**Specimen lesson Air Pollution BHAK Linz International Business**

1. **Warmer:**

What kinds of air pollution do you know?

What are the sources of this pollution?

Which effects does air pollution have on the human body?

Who might suffer most?

Where is air pollution probably most serious?

**Remedies:**

Give suggestions about what can be done to limit air pollution!

1. Legal aspects:
2. Technical aspects
3. **A short view of the developments in Linz, a typical industrial town**

1938: Beginning of erection of steel works (Hermann Göring Werke) near the town centre.

At the same time erection of a chemical company nearby

Blast furnaces cause a lot of pollution in Linz

After the second world war steaming chimneys are considered a sign of wealth – nobody bothers about pollution

With the growing traffic exhaust fumes the situation deteriorates more and more – Smog alarm

In the 80s industrial plants are outdated and would need replacement. However, there is an economic crisis, the plants are state-owned, and the state does not want to sack the people.

In the 1980s a citizens´ initiative forms and demands the closure of certain plants and the modernisation of others. There is heavy resistance against that from the population, from politicians and from the plant owners.

Finally a new generation of politicians comes to power in Linz that wants to clean up the mess, has a concept of changing the image of the town from industrial city to a city of culture. Members of the Citizens´ Initiative are invited to take part in talks about changes.

The Steel Works are partly privatised and new investments guarantee a modernisation. The amount of workers drops considerably, but the industry recovers and invests heavily in research and development and is now doing quite well.

In Linz the main source of air pollution is not industry any longer, but traffic.

To sum up: What lead to the clean up:

Modernisation of plants, pressure by citizens and the political will to clean up the industry.

1. **What are problems in connection with air pollution in your town and how could these be solved?**

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1. **Pertinent Information about Air pollution from the National Geographic website**

**AIR POLLUTION**

**Smog** hanging over cities is the most familiar and obvious form of air pollution. But there are different kinds of pollution—some visible, some invisible—that contribute to global warming. Generally any substance that people introduce into the atmosphere that has damaging effects on living things and the environment is considered air pollution.

Carbon dioxide, a greenhouse gas, is the main pollutant that is warming Earth. Though living things emit carbon dioxide when they breathe, carbon dioxide is widely considered to be a pollutant when associated with cars, planes, power plants, and other human activities that involve the burning of fossil fuels such as gasoline and natural gas. In the past 150 years, such activities have pumped enough carbon dioxide into the atmosphere to raise its levels higher than they have been for hundreds of thousands of years.

Other greenhouse gases include methane—which comes from such sources as swamps and gas emitted by livestock—and chlorofluorocarbons (CFCs), which were used in refrigerants and aerosol propellants until they were banned because of their deteriorating effect on Earth's ozone layer.

Another pollutant associated with climate change is sulfur dioxide, a component of smog. Sulfur dioxide and closely related chemicals are known primarily as a cause of acid rain. But they also reflect light when released in the atmosphere, which keeps sunlight out and causes Earth to cool. Volcanic eruptions can spew massive amounts of sulfur dioxide into the atmosphere, sometimes causing cooling that lasts for years. In fact, volcanoes used to be the main source of atmospheric sulfur dioxide; today people are.

Industrialized countries have worked to reduce levels of sulfur dioxide, smog, and smoke in order to improve people's health. But a result, not predicted until recently, is that the lower sulfur dioxide levels may actually make global warming worse. Just as sulfur dioxide from volcanoes can cool the planet by blocking sunlight, cutting the amount of the compound in the atmosphere lets more sunlight through, warming the Earth. This effect is exaggerated when elevated levels of other greenhouse gases in the atmosphere trap the additional heat.

Most people agree that to curb global warming, a variety of measures need to be taken. On a personal level, driving and flying less, recycling, and conservation reduces a person’s "carbon footprint"—the amount of carbon dioxide a person is responsible for putting into the atmosphere.

On a larger scale, governments are taking measures to limit emissions of carbon dioxide and other greenhouse gases. One way is through the Kyoto Protocol, an agreement between countries that they will cut back on carbon dioxide emissions. Another method is to put taxes on carbon emissions or higher taxes on gasoline, so that people and companies will have greater incentives to conserve energy and pollute less.

**Quiz: What You Don’t Know About Greenhouse Gases**

Question: 12345678910

Emissions from manufacturing in Toronto (Credit: Kibae Park/United Nations)

UN climate talks often focus on “carbon” pollution as they set guidelines to curb global warming. Yet carbon dioxide, emitted through the burning of fossil fuels, is not the only greenhouse gas that contributes to human-made climate change. So how much do you really know about these gases?

Quiz by Wendy Koch

1. True or False: The extent that a greenhouse gas warms the Earth depends on the length of time it remains in the atmosphere and its ability to absorb energy.

* True
* False

1. Which greenhouse gas has the highest global warming potential?

* Carbon dioxide
* Methane
* Nitrous oxide
* Sulfur hexafluoride

1. What is the largest source of U.S. greenhouse gas emissions?

* Agriculture
* Transportation
* Electricity production
* Home heating

1. Energy-related CO2 accounts for approximately what share of total U.S. human-made greenhouse gases?

* 20 percent
* 40 percent
* 60 percent
* 80 percent

1. After CO2, which greenhouse gas accounts for the next largest share?

* Sulfur dioxide
* Methane
* Nitrous oxide
* Hydrofluorocarbons

1. How long does methane stay in the atmosphere?

* 1 month
* 1 year
* 6 years
* 12 years

1. True or false: Water vapor is a greenhouse gas.

* True
* False

1. What can remove carbon dioxide from the atmosphere?

* Vegetation
* Oceans
* Carbon capture equipment
* All of the above

1. The United States and other countries are trying to stop the rising emissions of hydrofluorocarbons. Where are HFCs most commonly used?

* Boats
* Food
* Refrigerators
* Books

1. U.S. carbon emissions rose slightly in 2014 for the second consecutive year after declining for several years. What’s the biggest reason for this uptick?

* Increased use of natural gas
* Economic growth
* Slowdown in decline in coal
* Decreased production of nuclear power

<http://environment.nationalgeographic.com/energy/great-energy-challenge/greenhouse-gas-quiz/>

SOLUTION

1. **Correct Answer:** True

True. Scientists use these factors to [calculate a gas’s global warming potential](http://www.epa.gov/climate/climatechange/science/indicators/ghg/index.html), which measures how much heat it absorbs per pound.

1. **Correct Answer:** Sulfur hexafluoride

[This fluorinated gas](http://www.epa.gov/climate/climatechange/science/indicators/ghg/index.html) absorbs the most heat over a hundred-year period. Its global warming potential is 23,500, compared to 28 for methane and 1 for carbon dioxide.

1. [Electricity production accounted for 31 percent](http://www.epa.gov/climatechange/ghgemissions/sources.html) of U.S. greenhouse gas emissions in 2013, followed by transportation at 27 percent.
2. These emissions—mostly from burning coal, oil, and natural gas—[accounted for 82 percent](http://www.epa.gov/climatechange/ghgemissions/gases.html) of all U.S. greenhouse gases in 2013.
3. Methane—emitted from landfills, coal mines, oil/gas operations, and agricultural livestock—[accounted for 10 percent](http://www.epa.gov/climatechange/ghgemissions/gases.html) of U.S. greenhouse gas emissions.
4. On average, methane lingers in the atmosphere for 12 years, while CO2 can remain for thousands of years.
5. True. It’s one of the naturally occurring gases, along with carbon dioxide, methane, and nitrous oxide. [Others are synthetic,](https://www.ncdc.noaa.gov/monitoring-references/faq/greenhouse-gases.php) including chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
6. All of the above -[Vegetation and the oceans absorb](http://www.eia.gov/oiaf/1605/ggccebro/chapter1.html) some—but not all—CO2 emissions. Power plants can use carbon capture and sequestration technology to reduce emissions.
7. HFCs are coolants used in air conditioners and refrigerators that have a high global warming potential of about 10,000. (Learn more about [how your fridge is changing](http://news.nationalgeographic.com/news/energy/2015/03/150306-why-your-fridge-pollutes-and-how-its-changing/) as a result.)
8. Economic growth was the biggest reason, though coal’s slowing decline was a lesser contributor. Natural gas emits half as much CO2 as coal when burned, so it lowers emissions when used instead of coal. Generation of nuclear power, which emits almost no CO2, increased slightly in the last two years.
9. True,2) Sulfur hexafluoride

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