



**Acid Rain**  
**in**  
**Germany**

# Acid Rain

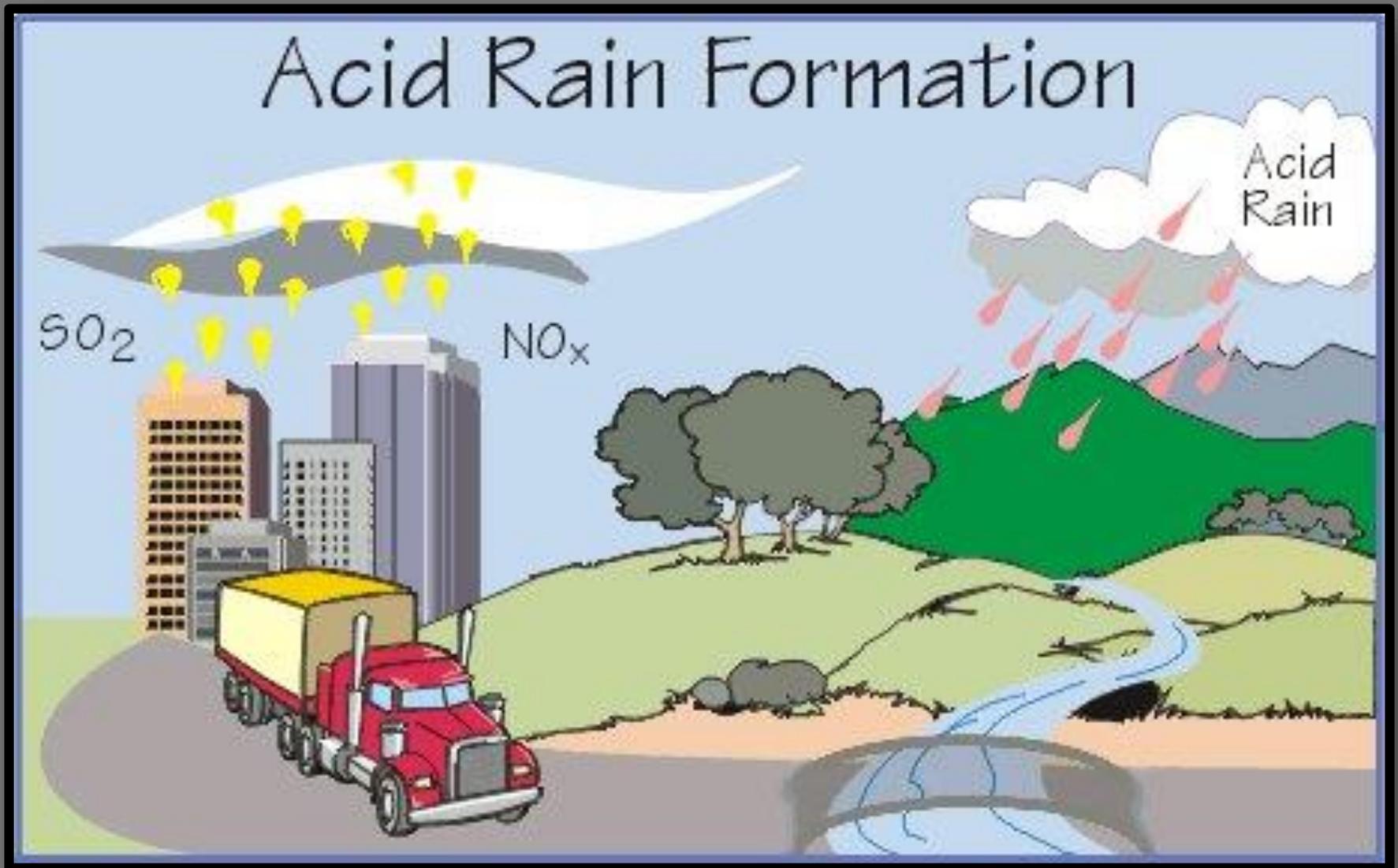
- Over the past 30 years, acid rain has been damaging Germany.
- It contaminates soil, kills trees, eats holes in the surfaces of buildings & statues, pollutes rivers, and harms wildlife.



# What is Acid Rain?

- Acid rain is a result of air pollution.
- When any type of fuel is burned, a lot of different chemicals are produced and released into the air.
- The chemicals mix with water in the clouds and come down with rain.

# Acid Rain Formation



# What is Acid Rain?

- The rain that falls has weak levels of acid mixed in.
- It's not acidic enough to burn your skin, but it is very harmful for the environment.



Left Branch shows needle loss and discoloration due to acid rain.

# Causes

- The main source of acid rain is smoke from factories (burning fuels like natural gas, coal, & oil).
- Cars and buses also produce harmful gases.

# Effects

- Acid rain can effect trees in several different ways.
- It dissolves & washes away the nutrients and minerals in the soil.
- It also causes the release of harmful substances such as aluminum into the soil.

# Black Forest

- Acid rain has destroyed nearly half of the Black Forest in Germany!
- This has really harmed Germany's economy because one of its major natural resources is timber.



# Effects

- Acid rain causes the water in rivers and lakes to become more acidic.
  - Fish and other animals that live in these waters are dying, as well as the animals that drink from these waters.
- It also causes people to face harmful health hazards because the rain contaminates the drinking water in fresh water reservoirs.

# Effects

- Nitrogen and sulfur in acid rain are eating away at many of Germany's landmarks, causing buildings and artwork to deteriorate.
- Concrete, metals, limestone, and marble are all susceptible to acid rain, and many of Germany's cultural objects that are hundreds of years old are slowly corroding away.

# Acid Rain Can Cause Erosion in Stone Statues & Buildings



# Germany's Solution

- In Germany, power plants that use water power are replacing many coal-burning factories.
- They are developing new types of energy, such as wind turbines and solar power.
- Germany's government has passed laws to reduce emissions from cars and factories.



# Air Pollution in the United Kingdom

# Air Pollution

- Many of the world's largest and most industrialized countries are in Europe.
  - Paris, London, Berlin, Rome, Amsterdam
- These cities tend to have a lot of factories, a lot of traffic, and produce a lot of air pollution.
- A country that has been greatly effected by this problem is the UK.



# UK's Air Pollution

- London, the capital of UK, is famous for air pollution.
- The word “smog” was first used in 1905 to describe air in London (thick fog + smoke).
- Thick London smog happens when sunlight acts on the gases from factory or automobile exhausts, or when water in the air mixes with smoke particles.



# Causes

- In the past, the major source of air pollution was smoke from burning coal in factories.
- The air quality in the UK began diminishing due to the smoke and air pollutants emitted from the burning coal.



# Causes

- Today, exhaust from automobiles is the big problem.
- Emissions from automobiles contain carbon monoxide and nitrous oxide, which stay close to the ground and contribute to low-lying smog.



# Effects

- Asthma and pneumonia are linked to vehicle emissions.
- Air pollution burns the lungs, nose, and eyes, and endangers human life.
- When air pollution levels are high, children, sick people, and the elderly have to stay inside to avoid breathing the hazardous air.



# Effects

- Air pollution also harms vegetation.
- Vegetation exposed to polluted air for long periods of time grows more slowly and is more susceptible to disease and insects.
- This causes a major decrease in crop production.

# UK's Solution

- Starting in the 1950s, UK's government has created smokeless zones in London where only smokeless fuels could be used.
- Electricity has also been used more in factories and homes.
- Laws have been created that require automobile makers to build cars that produce less exhaust.
- People have been asked to drive less and are encouraged to use public transportation or walk.



**What is Europe  
doing to fix  
these problems?**

# Environmental Policies

- In Western Europe, nations are trying to lessen pollution.
  - They are spending money and researching new ways to produce power that cause less environmental damage.
- In Eastern Europe, few nations are researching new technologies.
  - They have less money.

# European Union

- Most countries in Europe are members of a group called the European Union.
- Since its formation in 1993, the EU has passed policies designed to fight acid rain, improve air quality, restrict toxic waste, and reduce pollution.



**Nuclear  
Disaster  
in  
Chernobyl,  
Ukraine**



# Nuclear Power

- Between 1922 and 1991, Ukraine was part of the Soviet Union and was known for its fertile farmland and successful agricultural industry.
- During the 1980s, many countries in Europe began using nuclear power plants to produce cleaner and cheaper energy in order to rely less on fossil fuels.

# Nuclear Power

- Many European countries had strict regulations on nuclear power use; however, Ukraine did not.
- Chernobyl was a growing city in Ukraine, and it was home to the largest nuclear power plant in Europe.
- Unlike other nuclear power plants, Chernobyl was used to produce nuclear weapons material.

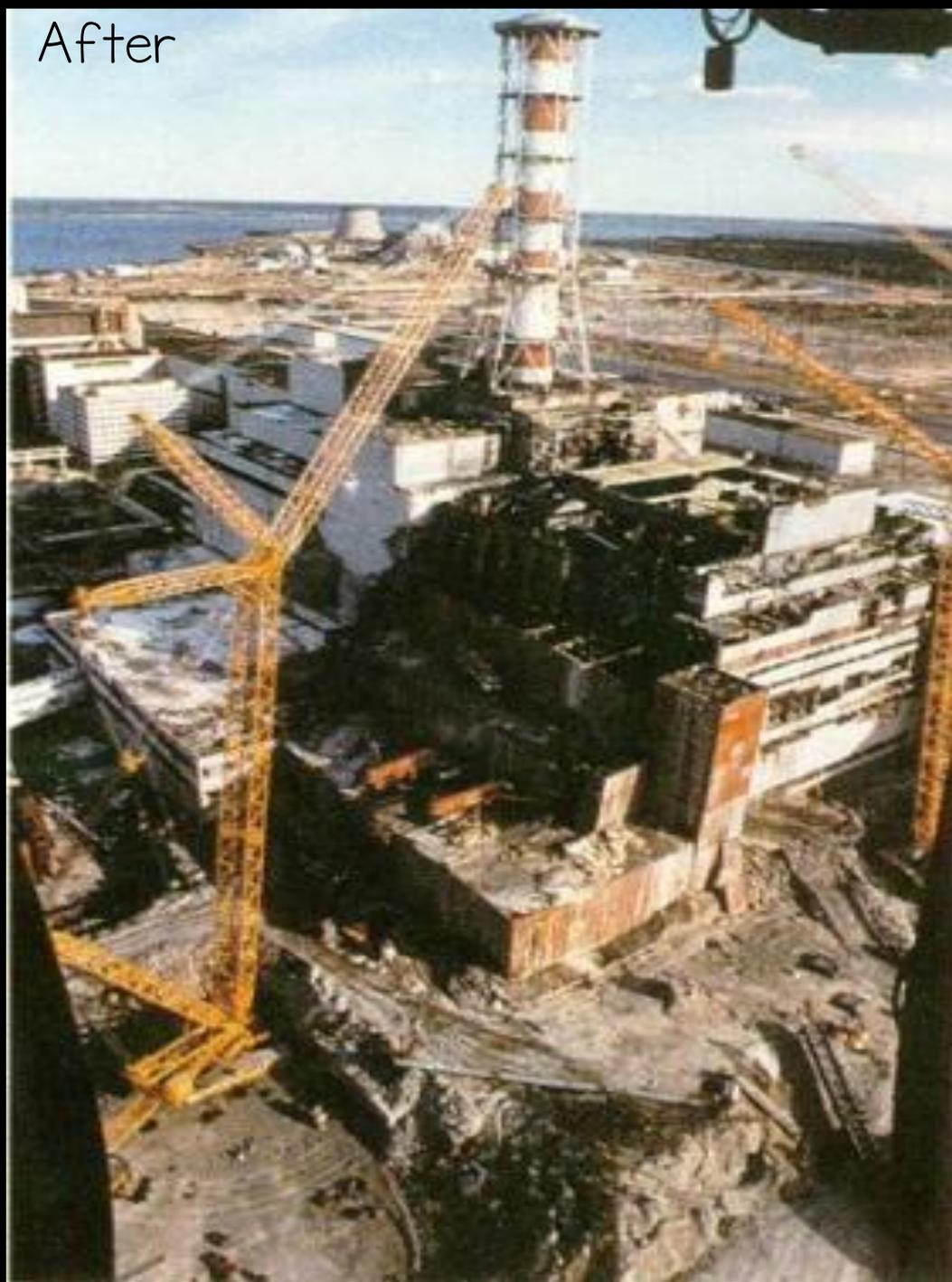
# Chernobyl

- In 1986, the Soviet Union generated 10% of the world's nuclear power.
- On April 26, 1986, one of the reactors at the Chernobyl nuclear power plant exploded.
- The explosion released large amounts of deadly radioactive nuclear material into the atmosphere.

Before...



After



# Soviet Reaction

- The morning after the explosion, there was no hint of a disaster.
- After 36 hours of being exposed to radiation, the people were finally told to pack their clothing and evacuate their homes.
- There was a 18 mile evacuation zone.

# Worldwide Impact

- Nearly nine tons of radioactive material (90 times as much as the Hiroshima bomb) was hurled into the sky.
- Over the following days, winds mostly blowing north and west, carried fallout into Belarus, as well as Russia, Poland, & other countries around the world.



# Effects

- In the first months after the accident, 28 emergency workers died from acute radiation syndrome.
  - Doctors have noticed an increase in cases of cancer who lived nearby.
- Many animals died or got sick.
  - Fish in nearby rivers were unsafe to eat for many years.
- Millions of acres of farmland have been poisoned.

# Radiation Suits Worn By Workers



**Waterford Salt Works, Birk, Hebrides, Leggings**  
Effective as of 1983  
It was used as a counter suit for the big bang  
It provided protection against water, heat and some  
chemical substances. In particular, it was used in 1986  
by the big bang of Chernobyl NPP and at Puysegur Gap  
during the accident at Chernobyl NPP

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# Effects

- The people exposed to the high levels of radiation developed a high level of health problems, including thyroid cancer, autoimmune disorders, birth defects, and other health issues.



# Chernobyl Today

- Chernobyl continued to produce electricity for another 14 years, until international pressure forced its closure in 2000.
- An official exclusion zone around the plant remains in place, extending for 18 miles.
- It is one of the most radioactive spots on Earth.

# Chernobyl Today...A Ghost Town



# Chernobyl Today

- In 2011, Ukraine opened up an area so tourists can see first-hand the effects of the disaster.
- Forests surrounding the city have repopulated with a variety of wildlife and vegetation.
- Radiation levels are still so high that humans cannot live here for 20,000 years!



Amusement Park

# Hospital (Baby Room)



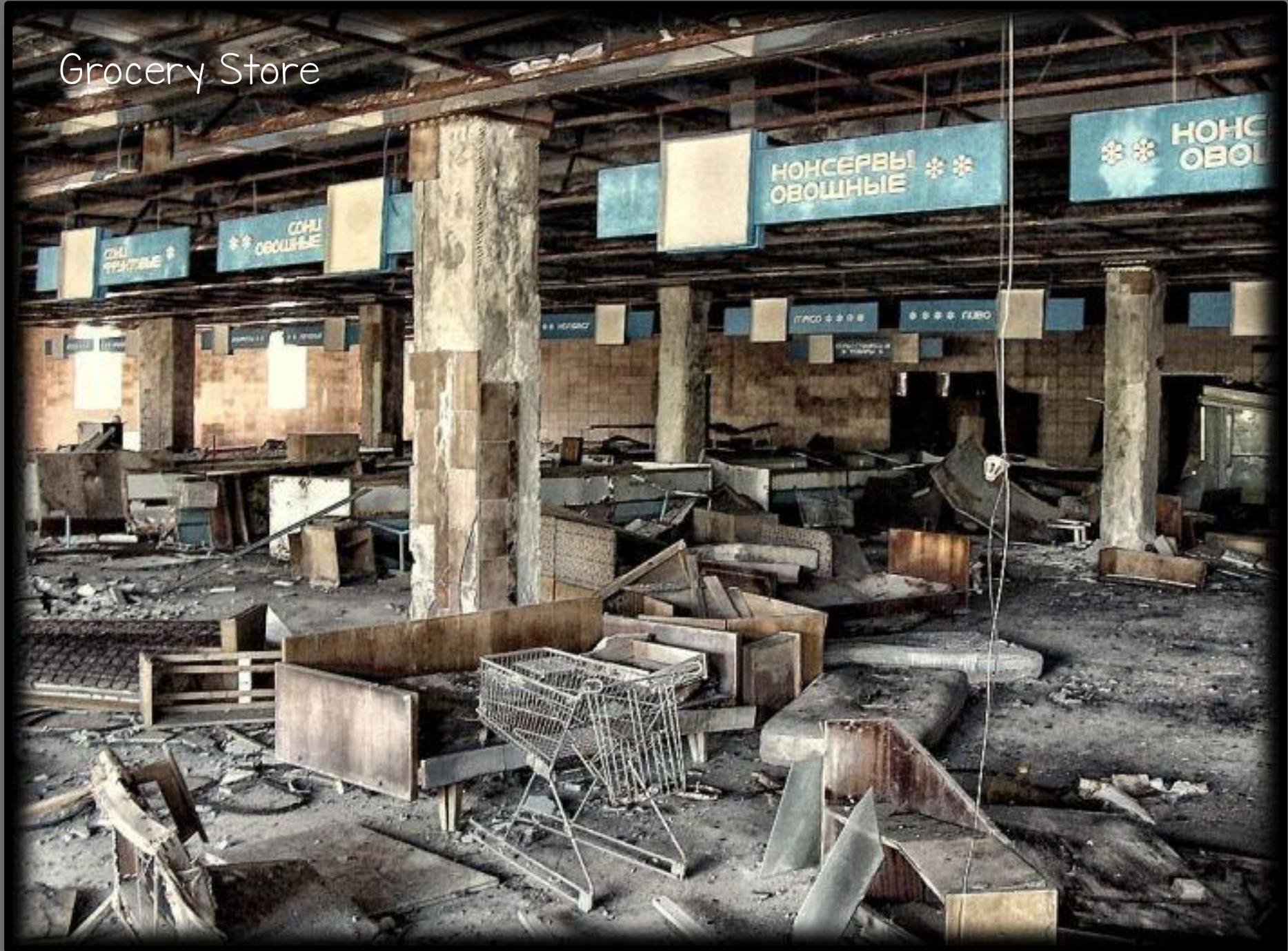
# School Classroom



# School Classroom



# Grocery Store



НОНС  
ОВОЛ

НОНСЕРВЫ! \* \*  
ОВОШНЫЕ

СОМ  
ОВОШНЫЕ

СОМ  
ОВОШНЫЕ

ПРИСО \* \* \* \*

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