



Investigating AIR POLLUTION



Why is air important?

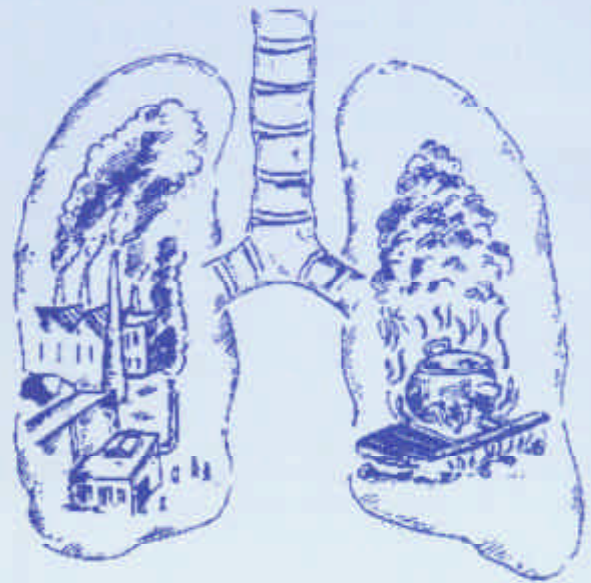
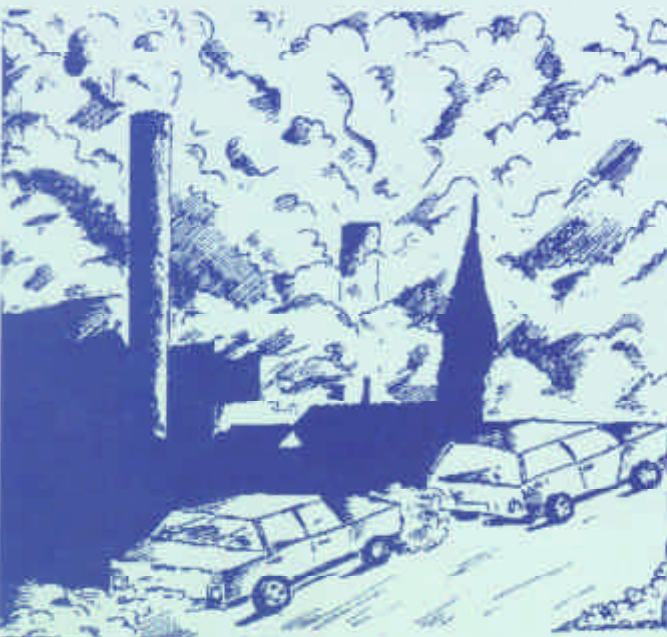
The air we breathe is made up of a mixture of gases, the main components being carbon dioxide, nitrogen and oxygen. Without air, life on this planet would cease to exist. However, air is constantly being polluted by humans, which damages the environment and human health. The air we breathe is not limitless so we must take care of it!

What is air pollution?

Air is polluted when other substances are introduced which give rise to harmful effects. It can even be polluted when the original components are present, but their quantities are changed, disrupting the natural balance. Unless everybody is aware of air pollution and its causes and effects, life is at stake. The main pollutants are, carbon monoxide, sulphur dioxide, smoke, lead and nitrogen oxides.

■ Sulphur Dioxide

Sulphur dioxide is emitted when fuels containing sulphur are burnt, such as coal or petrol. Those exposed to sulphur dioxide for a short time may suffer from respiratory illness. Long-term exposure to sulphur dioxide can lead to increased respiratory problems including chronic bronchitis and asthma.



■ Smoke

Smoke is formed when the air is polluted by tiny particles of unburned carbon. Motor vehicles which are not maintained well are one of the major causes of smoke emission, along with open domestic fires which burn coal. Smoke inhalation has generally the same bad effects as exposure to sulphur dioxide but it may also damage the heart. Smoke problems can be reduced by maintaining vehicles and by using smokeless fuels.

■ Lead

Lead is a highly toxic element which is put into fuel and used in petrol to run motor vehicles. Indeed, motor vehicles are the primary source of lead pollution in Ireland. Lead can be one of the factors leading to anaemia and hyperactivity. It can also reduce intelligence levels among young children. However, lead concentrations in the air are gradually decreasing as a result of more vehicles which are using unleaded petrol.

■ Nitrogen Oxides

Nitrogen oxides are produced mainly by traffic. Asthmatics can suffer attacks due to short-term exposure to nitrogen dioxide.

■ Smog

Smog is a result of water vapour condensing on smoke particles. The sulphur dioxide can then dissolve in the water. Smog adversely affects the lungs causing breathing difficulties. It can also cause flu-like symptoms. Buildings are also affected resulting in a black soot-like appearance.



Monitoring air quality using lichens

Deterioration in air quality has a bad effect on all forms of life. In complicated animals like man it is hard to measure this directly. In more simple organisms such as lichens a direct relationship exists between lichen species and air quality!

What is a lichen?

A lichen is a very primitive plant with no roots that gets all its nutrients from the air. Being a plant it makes its own food directly using sunlight through the process of photosynthesis. However, trace minerals are absorbed directly from the air. If the air contains nasty elements such as sulphur dioxide it absorbs these too with adverse effects on itself.

There are many different species of lichens but they all fall into three groups:

a) Shrubby lichens have many surfaces exposed to the air and are very vulnerable to sulphur dioxide. They are not found in cities and towns or places with high levels of pollution.

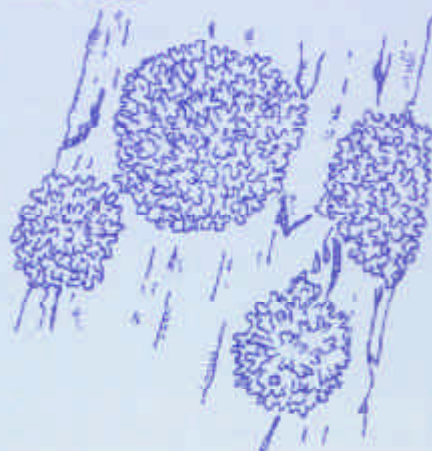
b) Leafy lichens are more flattened, have less surfaces exposed and can survive some pollution. They occur in the outskirts of towns.

c) Crusty lichens are closely pressed to the surface on which they grow. They are able to withstand some sulphur dioxide pollution and they occur right in the centre of our big towns. There are, however, parts of cities where even these are not able to grow because of air pollution.

1. Heavily polluted: a crusty greyish-green lichen grows on walls and tree trunks.



2. Moderately polluted: a leafy orange-yellow lichen grows on concrete, mortar and trees.



3. Lightly polluted: a grey leafy lichen appears on bricks.



4. Clean: flattened grey leafy lichens appear on trees. The higher up the tree they grow, the cleaner the air.



5. Very clean: shrubby grey-green lichens appear on trees.



6. Extremely clean: beard lichens will flourish on trees if the air is sufficiently moist and are grey-green or reddish in colour.

