

# Criteria Air Pollutant BINGO

Name: \_\_\_\_\_

NAME	SYMBOL(s)	CAUSES	CONCERNS	POSSIBLE SOLUTIONS
		Cleaning products Refrigerant Propellant (hair spray/paint)	Depletes stratospheric ozone	Montreal Protocol Reduce use of items with CFCs
		Cars/trucks exhaust Forest fires, Volcanoes, Powerplants (coal-burning)	Increase greenhouse effect, produce SMOG	Decrease auto & powerplant emissions Use non-emitting power source
		Combustion (burning) of fossil fuels	Increase trapped heat in atmosphere, leads to changing climate	Kyoto Treaty Paris Accords Decrease fossil fuel use
		Mined (mountain-top) Burned in powerplants	Increase CO <sub>2</sub> production Sulfur released during mining process	Decrease dependence on coal, mining regulations Invest in renewables
		Fertilizer production	Corrosive, increases acidity of rivers/streams	More stringent water quality standards
		Combustion of fossil fuels	Contaminates food chain (bioaccumulate & biomagnifies)	Reduce use of fossil fuels Invest in renewables
		Used in garment industry & to make detonators for war	Respiratory & gastrointestinal disorders	Stronger regulations (banned in US, but not everywhere)
		Fertilized agricultural fields and livestock manure, aerosols	Increase trapped heat in atmosphere, leads to changing climate	Sustainable agricultural practices, lower amount of livestock
		Combustion of fossil fuels (cars & burning coal)	Respiratory irritant, aggravates asthma, creates acid rain & smog	Stronger regulations on air quality standards
		Group that includes NO and NO <sub>2</sub> . From burning fossil fuels & cigarettes	Form smog and acid rain, respiratory irritant	Stronger regulations
		Created from chemical reactions between NO <sub>x</sub> and VOCs in presence of sunlight	Respiratory irritant, aggravates asthma, creates smog, harmful to vegetation	Uphold and strengthen ozone standards in the Clean Air Act
		Secondary pollutants formed in presence of sunlight	Form photochemical smog	Uphold and strengthen ozone standards in the Clean Air Act
		Leaded fuel Metal refineries	Brain & kidney damage Contaminate crops	Leaded gas banned (in US), decrease usage or ban elsewhere
		Natural decay of uranium in granite underground	Cancer-causing	Test for radon and then seal homes/businesses to prevent leakage IN
		Coal burning powerplant Refineries & volcanic eruptions	Lung damage Acid rain formation Eye irritation	Decrease coal usage Recycle metals (less refineries)
		Fracking, increase global appetite for beef, landfill decomposition	GHG - Increase trapped heat in atmosphere, leads to changing climate	Regulations on fracking, decreased beef consumption, landfill vent & capture
		Fuel in nuclear powerplants	Radioactive waste (no permanent storage plan) Creates H <sub>2</sub> O vapor (GHG)	Create permanent waste storage facility or decrease usage of nuclear power

NAME	SYMBOL(s)	CAUSES	CONCERNS	POSSIBLE SOLUTIONS
		See each individual pollutant listed above	Depletion of O <sub>3</sub> in stratosphere, leads to increase sunburn & skin cancer	Decrease auto emissions and leaded gas, Montreal Protocol
		Production of H <sub>2</sub> SO <sub>4</sub> and explosives	Affects respiratory tract, potential cancer-causing agent	Regulations and Air quality standards
		N/A	N/A	Clean Air Act set standards for ambient air quality and sets limits for pollutants
		Auto exhaust – VOCs & NO <sub>2</sub> UV rays required for photochemical smog	Lung irritant Eye irritant	Reduce auto emissions

Match each of the following to their air quality significance:

- Industry
- Decreased plankton
- Wet scrubber
- Catalytic converter
- Depletes soil fertility
- Pipes
- Electrostatic precipitators
- Smoke

- \_\_\_\_\_ – used to reduce emissions in cars
- \_\_\_\_\_ – results from stratospheric O<sub>3</sub> depletion and from ocean acidification
- \_\_\_\_\_ – results from acid deposition
- \_\_\_\_\_ – way to remove industrial particulate matter through use of charged particles
- \_\_\_\_\_ – helps to produce gray smog (ex. Beijing, China)
- \_\_\_\_\_ – used to remove Cl, NO<sub>x</sub>, SO<sub>x</sub>, and PM
- \_\_\_\_\_ – combines with fog to produce SMOG
- \_\_\_\_\_ – source of Pb in older homes (water pipes/plumbing, ex. Flint, Michigan)

List EACH item you matched for BINGO

BINGO: Round 1

BINGO: Round 2

**Conclusion Questions:**

1. Which THREE of the above criteria pollutants do you consider to be the greatest threats to our air quality?

Provide at least one reason for each.

2. Which TWO of the above criteria pollutants do you feel that we could do the best job mitigating?

Provide at least one reason why you chose each.