



# What is Air Pollution?

AIM: This worksheet will help you to discover what air pollution is, which are the major global air pollutants and where they come from.

## 1. What is air pollution? *Fill in the gaps.*

Air pollution describes anything in the \_\_\_\_\_ which causes \_\_\_\_\_ when breathed in. Air pollution can be both very small particles or different \_\_\_\_\_ in the air. The sources of air pollution can be either man-made ( \_\_\_\_\_ ) or \_\_\_\_\_. Air pollution in the atmosphere can be measured at the \_\_\_\_\_ or higher up by using instruments on \_\_\_\_\_, \_\_\_\_\_ and satellites.

surface                      anthropogenic  
natural                      balloons                      aircraft                      air                      gases                      harm

## 2. What are the sources of air pollution? *Sort the words into the table.*

Power  
Plants

Agriculture

Volcanic  
Eruptions

Cleaning  
Chemicals

Plants

Wood Burning  
Stoves

NATURAL  
SOURCES

ANTHROPOGENIC  
SOURCES

Cars & Other  
Vehicles

Forest Fires

Desert Dust

Fireworks

Sea Salt Spray

Industrial  
Processes

## 3. What are the major air pollutants? *Read the 'Air Pollutants Description' and fill in the table.*

Pollutant	Chemical Symbol or Acronym	Sources/How is it produced?	Health Impact
Nitrogen Dioxide			
Ground Level Ozone			
Carbon Monoxide			
Particulate Matter			
Sulfur Dioxide			
Black Carbon			



# Air Pollutants Description

## Description of pollutants from the World Health Organisation (WHO)

<https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health/ambient-air-pollution/pollutants/types-of-pollutants>

### Particulate Matter

Particulate matter (PM) are inhalable and respirable particles composed of sulphate, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. Particles with a diameter of less than 10 microns (PM10), including fine particles less than 2.5 microns (PM2.5) pose the greatest risks to health, as they are capable of penetrating people's lungs and entering their bloodstream. Sources of PM include combustion engines (both diesel and petrol), solid-fuel (coal, lignite, heavy oil and biomass) combustion for energy production in households and industry, as well as other industrial activities (building, mining, manufacture of cement, ceramic and bricks, and smelting).

### Black Carbon

Black carbon is a major component of PM2.5 and driver of climate change, also known as a "short-lived climate pollutant." SLCPs persist in the atmosphere for a shorter period compared to CO2. Despite its short atmospheric lifetime, black carbon is one of the largest contributors to global warming after CO2. It also known to decrease agricultural yields and accelerate glacier melting.

### Ground-level Ozone

Ground-level ozone is one of the major components of photochemical smog and a key health risk linked to breathing problems, asthma, reduced lung function and respiratory diseases. It is a secondary pollutant, meaning that it is not directly emitted. Instead, it is produced when carbon monoxide (CO), methane, or other volatile organic compounds (VOCs) are oxidized in the presence of nitrogen oxides (NOx) and sunlight. In addition to their role as ozone precursors, CO, VOCs and NOx are dangerous air pollutants themselves. Major sources of NOx and VOCs include emissions from motor vehicle exhaust, industrial facilities, and chemical solvents. Major sources of methane include waste and the fossil fuel and agricultural industry. Aside from its health impacts, tropospheric ozone is a short-lived climate pollutant and one of the most important greenhouse gases.

### Nitrogen dioxide

Nitrogen dioxide, mainly emitted by power generation, industrial and traffic sources, is an important constituent of particulate matter and ozone. There is growing evidence that independently, it can increase symptoms of bronchitis and asthma, as well as lead to respiratory infections and reduced lung function and growth. Evidence also suggests that NO2 may be responsible for a large disease burden, with exposure linked to premature mortality and morbidity from cardiovascular and respiratory diseases.

### Sulfur dioxide

Sulfur dioxide (SO2) is primarily produced from the burning of fossil fuels (coal and oil) and the smelting of mineral ores that contain sulphur. Exposure to SO2 affects the respiratory system and the function of the lungs, and causes irritation of the eyes. Inflammation of the respiratory tract from SO2 can aggravate asthma and chronic bronchitis, as well as increases the risk of infection, leading to increased hospital admissions and visits to emergency rooms. SO2 also combines with water in the air to form sulfuric acid - the main component of acid rain.

### Carbon monoxide

Carbon monoxide (CO) a colourless and odourless gas, which at high levels can be harmful to humans by impairing the amount of oxygen transported in the bloodstream to critical organs. Although high concentrations of CO are more of a concern indoors, emissions outdoors, particularly in developing countries can be high. New evidence also reveals that long-term exposure to low concentrations is also associated with a wide range of health effects. The main sources of ambient CO include motor vehicle exhaust and machinery that burn fossil fuels.



# What is Air Pollution? - Answers

AIM: This worksheet will help you to discover what air pollution is, which are the major global air pollutants and where they come from.

## 1. What is air pollution? **Fill in the gaps.**

Air pollution describes anything in the air which causes harm when breathed in. Air pollution can be both very small particles or different gases in the air. The sources of air pollution can be either man-made (anthropogenic) or natural. Air pollution in the atmosphere can be measured at the surface or higher up by using instruments on balloons, aircraft and satellites.

surface      balloons      air      gases      anthropogenic  
natural      harm      aircraft

## 2. What are the sources of air pollution? **Sort the words into the table.**

NATURAL SOURCES	ANTHROPOGENIC SOURCES
Desert Dust Plants      Forest Fires Sea Salt Spray Volcanic Eruptions	Cars & Other Vehicles Fireworks Agriculture (Forest Fires) Industrial Processes Power Plants Cleaning Chemicals Wood Burning Stoves

## 3. What are the major air pollutants? **Read the 'Air Pollutants Description' and fill in the table.**

Pollutant	Chemical Symbol or Acronym	Sources/How is it produced?	Health Impact
Nitrogen Dioxide	NO <sub>2</sub>	Power generation, industry, traffic	Bronchitis, asthma, respiratory infections and reduced lung function.
Ground Level Ozone	O <sub>3</sub>	VOCs + NO <sub>x</sub> in the presence of sunlight.	Asthma, reduced lung function, respiratory diseases.
Carbon Monoxide	CO	Motor vehicle exhausts and machinery that burns fossil fuels.	Reduces how much oxygen can be transported to organs.
Particulate Matter	PM <sub>2.5</sub> or PM <sub>10</sub>	Combustion engines, solid-fuels e.g. coal, industry.	Can enter lungs and bloodstream.
Sulfur Dioxide	SO <sub>2</sub>	Burning fossil fuels and mineral ore smelting.	Reduces lung function, eye irritation, asthma, chronic bronchitis, respiratory infections.