EU: Humans have an impact on the natural environment.

Standard: SS6G8
Environmental issues in Europe

Air pollution in the United Kingdom

Acid rain in Germany

Nuclear disaster in Chernobyl, Ukraine

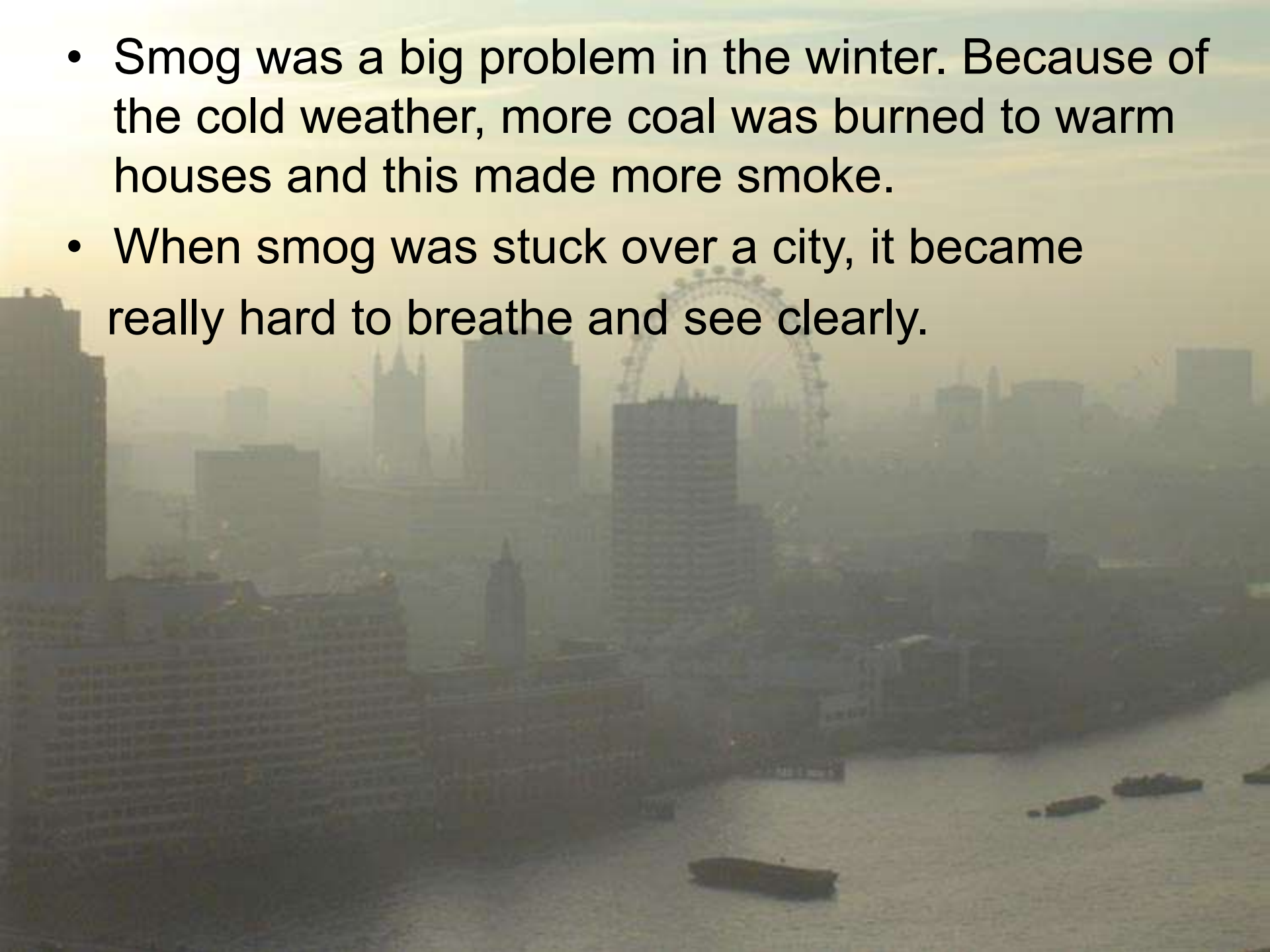
Be sure to ADD Notes to your INB!

Air Pollution in The United Kingdom
Where did it start?

500 years ago in Britain, the burning of coal was increasing in cities like London. Coal was used in factories for energy and in homes for heat.

Coal, when burned makes a lot of smoke, which makes the air very dirty.

- About 200 years ago, the **Industrial Revolution** began in Britain.
- Factories were built, and even more coal was burned. Air pollution was becoming a really big problem, especially when the weather was foggy.
- With foggy conditions and light winds the smoke or air pollution covered the whole city, and would not move.
- Smoke and fog together create **smog**.



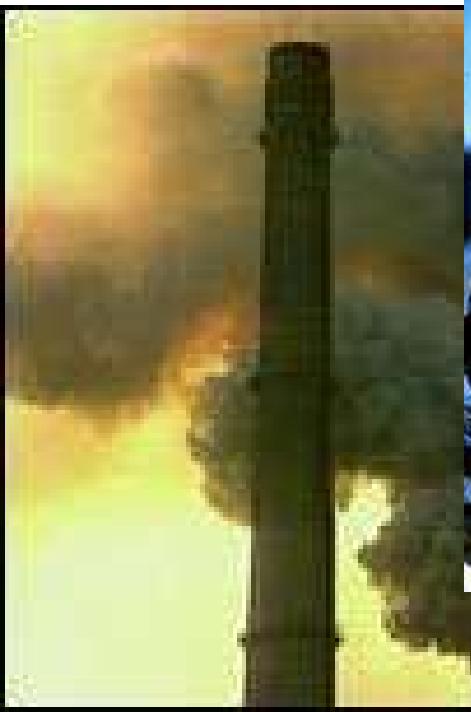
- Smog was a big problem in the winter. Because of the cold weather, more coal was burned to warm houses and this made more smoke.
- When smog was stuck over a city, it became really hard to breathe and see clearly.

- In 1952, the **Great London Smog** occurred and more than 4000 people died because of the smog!

- New laws were created from this catastrophe in 1956 and 1968, so that it would not happen again.
- These laws are called the '**Clean Air Acts**'.

- They were made so that air would become cleaner. The laws encouraged people to use less coal or use cleaner coal in their homes and switch to other fuels such as gas.

- Factories started using tall chimneys so that the smoke would go high up in the sky and no longer cover cities.
- New factories were built outside cities in the countryside. Smog occurred less often and the air became cleaner.



WHAT IS TODAY'S AIR POLLUTION LIKE?

Have you ever noticed that the air in a city smells different from air in the country? One of the reasons is that exhausts from vehicles give off fumes, or gases, which can poison you (carbon monoxide). Today, when we think of air pollution, we should think of transport, especially cars. There are about 23 million vehicles on the road in Britain: they use – petrol and diesel – and they release a lot of pollution in the air. Although the fuels are becoming cleaner, it will not make that much difference because there are more cars added to the roads every year.

While there is less pollution today from burning coal, today's modern world still creates air pollution.

Today, air pollution has not really fallen, because of new (or different) gases that are released in the air.

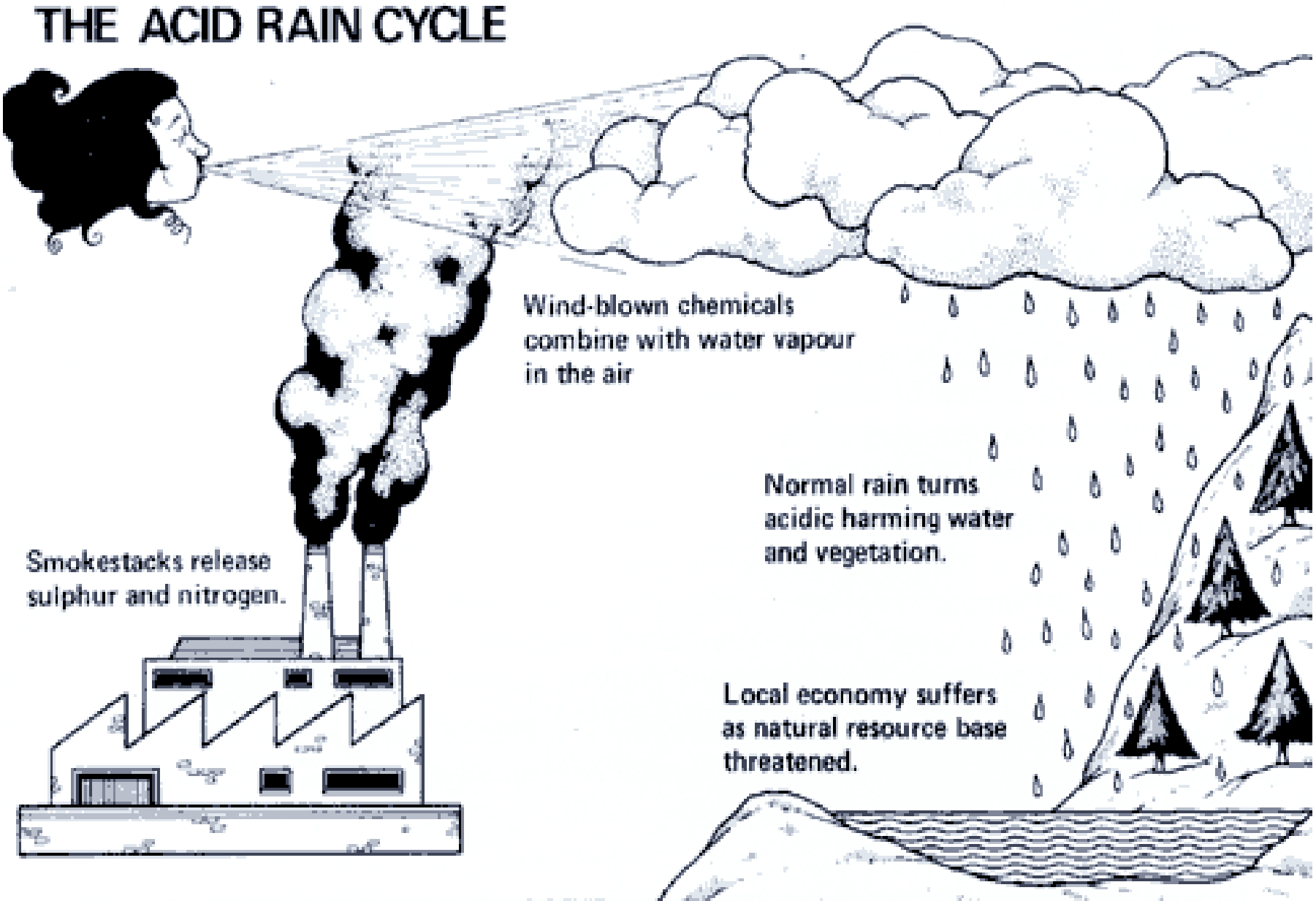
Transport is not the only reason why we have air pollution. Factories also release gases in the air, even with the 'Clean Air Acts', it still causes a lot of air pollution.

Air pollution is the main cause of acid rain.

Tomorrow we will discuss acid rain in Germany!

What causes acid rain?

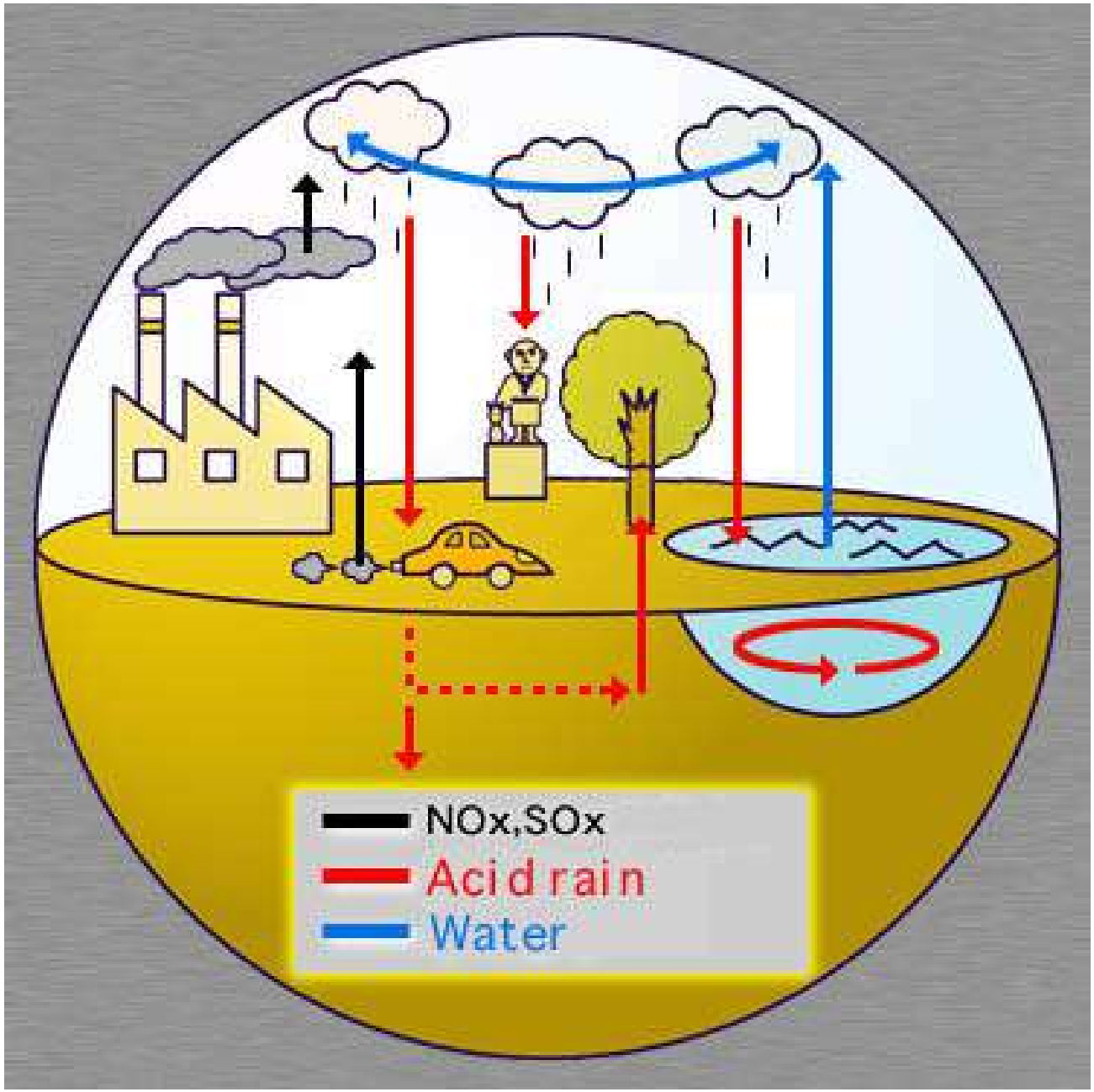
Draw (Quick Sketch) this diagram in your notes



What is acid Rain and why does it affect Germany?

- Natural rain and snow is naturally slightly acidic (pH 5.6) because of the carbon dioxide (CO_2) dissolved in it.

- Mainland Europe is downwind of industrial areas. This gives Europe a pH close to 4.5 and sometimes as low as 2.1 (equivalent to lemon juice).


NOx,SOx
Acid rain
Water

What are the results of acid rain?

- **Forests are withering**
- **Lakes are becoming uninhabitable to fish.**
- **Stone structures (such as buildings) and bronze statues are being damaged by corrosion.**

Mt. Harz, Germany

1970

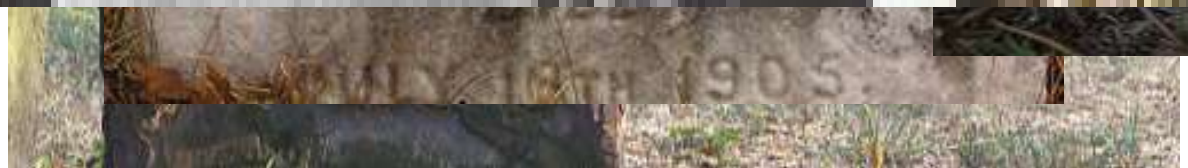
1985

Nitrogen oxides ("NOx"), which are converted into nitric acid, also contribute to acid rain.

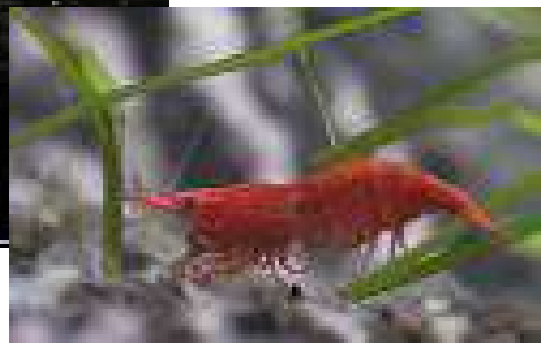
Automobile exhaust accounts for 50% or more of the nitrogen oxides in polluted air.

Forests in Germany

Adolph Hitler


MAY 16TH 1905.

- **Sensitive areas**
- There is solid evidence that lakes in certain "sensitive" areas of Europe have become more acidic in recent decades. Sensitive areas are downwind of major industrial areas and where the underlying rock is granite rather than limestone.



What can be done?

Reduce emissions:

- Burning fossil fuels is still one of the cheapest ways to produce electricity so people are now researching new ways to burn fuel which don't produce so much pollution..
- Sulfur can also be 'washed' out of smoke by spraying a mixture of water and powdered limestone into the smokestack.

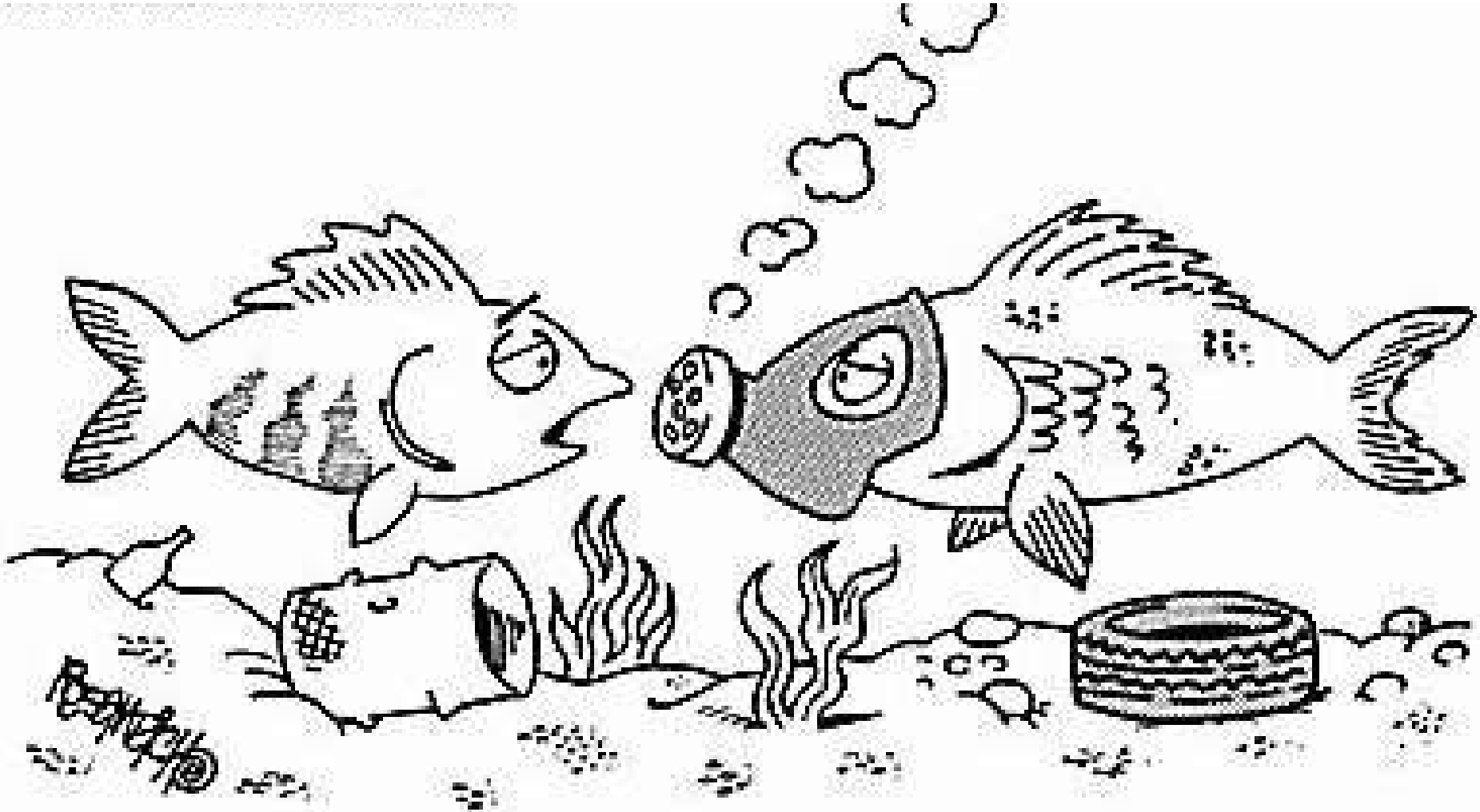
Find alternative sources of energy

- Two other sources that are currently used are hydroelectric and nuclear power. These are 'clean' as far as acid rain goes but what do they do to our environment?
- Other sources could be solar energy or windmills but how reliable would these be in places where it is not very windy or sunny?

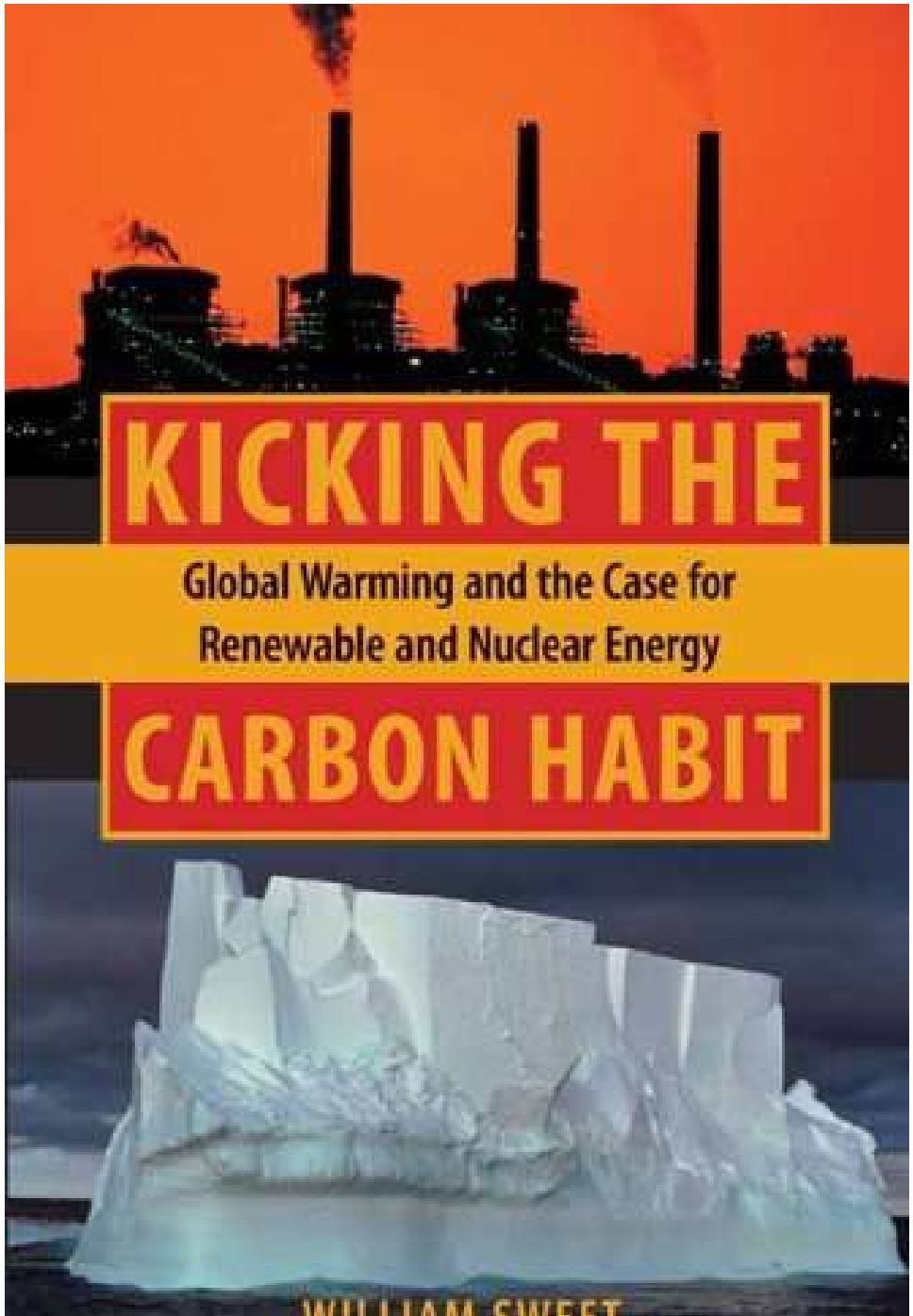
Conserving Resources

- public transport rather than always traveling by car.
- switching off lights when they are not being used
- energy-saving appliances - when less electricity is being used,
  pollution from power plants decreases.
- Walking, cycling and sharing cars all reduce the pollution from vehicles

- Restoring the Damage done by Acid Rain
- Lakes and rivers can have powdered limestone added to them to neutralize the water - this is called "liming". it is expensive and its effects are only temporary - it needs to be continued until the acid rain stops.
- The people of Norway and Sweden have successfully used liming to help restore lakes and streams in their countries. A major liming program is currently taking place in Wales.



"HEY WALLY, WHAT'S THIS ACID RAIN YOU KEEP TALKING ABOUT?"



Could Nuclear Power be the answer?

Tomorrow we will discuss Nuclear Power and the disaster at Chernobyl, Ukraine.

What is Nuclear Energy?

- ***Nuclear energy*** is energy that is generated through the use of Uranium, a natural metal that is mined all over the world. Nuclear energy is created through complex processes in nuclear power stations, it provides 16% of the Earth's energy requirements.

- Nuclear energy is created through chemical reactions that involve the splitting or merging of the atoms of nuclei together. The process of splitting an atom's nucleus is termed fission, and the process of merging the nuclei if atoms is termed merging.

- *Nuclear energy* is created in nuclear power stations, where uranium rods are the fuel used to create the energy or heat. The process through fission, where neutrons in the Uranium smash into the nucleus of atoms of Uranium. The Uranium nuclei will then split in half and release an energy that comes in a form of heat. At this point, carbon dioxide in gas form will be pumped into the reactors with the Uranium, removing the heat from the system. The gas turns very hot, and this heat is used to heat water into steam. The steam created from this process will drive the turbines which in turn drive the generators that produce the nuclear energy.

Creating nuclear energy is a complex chemical process that can be very dangerous. It does however have many advantages.

Nuclear energy is more affordable to create than coal energy, and does not use as much fuel in the process.

Produces less waste, and does not produce carbon dioxide or smoke.

These benefits mean that **nuclear energy** is more advantageous than coal energy.

The production of nuclear energy does not contribute to environmental hazards or the greenhouse effect.

Near Chattanooga, Tennessee

(Sequoia Nuclear Plant, Harrison Bay)

- April 27, 1986: The worst nuclear accident in history, the Chernobyl nuclear reactor over heated and blew up when its cooling system was turned off for repairs. Russia franticly worked to secure the reactor, performed health checks on their citizens, and attempted to clean the environment.


UKRAINE
BELARUS
POLAND
RUSSIA
MOLDOVA
ROMANIA
BLACK SEA
SEA OF AZOV
CRIMEA
Dnipro River
Kovel
Lutsk
Rivne
Chornobyl
Seredyna-Buda
Krolevets
Chernihiv
Lviv
Pochayiv
Zhytomyr
Kiev
Sumy
Uzhhorod
Ivano-Frankivsk
Khmelnytsky
Kharkiv
Cherkasy
Poltava
Kamyanets-Podilsky
Chernivtsi
Kremenchuk
Oleksandrija
Kirovohrad
Dnipropetrovsk
Luhansk
Zaporizhzhya
Donetsk
Mykolaiv
Odessa
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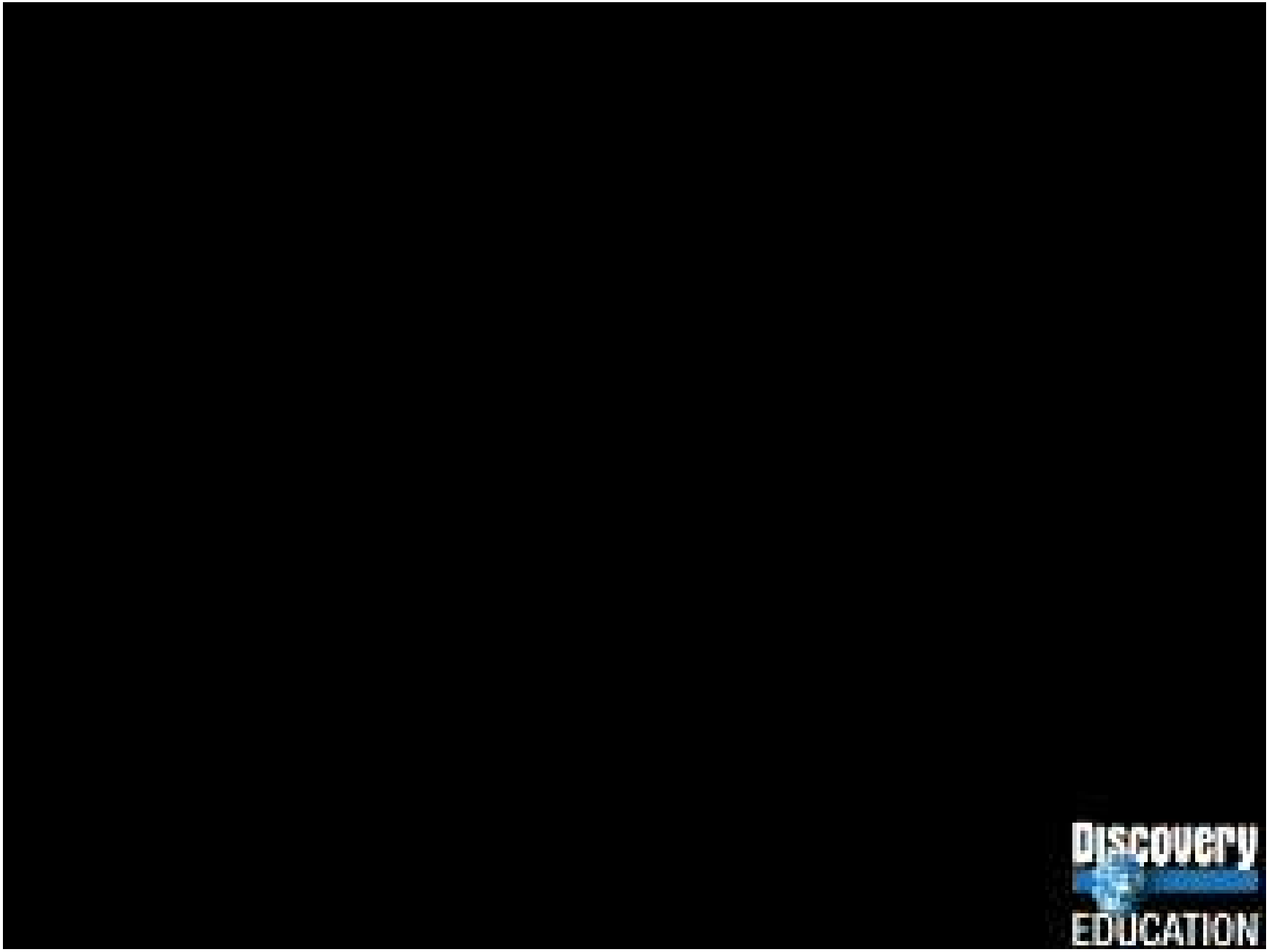
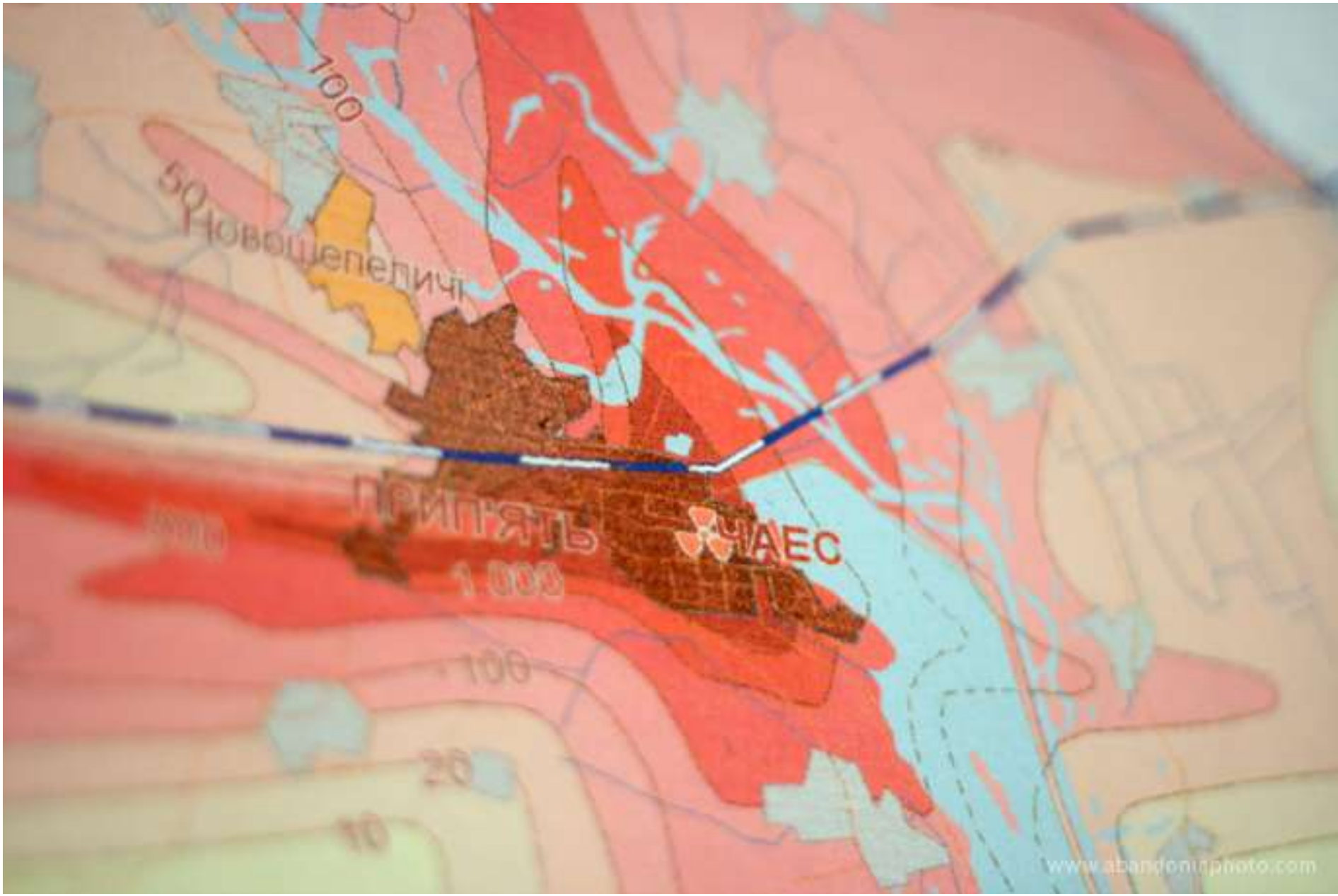
Sevastopol
Yalta
0 200 km
0 100 miles


Discovery
EDUCATION



This map shows the radiation levels of the area

This picture show was taken of the reactor prior to being sealed.

This monument is a remembrance of the people who died sealing the radiation leak.

These ships were abandoned after the Chernobyl disaster due to their high levels of radiation.

What happened: 190 tons of highly radioactive material were released into the atmosphere. The radioactive particles rained down not only on Chernobyl, but all over Ukraine, as well as the neighboring countries of Belarus and Russia, and drifted over to other European countries such as Poland. Scientists estimate that the amount of particles released was equivalent to the effect of 20 nuclear bombs. The Chernobyl accident remains the largest peacetime nuclear disaster ever.

Medical consequences

The massive radiation killed 31 people within a short time, mostly plant workers and people close to the accident site who died of radiation sickness. As time passed it became clear that the accident had left a number of serious long-term health problems for the people who lived in the area. These health problems were made worse by the poverty, poor nutrition, and lack of medical care in the region.

Thyroid cancer and the children

Most people around the world have forgotten the events of 1986. People in the area, however, are reminded of the nuclear accident whenever they look at their children and youth. The children are often behind in their growth, have poor dental health, immune disorders, and have a 10 times higher than normal rate of thyroid cancer.