



*“If we are to have a better future for our children, we should leave them a better planet in legacy. May this noble goal unite us in the name of future generations!”*

*Nevena Stoilkov*

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## The Impact of Pollution on Our Planet and Our Lives

### Subject

Geography, Science,  
Language Comprehension

### Learning Outcome

- To know some of the different forms of environmental pollution
- To explore ways to reduce environmental pollution
- To develop use of descriptive and comparison words and build research skills

### Preparation

- Prepare pictures for students to compare.
- Either print out the pictures or display them on a screen.
- Set up a television/projector to show the video.

- If you cannot access a television or projector, print out images of pollution in appendix 1.
- Pick out case studies for the students to use in their groups. If you are able to use the internet, choose case studies from the list in appendix 2.
- If you cannot connect to the internet, print out and use the simplified case studies in appendix 3.
- Provide access to a world map (appendix 4)
- Read through the Global Goals to explain how pollution relates to specific goals in appendix 5.

**Note:** This lesson can be taught without access to the internet.

Total Time:



Age Range:



World's Largest Lesson is a collaborative education project to support the announcement of the United Nations Global Goals for Sustainable Development. The project is living proof of the importance of Global Goal 17 "Partnerships for the Goals" and would not have been possible without the help of all of our partners working with us and with each other.

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Lesson plans created in collaboration with Think Global [www.think-global.org.uk](http://www.think-global.org.uk). Promoting learning for a just and sustainable world.



## Learning Activity

5  
mins

Have students watch a short video about pollution. [https://youtu.be/\\_6zIGYK7GME](https://youtu.be/_6zIGYK7GME)

Ask students to record all the different forms of pollution and environmental impact that they see in the video.

Ask students to consider whether any of these forms of pollution exist where they live. Are there are other forms of pollution not in the video that they see locally?

## Differentiation and Alternatives

Look through the selection of images relating to pollution appendix 1. Ask students to describe the type of pollution and environmental impact they can see.

## Learning Activity

20  
mins

Place students in groups of four. Each student in the group will have a different case study that describes the causes and effects of a form of pollution (e.g. an oil spill, vehicle exhausts, plastic bags, landfill, fossil fuel power stations, air travel, agricultural chemicals, and industrial water pollution). They should read these individually from the links provided in appendix 2 and highlight any descriptive words.

Students then have a few minutes to help each other with any unfamiliar vocabulary and to locate the case study on a world map (appendix 4). Afterwards, students can take turns explaining the case study they read to their group. Encourage the students to take notes when listening.

## Differentiation and Alternatives

Students without internet access can use the 4 case studies in appendix 3.

To plan this activity for younger or less able students, prepare a list of questions about the case studies. Choose a different question to ask each student after they have explained their case study.

Support students further by preparing some true/false statements for each case study. Ask students to decide whether each one is true or false and record their answers as they listen to the other students.

## Learning Activity

20  
mins

Ask each group to come up with ideas for preventing the form of pollution they have read about. If possible, solutions should focus on stopping the cause of the pollution, rather than just dealing with the effects of pollution. Allow students to be creative with this and be prepared to support them with ideas for preventing pollution.

Ask students to draw a diagram that shows the effects of taking action to prevent pollution. Students can use words, symbols, or pictures.

Example: Using fewer plastic bags > less plastic waste in the sea > marine life thrives

## Differentiation and Alternatives

You could structure this activity more effectively by preparing short written descriptions of various solutions to problems. Students must then match up the solutions with the correct case study and problem.

## Learning Activity

5  
mins

Introduce the Global Goals (appendix 5) and explain that the environment is one of the areas these goals will work to improve in.

If students have not watched the Global Goals animation film, please amend the lesson to include it here: [www.globalgoals.org/worldslargestlesson](http://www.globalgoals.org/worldslargestlesson)

## Differentiation and Alternatives

Students could discuss the benefits of a global initiative like the Global Goals, when it comes to stopping environmental pollution.

## Learning Activity

10  
mins

Each group should end the lesson by writing down two things they can do on a daily basis to prevent pollution of their local environment. Refer back to the discussion at the start relating to pollution that exists where they live. Ideas could be recorded in the classroom so that students can be reminded of them over the coming days and weeks.

### Take Action fo the Global Goals

As an educator you have the power to channel students' positive energies and help them believe that they are not helpless, that change is possible, and that they can drive it.

The Design for Change "I Can" School Challenge invites children to take action, make change for themselves and share it with children across the world.

Visit [www.dfcworld.com](http://www.dfcworld.com) to get started.

To download a Design for Change lesson pack or a simple advice pack for young people to take action themselves visit [www.globalgoals.org/worldslargestlesson](http://www.globalgoals.org/worldslargestlesson)

DESIGN *for*  
CHANGE













All Images Lovingly Provided By Getty Images

# Pollution Case Studies to Research in groups

- **An Oil Spill**
  - Gulf of Mexico BP Oil Spill: [http://www.bbc.co.uk/schools/gcsebitesize/geography/wasting\\_resources/waste\\_pollution\\_rev5.shtml](http://www.bbc.co.uk/schools/gcsebitesize/geography/wasting_resources/waste_pollution_rev5.shtml)
  - The Sea Empress Oil Spill: <https://lypte.org.uk/factsheets/oil-pollution-case-study/oil-pollution>
- **Vehicle Exhausts**
  - Taking Control of Air Pollution in Mexico: <http://www.idrc.ca/EN/Resources/Publications/Pages/ArticleDetails.aspx?PublicationID=567>
  - Transport and Air Pollution (not a case study, but explains air pollution caused by transportation vehicles): <http://www.ecofriendlykids.co.uk/transportairpollution.html>
- **Plastic Bags**
  - Plastics, Human Health, and the Environmental Impact: <http://journalistsresource.org/studies/environment/pollution-environment/plastics-environmental-health-literature-review>
  - Plastics in the Ocean: [http://serc.carleton.edu/NAGTWorkshops/health/case\\_studies/plastics.html](http://serc.carleton.edu/NAGTWorkshops/health/case_studies/plastics.html)
- **Landfill**
  - Landfill in Samoa: [http://www.sprep.org/attachments/CaseStudy/Case\\_Study\\_-\\_Semi-aerobic\\_fukuoka\\_landfill\\_in\\_Samoa.pdf](http://www.sprep.org/attachments/CaseStudy/Case_Study_-_Semi-aerobic_fukuoka_landfill_in_Samoa.pdf)
  - Landfill in Illinois: <http://www.epa.gov/superfund/programs/recycle/pdf/hodcase.pdf>
- **Fossil Fuel Power Stations**
  - Fossil Fuels Pro/Con Case Study <https://www.tes.co.uk/teaching-resource/fossil-fuels-nuclear-power--pros-cons-case-study-6087890>
  - Fuels for Power Stations: [http://www.bbc.co.uk/schools/gcsebitesize/science/ocr\\_gateway/energy\\_resources/fuels\\_for\\_powerrev1.shtml](http://www.bbc.co.uk/schools/gcsebitesize/science/ocr_gateway/energy_resources/fuels_for_powerrev1.shtml)
  - Debating Energy Futures DVD (cost attached): <http://globaldimension.org.uk/resources/item/2208>
- **Air Travel**
  - Heathrow Airport Pollution: <http://www.theguardian.com/environment/2012/oct/12/heathrow-third-runway-air-pollution>
  - Plane Exhaust: <http://news.nationalgeographic.com/news/2010/10/101005-planes-pollution-deaths-science-environment/>
- **Agricultural Chemicals**
  - Chemical Free Farming: <http://www.artofliving.org/environmental-care-case-studies/chemical-free-farming>
  - Pesticides in Vietnam: <http://www1.american.edu/ted/vietpest.htm>
- **Industrial Water Pollution**
  - Water Pollution in a Lake in Inner Mongolia: <http://www.theguardian.com/environment/2012/aug/07/china-rare-earth-village-pollution>
  - Water Pollution in China: <http://www.bsr.org/en/our-insights/case-study-view/cleaning-up-industrial-water-pollution-in-southern-china>
  - The Ganges River, India: [http://www.who.int/water\\_sanitation\\_health/resourcesquality/wppcasestudy1.pdf](http://www.who.int/water_sanitation_health/resourcesquality/wppcasestudy1.pdf)
  - Hidden Consequences of Water Pollution: <http://www.greenpeace.org/international/Global/international/publications/toxics/Water%202011/Hidden%20Consequences.pdf>
  - Various Indian Environmental Pollution Case Studies: <http://www.coolgeography.co.uk/GCSE/AQA/Changing%20Urban/Urbanisation&environment/Urbanisation&environment.htm>

# ENVIRONMENTAL IMPACT CASE STUDY

## Water Pollution: BP Oil Spill in the Gulf of Mexico

Adapted from the BBC Bitesize website:

[http://www.bbc.co.uk/schools/gcsebitesize/geography/wasting\\_resources/waste\\_pollution\\_rev5.shtml](http://www.bbc.co.uk/schools/gcsebitesize/geography/wasting_resources/waste_pollution_rev5.shtml)



On 20 April 2010, a deep water oil well exploded in the Gulf of Mexico. The immediate effect was that it killed 11 people and injured 17 others. Oil leaked at a high rate which is difficult to calculate. Some estimates are around 40,000 barrels a day. The oil spill posed risks to the environment and affected local industry.

The impact of this oil spill depended on which parts of the coastline you look at. It is difficult to measure the effects because of seasonal changes in wildlife.

### Economic impact

- The government asked for \$20 billion in damages from BP and BP's share price fell.
- Local industries, such as fishing, were threatened. There was a ban on fishing in the affected area.
- Tourism declined.

### Environmental impact

- Plants and animals were completely covered in the oil. Seabirds, sea turtles, and dolphins have been found dead.
- Oil entered coastal wetland areas leading to a slow recovery.
- Fish stocks were harmed and productivity decreased.

The size of the oil spill was one of the largest America had seen. However because the oil entered warm waters, organisms in the water helped to breakdown the oil. The overall effect may be less than Exxon Valdez Oil spill in 1989 which happened in colder water.

# ENVIRONMENTAL IMPACT CASE STUDY

## Air Pollution: Heathrow, UK

Adapted from The Guardian website:

<http://www.theguardian.com/environment/2012/oct/12/heathrow-third-runway-air-pollution>

### What is the problem?

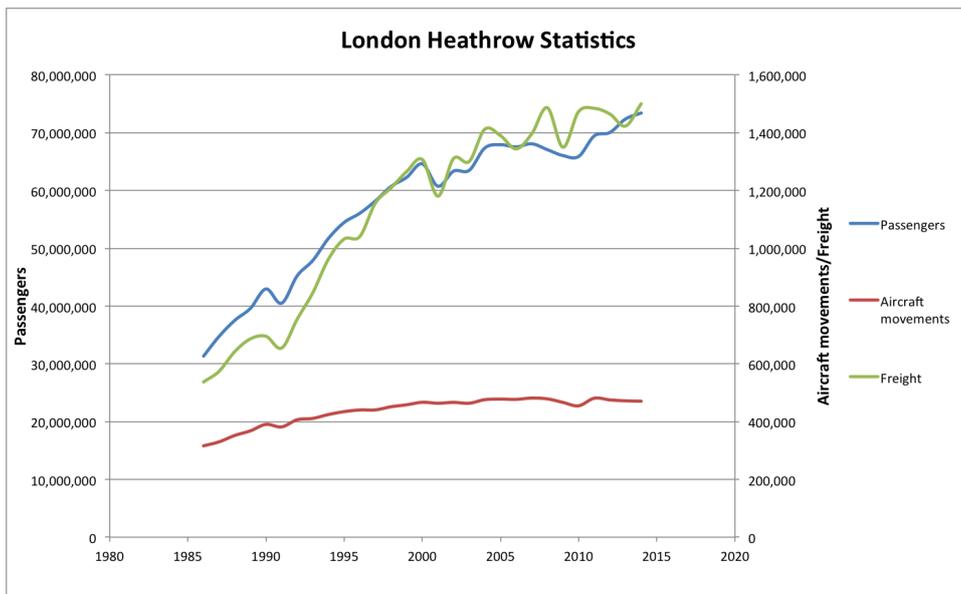
“The main issue with Heathrow is it’s essentially in the middle of a major population centre,” says Professor Steven Barrett, director of the Massachusetts Institute of Technology laboratory for Aviation and the Environment and senior author of the study. “Also, because of the prevailing winds in the UK, emissions tend to get blown over the whole of London.”

The researchers conclude that, based on 2005 data, UK airports contribute to 110 early deaths each year, mostly due to lung cancer and cardiopulmonary complaints. Of those, 50 can be attributed to Heathrow alone, they calculate.

With government figures projecting a more than 50% rise in air travel over the next two decades, the public health effects are also expected to increase.

### What can be done?

Many of the deaths could be avoided by relatively simple measures, Barrett argued. Airplanes get their electricity from on-board power units – small jet engines that are often left running while the planes are at the stands. Plugging into the airport electricity supply would reduce those emissions. As would the use of electric vehicles for airport support operations. And using de-sulphurised fuel would add only 2% to fuel costs, while reducing the health effects by 20%. Altogether, mitigation efforts could halve the pollution from airport operations.



“London Heathrow Statistics” by Seadart - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons [https://commons.wikimedia.org/wiki/File:London\\_Heathrow\\_Statistics.png#/media/File:London\\_Heathrow\\_Statistics.png](https://commons.wikimedia.org/wiki/File:London_Heathrow_Statistics.png#/media/File:London_Heathrow_Statistics.png)

# ENVIRONMENTAL IMPACT CASE STUDY

## Water Pollution: the Ganges River, India

Adapted from Wikipedia and the Cool Geography website: <http://www.coolgeography.co.uk/GCSE/AQA/Changing%20Urban/Urbanisation&environment/Urbanisation&environment.htm>

[https://en.wikipedia.org/wiki/Pollution\\_of\\_the\\_Ganges](https://en.wikipedia.org/wiki/Pollution_of_the_Ganges)

The Ganges is the largest river in India with a significant religious importance for Hindus. It provides water to about 40% of India's population across 11 states, serving an estimated population of 500 million people or more, which is larger than any other river in the world. Today, it is considered to be the sixth most polluted river in the world.

The Ganges River is a sacred Indian river that flows in the north of the country. Pollution of the Ganges has become so serious that bathing in and drinking its water has become very dangerous.



### Causes

- The major polluting industry along the Ganges is the leather industry from which Chromium and other chemicals leak into the river.
- Another huge source of pollution is the nearly 1 billion litres of mostly untreated raw sewage that enters the river every day.
- Inadequate cremation procedures result in partially burnt or unburnt corpses floating in the river.

### Cleaning efforts

The Ganga Action Plan (GAP) was set up in 1985 by the Indian government with British and Dutch support to build a number of waste treatment facilities. Under the GAP, sewage is intercepted and water is diverted for treatment and several electrical crematoria have been built. The project is now in its second phase - GAP II.

# ENVIRONMENTAL IMPACT CASE STUDY

## Industrial waste : Inner Mongolia

Adapted from the Guardian website: <http://www.theguardian.com/environment/2012/aug/07/china-rare-earth-village-pollution>

Photo: <http://abcnews.go.com/Technology/toxic-lake-black-sludge-result-mining-create-tech/story?id=30122911>

The town of Baotou, in Inner Mongolia, is the largest Chinese source of minerals used in smartphones, GPS receivers, wind farms, electric cars and many more products. The minerals are mined at Bayan Obo, 120km farther north, then brought to Baotou for processing.

### The problem:

From the air it looks like a huge lake, but on the ground it turns out to be a murky expanse of water, in which no fish or algae can survive. The shore is coated with a black crust, so thick you can walk on it. Into this huge, 10 square km pond, nearby factories discharge water loaded with chemicals used to process the 17 most sought after minerals in the world

The polluted waters of the pond contain all sorts of toxic chemicals, but also including radioactive elements that can cause cancer.

### The effects:

Before the factories were built, there were many fields with vegetables growing. In 1958 the Baotou Iron and steel company started to produce the minerals. In the 1980s the local people noticed that their vegetables would no longer grow, and over time farming decreased. Most of the farmers have moved away. In just 10 years the population has dropped from 2,000 to 300 people. Residents of Baotou were inhaling solvent vapour, particularly sulphuric acid, as well as coal dust. The local population have also suffered physically.





# THE GLOBAL GOALS

For Sustainable Development

