

STICKY LEAVES

Summary: A fun, outdoor activity that investigates air and makes air pollution visible.

Aim: To learn about air pollution and investigate local air quality.

Equipment: Clear sticky tape, maps, white paper

Preparation: Find a suitable place to run the activity

Duration: One hour

Setting: An outdoor setting with trees and shrubs. The activity can be done at more than one location. If this is the case, choose areas that differ in their proximity to roads, factories, or other sources of air pollution. The areas will need trees or bushes in leaf but the leaves should not be near the ground. One important point to note is that smooth surfaced leaves give better results than hairy leaves.

Age Range: under 11



LARCH HILL

INTERNATIONAL SCOUT CENTRE

eco adventure

Educational objectives

Explore the sources of clean water and clean air in the local environment. Understand the ways water and air are naturally cleaned.

Aim

To learn about air pollution and investigate local air quality.

Background

An air pollutant is any unwanted substance or chemical that contaminates the air that we breathe resulting in a decline in air quality. Air pollutants include smoke, carbon monoxide, nitrogen oxides, sulphur dioxide, particulates and ozone. Air pollutants have sources that are both natural and human. Natural sources include volcanoes, wildfires, airborne dust, cattle digesting grass and natural radioactive decay. Although some pollution comes from natural sources, most pollution is the result of human activity. The biggest causes are the operation of fossil fuel-burning power plants and automobiles that combust fuel. Most of the main air pollutants can be harmful to human health. Air pollution is frequently associated with respiratory problems. It can make people sick or cause long-term illness, particularly in those most sensitive to pollution, such as children and the elderly. There are three ways in which animals can be affected by air pollution. They can breathe in gases or small particles, eat particles in food or water or absorb gases through the skin. Soft-bodied invertebrates, such as earthworms, or animals with thin, moist skin such as frogs, are particularly affected by absorbing pollution. Sources of air pollution and dust often leave residues on the top of exposed leaves. The sticky leaves activity collects these residues. This makes air pollution 'visible' and easier to understand. The air pollution in different areas can be compared and related to the source of the pollution.

Step by step guide to activity

1. Give the Scouts five minutes to explore their surroundings. They can explore in small groups or individually. Ask them to discover all the different things that make up the environment around them.
2. Gather the group together and discuss their discoveries. They should have noticed living things such as trees, plants and animals as well as inanimate objects like soil, rocks and water. Ask the Scouts how are these things all connected? Who eats who? Where do the animals live? What do the trees and plants need to survive? They should discover that the environment is all linked together. Ask them if there is anything else that is vital to this environment that we can't see. The answer is air.
3. Sit the Scouts down and ask them to spend one or two minutes breathing in the air and thinking about it. They should take really deep breaths and try to fill their lungs. At the end of the allotted time ask them to describe the air around them. Does it taste of anything? Does it smell of anything? Can they see it? What is in air?
4. Introduce the sticky leaves activity. Our air contains 21% oxygen, 72% nitrogen, approximately 7% carbon dioxide and approximately 1% other gases including pollutants. The majority of the gases and particles that make up our air, including the oxygen, nitrogen and carbon dioxide, are colourless, odourless and tasteless. However, some of the pollutants are in particles big enough to be visible to the naked eye. The sticky leaves activity enables these particles to be collected.
5. Ask the Scouts where they think air pollutants might come from (some sources are cars, fossil fuel-burning power plants, volcanoes, fires, dust). Ask the Scouts about their current location. What sources of air pollution are nearby?
6. Split the Scouts into small groups and give each group some white paper, scissors and some sticky tape. Depending on the size or other characteristics of your natural area and the size of your group, you can allocate each group their own area or vegetation type or you can allow them to decide themselves where they sample.

7. The Scouts cut a piece of sticky tape and press it firmly, sticky side down, onto a leaf. They then carefully remove the tape and stick it onto a piece of white paper. Each group should do this at least ten times in order to get a representative sample and write down or draw the location where they took the sample.

Evaluation

1. Gather the Scouts together and compare the results. If you have access to a magnifying glass or microscope, look closely at the samples. Rank the different samples in order of how dirty they are. Where were the dirtiest samples taken from? Where were the cleanest samples taken from? Is there a pattern, if so why? Where is the pollution coming from?
2. If you have sampled in more than one area then transfer your results to a map and discuss. Is there a reason why certain areas show more pollution than others? Where is the pollution coming from?
3. Think about the damage the pollution in the air might be doing. How might it affect the plants? How might it affect human health? How might it affect animals? Bear in mind that this is only the pollution that is visible. A lot of pollution is not visible to the naked eye.

Further activities

1. There are other ways that air pollution can be 'seen'. Investigate buildings made of stone in your local area. These can show evidence of air pollution, in particular from vehicles on adjacent roads. Look out for natural stone that looks 'dirty'. Graveyards are also good places for seeing the effect of air pollution on stone. Find out how scientists measure air quality.
2. Think about how our actions affect air pollution. How they contribute to it and what we can do to reduce air pollution.
3. Make a poster showing all the different things in your local area that contribute to air pollution.