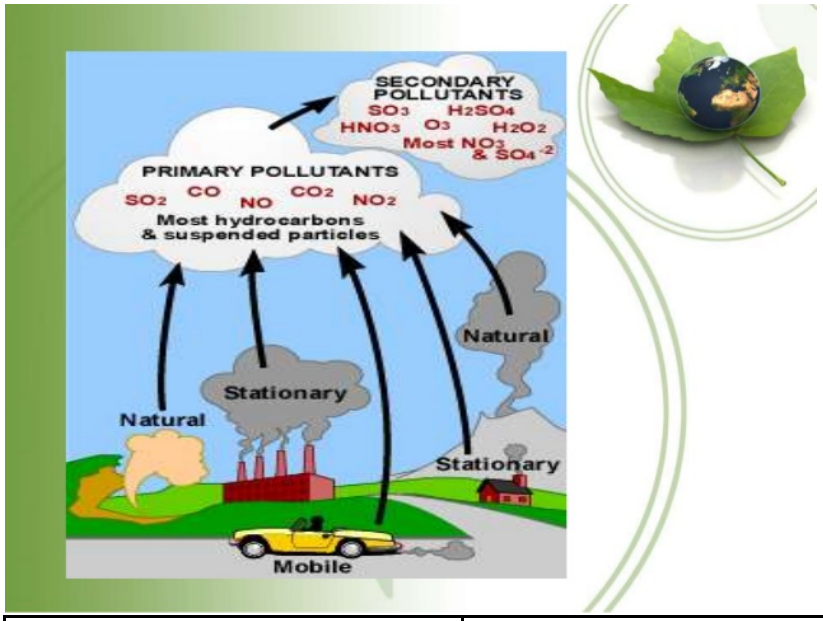
What are indicators for outdoor air quality?

What is an Indicator?

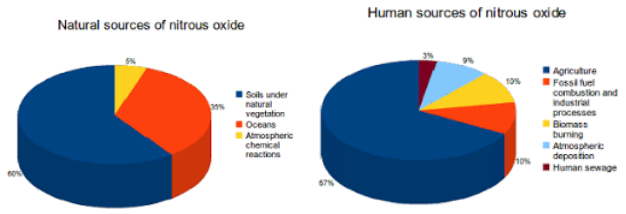
- A way to measure, indicate, point out or point to with more or less exactness;
- Something that is a sign, symptom or index of;
- Something used to show visually the condition of a system.

Example:

Key indicators for outdoor air quality:



Nitrogen Dioxide NO_2 EPA Standard: .053 ppm	Sources: fossil fuel combustion at high temperatures (ex. burning fuel in a car), power plants, forest fires, volcanoes, bacteria in soil Nitrogen Dioxide is a reddish brown gas which reacts to form nitric acid in the air. Increased levels of nitrogen dioxide can lead to *environmental* problems such as acid rain (can damage trees, soil, and aquatic life), decreased visibility, and decreased plant growth, *physiological* (health) problems such as lung irritation or damage, asthma and chronic bronchitis, increased susceptibility to respiratory infections (like the flu and common colds), and heart problems, and *property* damage as it damages fabrics, corrodes metals and eats away stone on buildings/statues.

	
Ozone O_3	Sources: created from reaction on nitrous oxide/nitrogen dioxide and volatile organic compounds, photocopiers, cars, industry, gas vapors, chemical solvents, and incomplete fuel combustion products. Ozone is a colorless gas with an unpleasant odor that can cause lung irritation, damage eyes, damage plants, rubber, and fabric. Every year 10-15,000 people in the US are admitted to hospitals due to ozone-related illnesses.
Carbon Monoxide CO EPA Standard: 9 ppm	Sources: incomplete combustion of fossil fuels, in large part 60-95% from automobile exhaust). Carbon monoxide is a colourless, odourless gas that is a byproduct of incomplete combustion of fossil fuels. By depriving the brain of oxygen, high levels of carbon monoxide can lead to nausea, unconsciousness and death. Every year 5.5 billion tons enter the atmosphere
Lead Pb EPA Standard: 1.5$\mu g/m^3$	Sources: smelters, batteries, particulates Lead is a highly toxic metal that accumulates in body tissue and affects primarily the kidneys, liver, and nervous system. Children are most at risk and 20% of city kids have elevated lead levels. At moderate levels, risks increase greatly for cognitive issues and possibly cancer. Over 3 million tons enter the atmosphere annually.
Particulate Matter PM_{10} PM2.5 EPA Standard: 50$\mu g/m^3$	Sources: burning coal or diesel, volcanoes, lint pollen, spores, factories, unpaved roads, plowing, burning fields. Particulate matter is made up of particles suspended in the air (both size and material of PM is important). PMs can cause lung damage and may be mutagenic (promote mutations), carcinogenic (cause cancer), and teratogenic (dangerous to pregnancies and embryos). Lead is a subcategory of this class of pollutants which also includes asbestos, soot, dust, PCBs (polychlorinated biphenyls), dioxins, and pesticides
Sulfur Dioxide SO_2 EPA Standard: 0.3 ppm	Sources: burning high sulfur coal or oil, smelting or metals, paper manufacturing.

	Sulfur dioxide is a colorless gas with an irritating odor which may produce acid rain, increase breathing difficulties, and eutrophication (conversion of lakes to marshland from excess of nutrients promoting plant growth that is too dense for aquatic animals). Finding lichen and moss are indicators of the presence of sulfur dioxide. In combination with water and ammonia (NH4) it can increase soil fertility.
Volatile Organic Compounds VOCs	Sources: vehicles, evaporation of solvents or fossil fuels, aerosols, paint thinners, or dry cleaning. Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. Interaction with VOCs can lead to eye and respiratory irritation, cancer, damage of the liver, nervous system, and kidney, plant damage, lowered visibility, and global warming.
Pollen, Dust-mites, other allergens	Pollen is responsible for plant reproduction, but the mechanism for pollination through the air allows particles to affect people with allergy responses. Rising temperature and carbon dioxide levels from human pollution lead plants to produce more pollen