Activity 4.2.4 Student Worksheet

Table 1. Six Common Pollutants – Air Trends

	Carbon Monoxide (Elise, Harold, Seth)	Ground Level Ozone (Katie & Michelle)	Lead (Pat and Tasha)
Describe the pollutant. In what unit is it measured?	CO is produced by burning fossil fuels - vehicles and machinery are biggest source. It is measured in ppm (mg/L)	3 atoms of oxygen (O3) ppm	Lead is an element that is naturally occurring and is found in the earth's crust and is toxic to humans and animals. It is measured in ppm (parts per million).
How can the pollutant be detrimental to human life?	CO reduces the amount of oxygen that can be transported in the blood stream to critical organs - causes dizziness, confusion and even death at high levels	Chest pain, coughing, airway inflammation, reduced lung function, damaged lung tissue, worsen respiratory symptoms/disease	High lead concentrations in water and food can lead to behavior and learning problems, lower IQ, slowed growth, hyper activity, hearing problems, anemia, premature birth and cardiovascular issues, kidney issues and reproductive problems
How many years has data been collected for each pollutant?	Since 1980	1980-2016 36 years	Lead data has been collected since 1976 in children and pregnant women.

Does the trend for the pollutant appear to be improving or worsening? (National or Local?)	National Improvement of CO - decreased by 85% from 1980 to 2016. Northeast improvement as CO has decreased by 54% from 2000 to 2016	Nationally improving	The trend is improving as the public awareness has increased and lead pipes in plumbing and paint has decreased. Lead was found in lead smelters and in the mining, smelting and refining industries.
How is the pollutant typically removed or reduced from the air and emissions?	Using less fossil fuels is key - more efficient vehicles, appliances and machines.	Cleaner commute, safe paints and cleaning products, mulch/compost leaves/yard waste, conserve electricity, reduce use of fireplaces	Lowering your chances of exposure is vital--inspect all paint surfaces, adress water damage quickly, keep your home clean and dust-free, flush water outlets used for drinking or food prep, wash hands. Lead dust is an issue so keep clean.

Table 1.(Continued) Six Common Pollutants – Air Trends

	Nitrogen Dioxide Sara, Kris, Ashok	Particulate Matter Jaimee & Frank	Sulfur Dioxide
Describe the pollutant. In what unit is it measured?	NO2 is a chemical compound that is used in the formation of various chemicals and fertilizers. It is also produced from the exhaust of vehicles. Measured in parts per billion (ppb)	10 micrometers and smaller Also called particle pollution - inhalable particles	Most concerning of all sulfur dioxides Used as indicator for the larger group of gaseous sulfur oxides (SOx) Largest source of SO2 in atmosphere is burning fossil fuels by power plants and other industrial facilities
How can the pollutant be detrimental to human life?	**Short periods of exposure: aggravate respiratory diseases, (asthma), leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing).* **Long periods of exposure: contribute to the development of asthma and potentially increase susceptibility to respiratory infections.* **Reacts with other chemicals in the air to form both particulate matter and ozone = dangerous when inhaled*	Effect heart, lungs and serious health effects	● Contribute to particulate matter ● Get to sensitive parts of lungs and cause health problems ● Damages foliage on trees and plants and decreases growth ● Contributes to acid rain

How many years has data been collected for each pollutant?	*Since it was proposed in the Rule Making for Air Quality Standards in 1971 --- (47 years)*	26 years	38 years (since 1980)
Does the trend for the pollutant appear to be improving or worsening?	Since 1980, the range has been substantially improved from approx. 190 ppb to nearly 60-70 ppb. On the high scale per yearly readings. The national standard is 100 ppb. for reference.	Improving	Since 1980, the national average has decreased by 87%
How is the pollutant typically removed or reduced from the air and emissions?	Gas scrubbing is one of the most common forms of NOx treatment, with sodium hydroxide being the conventional scrubbing medium. Improve the combustion efficiency in motor vehicles and power plants. Catalytic and non-catalytic combustion.	EPA regulates it, and reduce emissions that form PM	