

Activity C:

The Chernobyl Disaster

Teacher's Briefing

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Map cards

A3 map

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Activity C:

The Chernobyl Disaster: Activity overview

Concepts to examine

Nuclear accidents, the effects of radiation on humans, the effects of radiation on the environment.

Materials and space needed

Tables for pair/small group work, A3 maps of Europe (if you do not have access to a colour photocopier, then further copies of the map are available).

Learning outcomes

By the end of the lesson:

All students should be able to identify what sort of power station exploded and name an effect.

Most students will be able to name some of the effects and match them to the country where they occurred.

Some students will be able to compare the disaster to other nuclear explosions and discuss the similarities and differences.

Overview

- In pairs or small groups, students match up the cards of information about the effects of the nuclear fallout from Chernobyl and discuss its effects.

Instructions

- Split the students into pairs or small groups and provide each group with a copy of the map of Europe.
- Instruct the students to match the cards detailing the effects to the corresponding countries on the map.
- In their pairs or small groups, ask the students to write down the countries in distance order from the disaster. For each country, students should also list one effect the radiation had on that area.
- Go around the class asking groups in turn to feed back a country (and one effect) in distance order.

Plenary

To discuss:

- Imagine that you and your family had to leave your town at short notice due to a nuclear disaster. What single item would you take with you? How would you feel?
- Why do you think that older people have returned to Pripjat, despite the high danger of getting ill?
- The Chernobyl disaster is an example of how catastrophic the release of radiation can be from a nuclear disaster. What other causes of nuclear disasters can you think of?
- Do you think a disaster like Chernobyl could happen in Britain today?

Activity C:

The Chernobyl Disaster: Further information

Where is Chernobyl?

Chernobyl is about 1,500 miles from Britain, 60 miles north of Kiev, capital of Ukraine in eastern Europe. Now an independent country, in 1986 Ukraine was part of the Soviet Union. Just to the north is the international border with Belarus, then also part of the Soviet Union. Belarus was to be the country worst affected by the disaster. The nuclear power station was Soviet designed and built.

What caused the Chernobyl Disaster?

In the early morning of 26 April 1986, one of the four reactors at the Chernobyl nuclear power station ran out of control while engineers were running safety tests. Within four seconds, a power surge of 100 times normal output led to a violent explosion and fire. The 1,000 tonne concrete top of the reactor building was blown off and huge chunks of blazing, radioactive material were blasted into the air like a volcanic explosion. The reactor burned furiously and highly radioactive debris was scattered around and inside the reactor building. The reactor burned for a week, spewing out radiation, and was eventually put out by helicopters dumping tonnes of sand, and firefighters and site workers fighting the blaze. Hundreds of thousands of people, many of them soldiers, were drafted in to clean up the site. They had very little in the way of protective clothing and were only allowed into the reactor building for 90 seconds at a time. They were called the 'liquidators'.

The clean-up work continued for two years as the entire reactor building was sealed in a huge concrete tomb-like structure known as the Sarcophagus.

What radioactive elements were released?

Different radioactive elements remain

dangerous for varying lengths of time depending on their half-life. For example: radioactive iodine-131 has a half-life of 8 days, caesium-137 over 30 years and plutonium 24,000 years. A wide range of radioactive elements were thrown out by the explosion and fire.

All radioactive materials are carcinogenic – that is they can lead to cancer in people and animals. Different radioactive materials are likely to affect different parts of the body. Iodine-131, for instance, attacks the thyroid gland, particularly in babies and young children.

What happened to those nearby?

Direct casualties of the explosion were rushed off to hospitals as far away as Moscow. Then it became clear that because of the intense radioactive fallout, all the surrounding population would have to be evacuated. Police surrounded Pripyat, the nearest town (2.5km away), set up road blocks and prepared to deal with any panic.

On Sunday 27 April, at 1.50pm, local radio announced the start of a mass evacuation. At 2pm, 1,100 buses began to pick up the 40,000 residents. Almost all belongings had to be left behind. Sunday lunches were left on tables, pets and livestock abandoned. By 4.20pm the town was empty. On 3 May, the total evacuation zone had to be extended to a 30km radius. In early June another 35,000 people had to be moved as more highly radioactive spots further away were discovered. In all, more than 110,000 men, women and children were evacuated. This area, officially called the exclusion zone and known locally as the Dead Zone, is still more than three decades later, empty – except for a few hundred elderly people who have returned to their land. Pripyat is a ghost town.

Illnesses and deaths

Immediately after the accident about 30 people died but this was just the beginning of the deaths and illnesses. Although it is impossible to say with certainty that a particular cancer has a particular cause, statistics imply that the accident at Chernobyl has had a catastrophic effect on the populations of nearby areas. According to the United Nations Committee on the effects of Atomic Radiation:

Among the residents of Belarus, the Russian Federation and Ukraine, there had been up to the year 2002 about 4,000 cases of thyroid cancer reported in children and adolescents who were exposed at the time of the accident, and more cases can be expected during the next decades. Notwithstanding problems associated with screening, many of those cancers were most likely caused by radiation exposures shortly after the accident. (UNSCEAR, 2007)

Other reports predict deaths from related cancers to be in their thousands. As scientists and medical experts learn more about the long-term effects of radiation exposure, estimates of the numbers who will die as a result of the disaster increase. The World Health Organisation expects to see a steep rise in the number of cancers over the next 30 years among the local population (including up to 40% of the children) and the liquidators.

Chernobyl today

In November 2016 the Chernobyl plant was covered in steel to make it safer. 95% of the radioactive material is still within the plant, and storage facilities are also being built for the radioactive waste. People today suffer ill health, with medicines difficult to come by, and they are also angry and grieving. Many feel angry about the disruption to their lives.

Question sheet

The Chernobyl Nuclear Disaster

Visit: bit.ly/1beSWTR

What happened?

1. What date(s) did the reactor begin to fail?
2. What happened when the reactor exploded?
3. What was released that was so dangerous?

Visit: bit.ly/15CdztC

4. How many people were evacuated?

Visit: bit.ly/i4HCDm

The Liquidators

5. Who were the liquidators?
6. Look at the photos –
Which one stands out to you?
Why?

Visit: bit.ly/1beTPvy

The Ghost Town

7. Look at the 12 pictures of the abandoned town of Pripyat –
Which one stands out to you?
Why?

Visit: bbc.in/1a9dUDA (Note, this page is from 2006)

The Children of Chernobyl

8. Why do Keisha's family and others host children from Belarus?

<p>Russia – borders to the East of Ukraine</p> <p>Russia is about 150km from the power plant and was also heavily affected. The ground was contaminated as the wind blew radioactive dust over areas of the country. People here also contracted thyroid cancer and many children are still ill from the effects. It is estimated that in Belarus, Ukraine and Russia alone more than 200,000 people have died from the effects of the Chernobyl disaster.</p>	<p>United Kingdom – to the West</p> <p>The worst affected British areas were hill farms in Cumbria, North Wales and South West Scotland. People in these areas were warned not to drink rainwater.</p> <p>Until 2012, there were sheep farms in Wales (2,250km from the plant!) that were specially monitored and some sheep could not be used for humans to eat.</p>	<p>Germany – to the West</p> <p>Germany was affected by radiation too despite being 1,050km away from the Chernobyl plant.</p> <p>There were food scares as some areas received a lot of radiation. Also more children were born with disabilities and illnesses and studies have linked this to the disaster.</p>	<p>Belarus – on the North Border with Ukraine</p> <p>Belarus is a country just 13km North of the power plant. It was heavily affected by the radiation.</p> <p>Children were particularly affected and were 100 times more likely to develop thyroid cancer than before the accident.</p>	<p>The Chernobyl nuclear power station, Ukraine</p> <p>An explosion in the plant happened when there was a power surge and there was not enough water to cool down the reactors. The top blew off like a volcano and released lots of radiation</p> <p>The people sent in to battle the flames were called 'liquidators'. The radiation made them ill and many died. Their children have also been born with illnesses.</p>
<p>Portugal – to the South West</p> <p>Despite being 3,000km away, areas of Portugal contained traces of radiation.</p> <p>Spain also received some radiation. However, these countries received less than many others in Europe did.</p>	<p>Poland – borders to the West of Ukraine</p> <p>Poland is about 400km away from the explosion. However, it still received quite high levels of radiation. Many more stillbirths and babies dying shortly after birth were recorded after the disaster. Many other countries surrounding Ukraine were also affected. For instance some studies have shown Romania had an increase in childhood leukaemia.</p>	<p>Scandinavia – to the North</p> <p>It was radiation on clothes of Swedish nuclear power plant workers 1,200km away that first alerted the world to the disaster. The Swedish plant first thought they had experienced a leak, but found no problems.</p> <p>The radiation was carried to Norway and Finland where studies have claimed it affected the reindeer which the Lapp people rely on for food and clothes. Fish were also thought to be contaminated.</p>	<p>The 'Dead Zone' – covering Ukraine and Belarus</p> <p>There was a zone of 30km around the plant that was evacuated and today it is known as the 'dead zone'. 110,000 people were evacuated in all. Even more families left voluntarily.</p> <p>Vegetables and animals were contaminated by radioactive rain. It is still unsafe to spend much time in the zone today.</p>	<p>Pripyat and Chernobyl, Ukraine</p> <p>Closest towns to the power station. Pripyat (approx. 3km away) was where the workers mainly lived. 40,000 people were evacuated from the town, leaving all their things. Even lunches were left on the tables.</p> <p>It is still too radioactive to live there safely today, but some older people have returned. Besides them, it is like a 'ghost town'.</p>