply to you (for example, applying nail polish or mowing the lawn). That's why you each have your own cup, because each individual's contribution to air pollution is unique.

<u>Scenario 1</u>	<u>Scenario 2</u>	<u>Scenario 3</u>	<u>Scenario 4</u>	<u>Scenario 5</u>	<u>Scenario 6 & Final Cup</u>
					

Analysis Questions:

1. Look inside your cups. If the air pollution around you were this apparent, would you want to breathe the air? Explain your thoughts.

2. What other sources of air pollution, beyond those mentioned in this demonstration, could you think of as being produced in a single day?

3. What could you do to reduce the number of pollutants released each day?

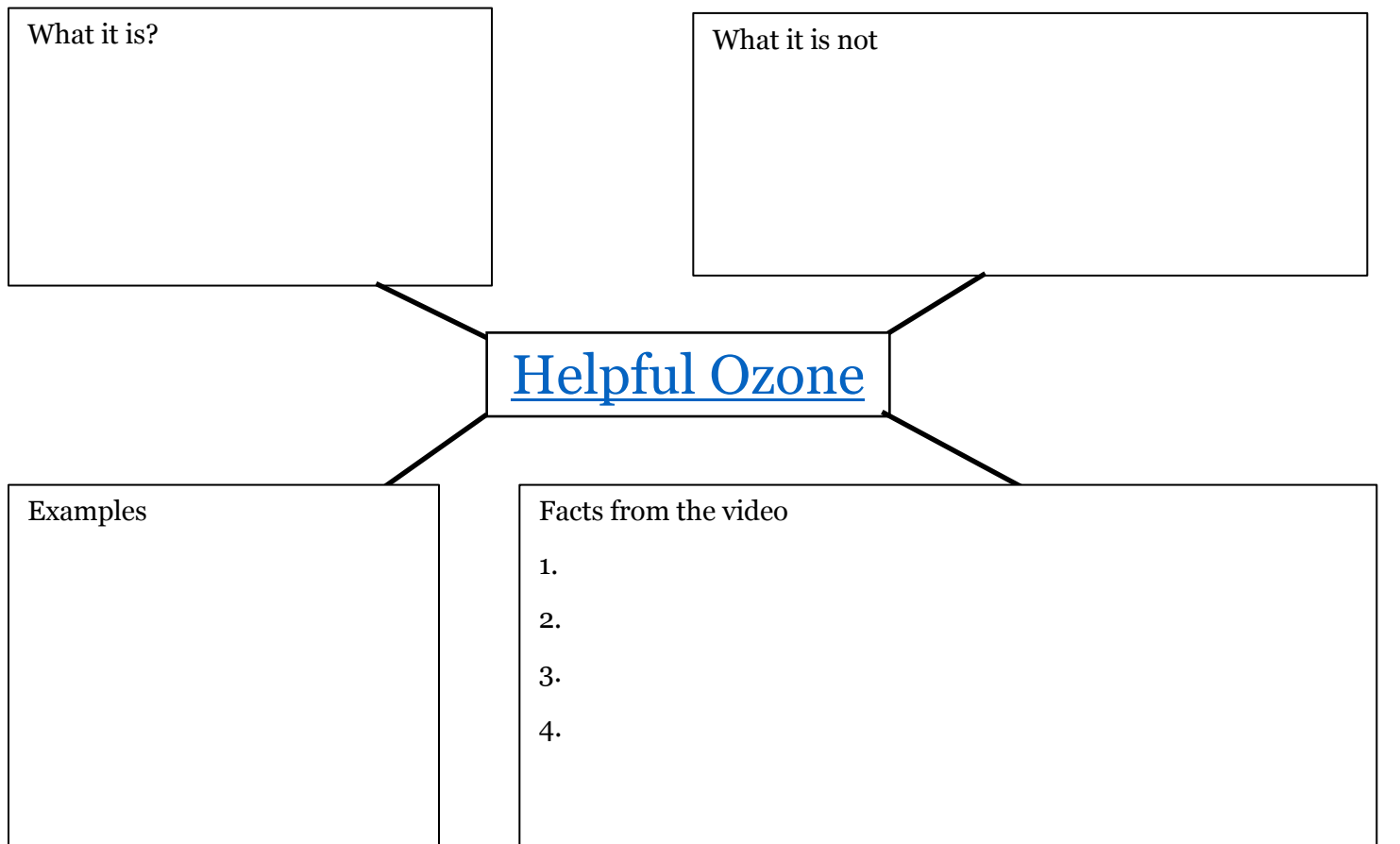
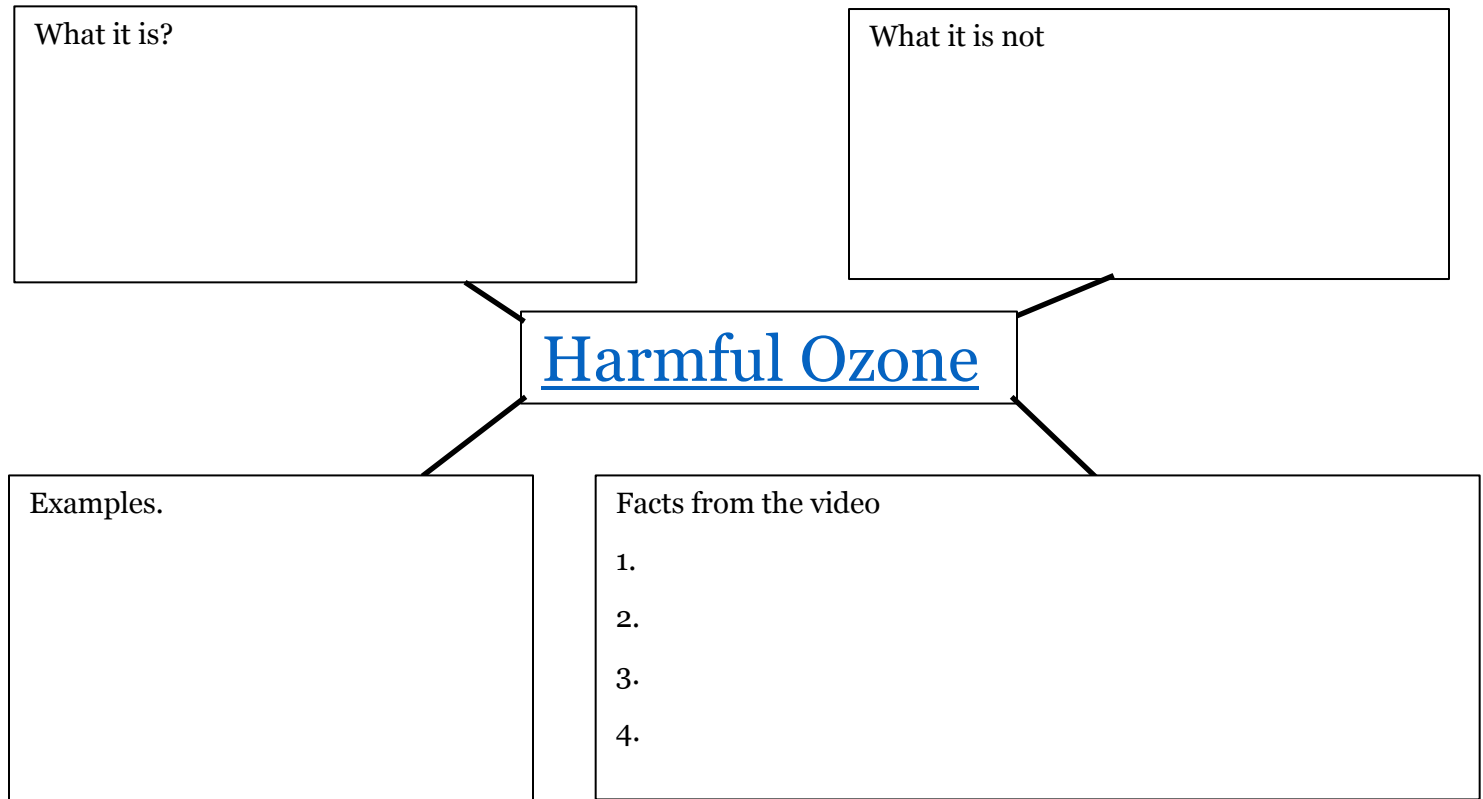
4. What are your thoughts/comments on the combined effect of each individual's pollution (container with everyone's pollution)?

Station 2: Study the website, [Our World Data](#), and answer the following questions.

1. According to this website, what is the definition of air pollution?
2. What is SO₂?
3. The World Health Organization states that air pollution....
4. The beginning of man-made air pollution is attributed to what event(s)?
5. Looking at the chart titled “**SO₂ emissions, but world region,**” explain the trend.
6. Looking at the world map titled “**PM_{2.5} air pollution, mean annual exposure (micrograms per cubic meter), 2015,**” identify the areas of the world that have the greatest concern of air pollution. Infer why this is the case.
7. Looking at the world map titled “**Absolute number of deaths from outdoor air pollution, 2016,**” identify the areas of the world that have the greatest concerns. Infer why this is the case.

Station 3: [Helpful and Harmful Ozone](#)

Watch the video and fill out the graphic organizer for helpful and harmful Ozone.



Station 5: Read the article and answer the questions below.



WHO: Global Air Pollution is Worsening, and Poor Countries are Begin Hit the Hardest

1. Explain the results of the study (minimum 5 sentences).
2. As air quality declines in urban settings, what is a concern for those that live there?
3. Make an inference as to why there is a greater concern about air pollution in poor countries rather than more wealthy countries.
4. Should we, as United States citizens, be concerned about this issue? Justify your reasoning in a minimum of 5-7 sentences.

Station 6: Study the website, aqicn.org and answer the following questions.

1. AQI stands for _____
2. Look around at various part of the world to determine what the current AQI is for that area. Choose 5 countries and list their current AQI.

Country	AQI

3. Look at the Air Quality and Pollution Measurement Chart (bottom of page) and identify any health implications and cautionary statements for your chosen countries.

Country	AQI	Air Pollution Level	Health Implications	Cautionary Statements

4. Looking at the world map, do you notice any patterns or trends? Explain.