

Theme: Pollution

Pollution is all around us. It affects the air we breathe, the food we eat, the places we live and the water we drink, which can cause a whole range of health issues. And it doesn't just affect humans. Pollution affects ecosystems of plants and animals too.

- Pollution is caused when something which has **harmful or has poisonous effects** is introduced into the environment.
- People and their environment can experience different types of pollution including: **soil, water, air, light, noise and thermal**.
- Soil pollution occurs when soil contains chemicals that are **dangerous or toxic**. Those substances put people in danger for example when they are exposed to high concentration of heavy metals in soil as it might lead to **liver or kidney damage**.
- Water pollution is mostly caused by dumping industrial waste into the water bodies, spraying pesticides on plants or allowing detergents used for daily activities (e.g. washing cloths) into lakes or rivers. Water pollution not only harms the aquatic beings but also travels **up the food chain – to us**.
- Water-borne diseases (such as **typhoid or cholera**) spread mainly through polluted water either directly or through flies or filth. Every year 3 million people die globally from water related diseases.
- Breathing polluted air puts people at a higher risk of **cancer or asthma** and other respiratory diseases. Coughing and wheezing are common symptoms experienced by people living in cities with high levels of air pollution.
- Air pollution is contributing to about **40,000 early deaths a year in the UK**, say the Royal College of Physicians and the Royal College of Paediatrics and Child Health.
- Noise pollution is caused by human activities and can come from traffic, airports, factories, music concerts and others. People exposed to high noise level might suffer from **sleep disturbance or hearing loss**. Noise pollution can also affect their mental health by causing **stress or hypertension**.
- Pollution **damages the immune system**, endocrine and reproductive systems.
- High levels of particle pollution have been associated with higher incidents of **heart problems**.

How can we use the Internet of Things to tackle pollution to improve health?

No one really knows what the long-term effects some of these substances will have on the health of plants, animals and humans; there is a great deal of uncertainty about their combined effects, even in low concentrations. As pollution is worsening around the world, technology and data collection methods are advancing which provides a great opportunity to understand and address pollution and related issues.

It's important to remember that although pollution is a global problem, there are also lots of things we can do as individuals and communities to reduce the amount we pollute as well as minimise how it affects us. The Internet of Things can help us do that by better understanding how the negative substances are spread and help us better manage health issues caused by pollution.

People around the world are already using the Internet of Things concept to tackle pollution mainly by installing various types of sensors that can measure quality of air or water. Data collected from those sensors can provide an accurate picture of pollution levels in specific locations (for instance London) and that knowledge can help people better understand the issue and focus their efforts to solve the problem. There are also examples of how the Internet of Things monitor or/and address health issues caused by pollution.

There's a need for new ideas about how the Internet of Things can help us not only **monitor** but also **reduce, reverse and prevent** the negative health issues caused by pollution.

Questions for brainstorming

- What are the different types of pollution? What types of pollution affect us and our community?
- What are the causes of pollution? What pollution do my actions cause?
- Why is pollution an important issue to me / my community / the country / the world?
- What solutions are there to help us reduce the amount of pollution we cause? How could the Internet of Things enhance these solutions?
- What existing Internet of Things solutions are there that tackle pollution and address health issues caused by pollution?
- How could Internet of Things solutions help to prevent, reduce or monitor pollution?
- How could Internet of Things solutions help to prevent, reduce or monitor the impact of pollution on our health?
- How could Internet of Things solutions help raise awareness of pollution? How could it help people make choices that reduce the effect pollution has on them?

See our design toolkit for guidance on how to come up with new ideas!

Examples

Aerocrine has introduced a handheld device that uses sensors to measure nitric oxide level in a patient's breath to diagnose and manage asthma. The device can also tell a doctor what drugs can be used to help the patient. The data stored in the cloud can be used by doctors to analyse patients' symptoms over time and how they react to treatment.



See more details at: <http://www.niox.com/en-US/>



Nightingale is a smart home sleep system designed to mask disruptive indoor and outdoor noises to help you sleep better at night. Nightingale uses two devices placed on two opposite walls create sound blankets that are acoustically tuned to the frequencies of common noises such as car traffic. It can be managed by a smartphone and connected with popular smart home appliances.

See more details at:
<http://www.meetnightingale.com/>

BuggyAir is a project that is looking at how the Internet of Things can be used to measure air pollution at ground - or buggy - level. Compact air quality monitors and GPS trackers can be fitted to a pushchair. The information collected can then be used by parents to avoid places at times when there is high pollution. It could also be used to support campaigning.

See more details at:
<https://www.iotacademy.org/group/buggyair>



Other information

Here are some additional resources that might help to explore this theme:

- [Young People's Trust For the Environment](#)
- [2016 World's Worst Pollution Problem Report](#)
- [Mapping for Change](#)
- [WHO on environmental pollution](#)
- [London Air](#)
- [Climate Change and the Life Cycle of Stuff](#)
- [Air Quality Egg](#)
- [Mad About Pollution](#) (resource)
- Articles:
 - [Will The Internet of Things be Beneficial for the Environment?](#)
 - [Four Ways the IoT is saving the environment](#)
 - [The Internet of Things Will Create a More Sustainable World](#)