

## SS6G9

The student will discuss  
environmental issues in Europe

- a. Explain the major concerns of Europeans regarding the issues such as acid rain in Germany, air pollution in the United Kingdom, and the nuclear disaster in Chernobyl, Ukraine.

# Student will be able to:

- Explain the impact of acid rain, air pollution and the Chernobyl Nuclear Disaster on the economies and population of Europe.

# Europe's Environmental Issues: SS6G9

| What is it?      | Causes | Affects on the Environment | Affects to the people | Solutions to the problem | Real Historical Examples |
|------------------|--------|----------------------------|-----------------------|--------------------------|--------------------------|
| Air Pollution    |        |                            |                       |                          |                          |
| Acid Rain        |        |                            |                       |                          |                          |
| Nuclear Disaster |        |                            |                       |                          |                          |

# Comp Book:

## Describe this picture.



# Smog in the UK: SS6G9

- What Causes Smog? (3 min) news report on Youtube:

[http://www.youtube.com/watch?v=JVcFps\\_gWpk](http://www.youtube.com/watch?v=JVcFps_gWpk)

- [BBC Remembers \(3 min\)](http://www.bbc.com/news/uk-england-london-20615186)

<http://www.bbc.com/news/uk-england-london-20615186>

- 13 min Documentary on youtube:

<http://www.youtube.com/watch?v=Vkx-2mT1-q4>

- Primary Source Pictures (use OPTICS to analyze):

<http://www.theguardian.com/environment/gallery/2012/dec/05/60-years-great-smog-london-in-pictures>

# Air Pollution in the United Kingdom

- What are the primary causes of air pollution in the U.K.?

Power stations

Vehicle exhaust

Fossil Fuels Burning (Coal, Diesel gas,...etc.)

$NO_x$  + warm weather + trapped air (w/ out breeze)  
+ Dense Population  
factories 1950s  
+ homes cars

- What effects does air pollution have on the environment of the U.K. and that of neighboring countries?

Damage to crops & animals (\$ loss)

Harm to the atmosphere (

Harm to humans

Unsafe conditions to do any activities

# London-Type Smog

- occurs when moisture condenses with smoke produced by the burning of coal
- forms smog droplets
- sulfur dioxide is in air in London--attacks the lungs and makes breathing difficult (called *sulfur smog*)

# Examples of Air Pollution in the 1952 U.K.

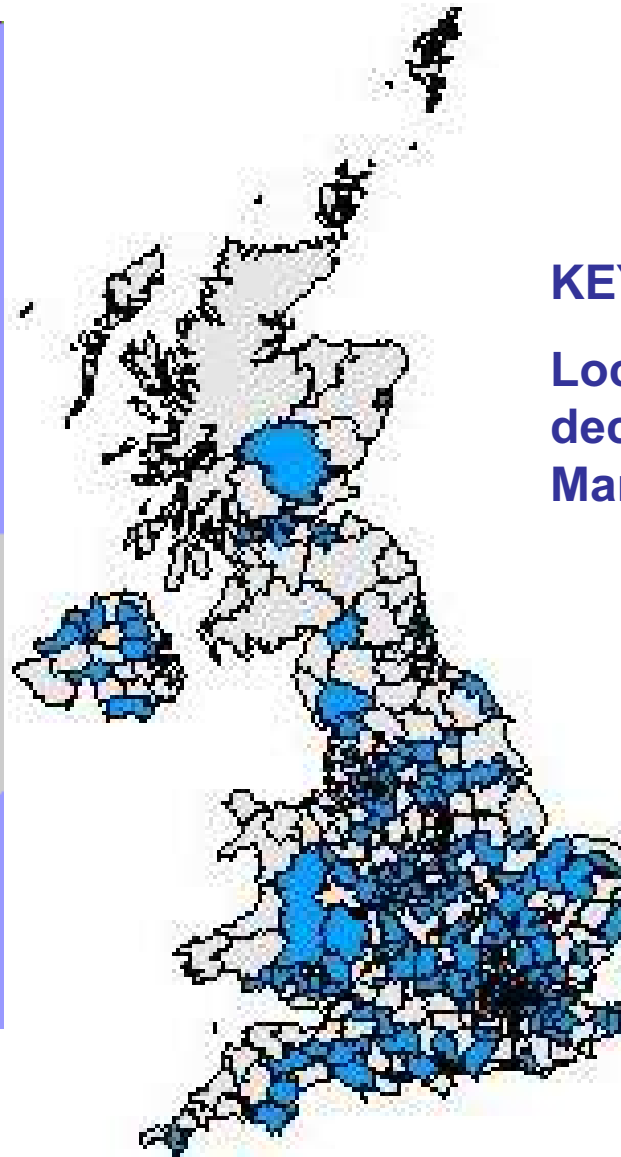


# Air pollution in the United Kingdom

The Industrial Revolution began in Great Britain.



Clean up has been expensive



KEY (blue)

Local Authority has  
declared an Air Quality  
Management Area

Years of  
unregulated  
factory waste  
has caused  
pollution in the  
water and air.

# How do these major environmental issues effect the economies and population of Europe TODAY?

## Air Pollution

- Respiratory disease= greater healthcare costs.
- Creates acid rain in the U.K .and other European countries.
- Damage to fish stocks and forests have great economic impact to local economy and international trade.
- Damage to buildings resulting in money having to be spent to renovate = \$\$\$
- Closure of many factories resulting in loss wages.
- Money has to be spent on improving public transportation to reduce number of vehicles on road therefore reducing emissions...
  - Public Transportation = \$\$\$

# Europe's Environmental Issues: SS6G9

| What is it?  | Causes  | Affects on the Environment  | Affects to the people  | Solutions to the problem   | Real Historical Examples  |
|--|---|---|--|--|---|
| <b>Air Pollution</b><br>Creates smog when it is concentrated<br><br>-Exhaust + NoX + Sunshine = Smog | -- Vehicle & power plant & factory <u>exhaust</u><br>- <u>Coal</u><br>-- <u>Dense population (city)</u> - 8mill. Ppl. In London<br><br>-- <u>trapped air (buildings)</u><br><br>-- <u>over production (Industrial Revolution)</u> | -seeps in everywhere<br><br>-greatly <u>harms plants and animals</u> (food supply)<br><br>- <u>dense smog blanket over city</u> | - <u>deaths &amp; respiratory diseases</u> (lungs)<br><br>- <u>Blackout</u> (can't see)<br><br>- <u>closed business = no work</u><br><br>- <u>HUGE \$ loss</u> | -Emissions<br><br>-Recycling<br><br>-Clean energy<br><br>-Carpooling<br><br>-Less production (PM)<br><br>-laws | Dec. 1952→ Great London Smog (U.K.)<br><br>-- <u>3,000 + deaths</u><br><br>-- <u>Loss of \$\$</u><br><br>-- Very cold then the weather changed quickly trapping the smog in for days. |

# SS6G9: Acid Rain in Germany

- Obertopia Video explaining how air pollution creates acid rain: <http://www.youtube.com/watch?v=m2ryRDgCgCs>
- How does Acid Rain affect plants?  
<http://www.youtube.com/watch?v=RValqMHlmsg>
- Informative Websites on Acid Rain
  - Generally with diagrams and reasons:  
<http://ga.water.usgs.gov/edu/acidrain.html>
  - in Germany: <http://acidraingermany.webs.com/>
- Prezi on Acid Rain in Germany:  
<http://prezi.com/d2dt9779sjbx/acid-rain-in-germany/>

## 9/4 Opening:

Write a caption that explains each of these pictures (separately). Write what **YOU THINK** is happening here & why.



1



2

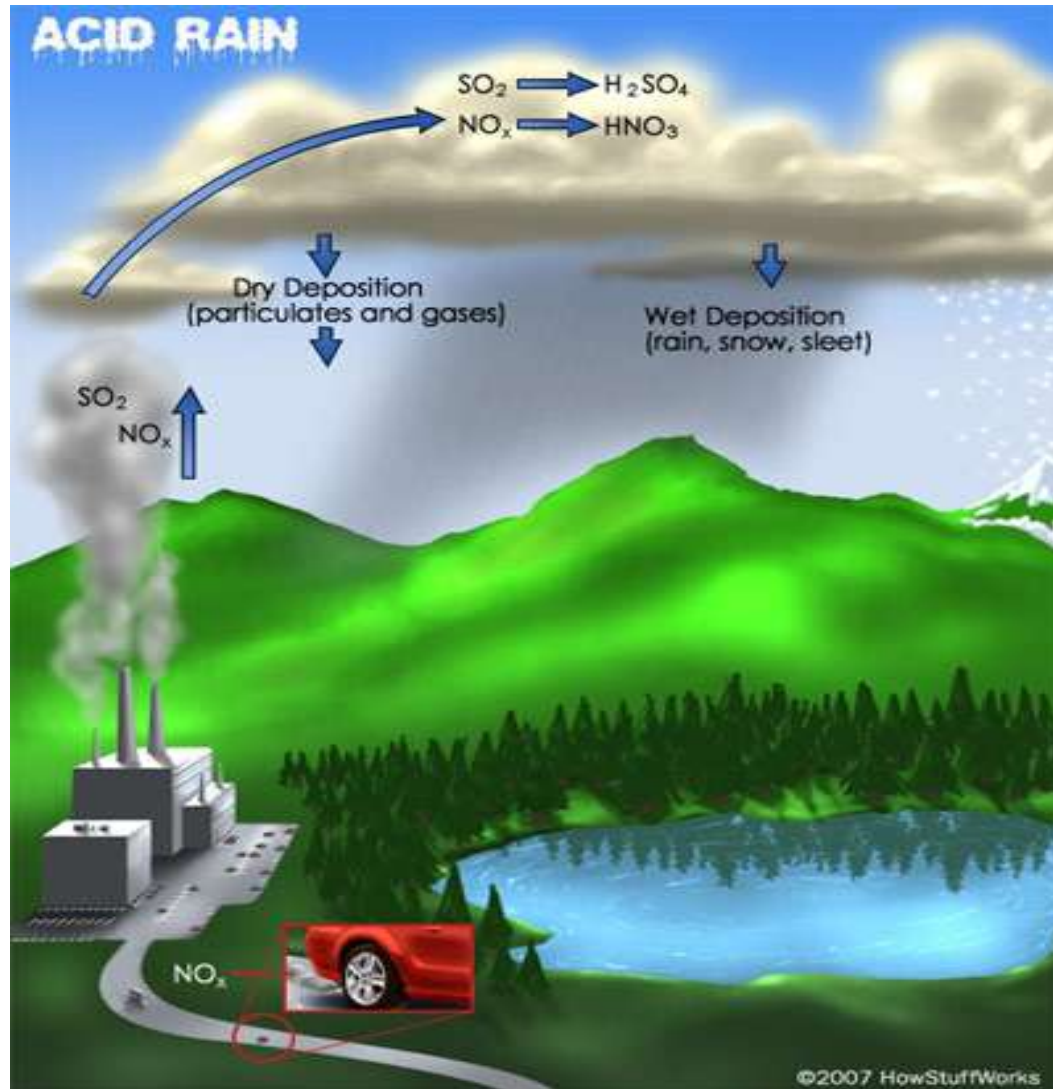
# Acid Rain in Germany

- What causes acid rain?

Acid rain occurs when factories' smoke or vehicles' exhaust containing sulfur dioxide and nitrogen oxides go up into the atmosphere and come back down to earth in the form of harmful precipitation (rain, snow, etc.)

Dry deposits also fall from the sky when there is no precipitation.

# Illustration of how acid rain occurs



# Acid Rain In Germany

- is rain, snow, sleet, or other wet precipitation that is polluted by acids such as sulfuric acid and nitric acid
- caused chiefly from the emission from the burning of coal, gas, and oil by cars, factories, and power plants
- harms the environment over large areas:
  - a) can damage statues, buildings, and bridges,
  - b) has killed entire fish populations in lake, &
  - c) can harm forests and soil

# Effects of Acid Rain

- What effects does acid rain have on the environment of Germany and that of neighboring countries?

Damage to vegetation

Damage to lakes, rivers and streams

Contamination of drinking water

Damage to buildings and monuments

Sulfur deposits from acid rain are carried through the air causing acid rain in other countries in Europe.

# Damage due to Acid Rain



# Acid rain in Germany



Acid rain damages the waxy outer coating that protects leaves, it also harms the soil that the trees are growing in by taking most of the valuable nutrients away from the soil.



The many factories along the Ruhr Valley (area within the circle) cause pollutants which return to the earth as acid rain.





**1908**



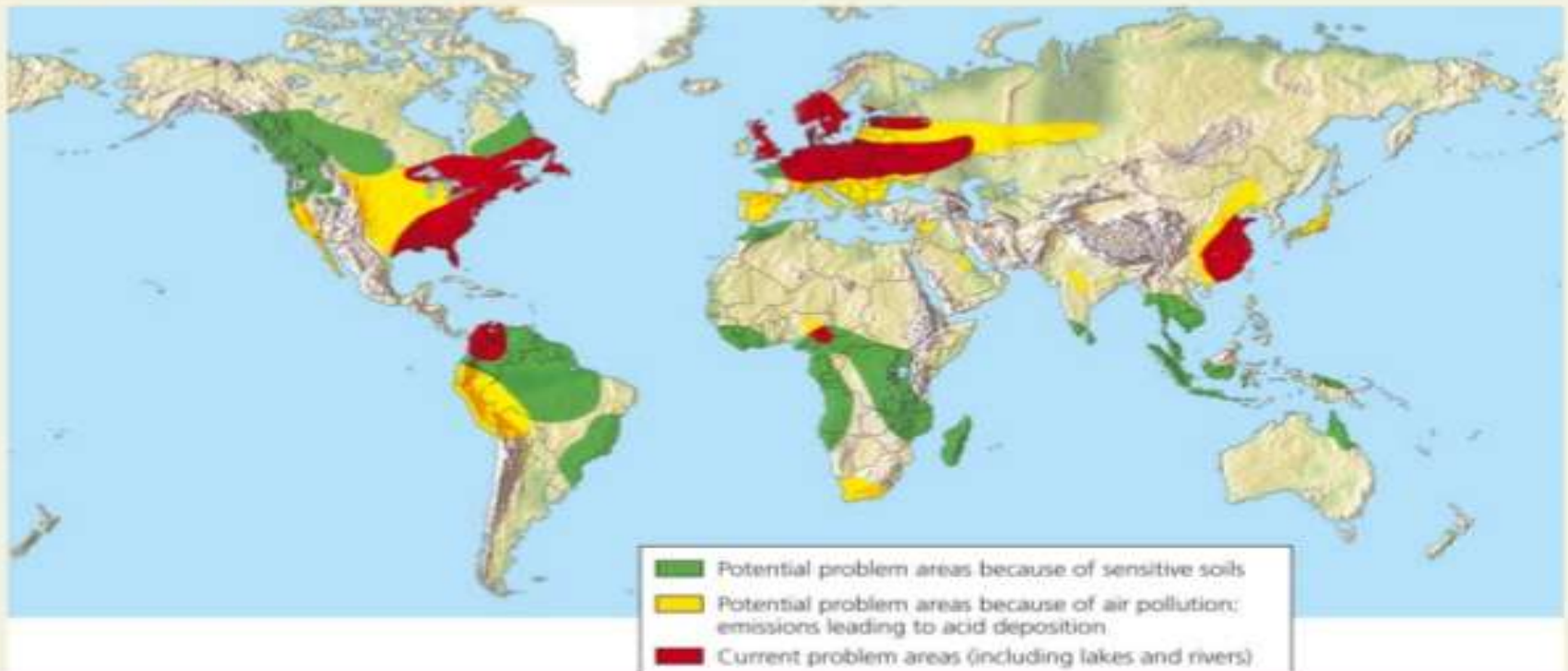
**Present**

# Areas Where Acid Rain Is A Major Problem

- Central Europe, Scandinavia, & Eastern North America

## Acid Disposition Is a Serious Regional Air Pollution Problem

- **Acid deposition**, acid rain



# How do these major environmental issues effect the economies and population of Europe TODAY?

- Acid Rain

Damage to fish stocks and forests have great economic impact to local economy and international trade.

Damage to buildings resulting in money having to be spent to renovate.

Closure of many factories resulting in loss wages.

- What can be done about air pollution?

Use of cleaner fuels, emission controls and advanced engine technologies. Find alternative energy sources (solar, wind turbines, hydro-electricity...etc.. Conserve resources (recycle & use less).

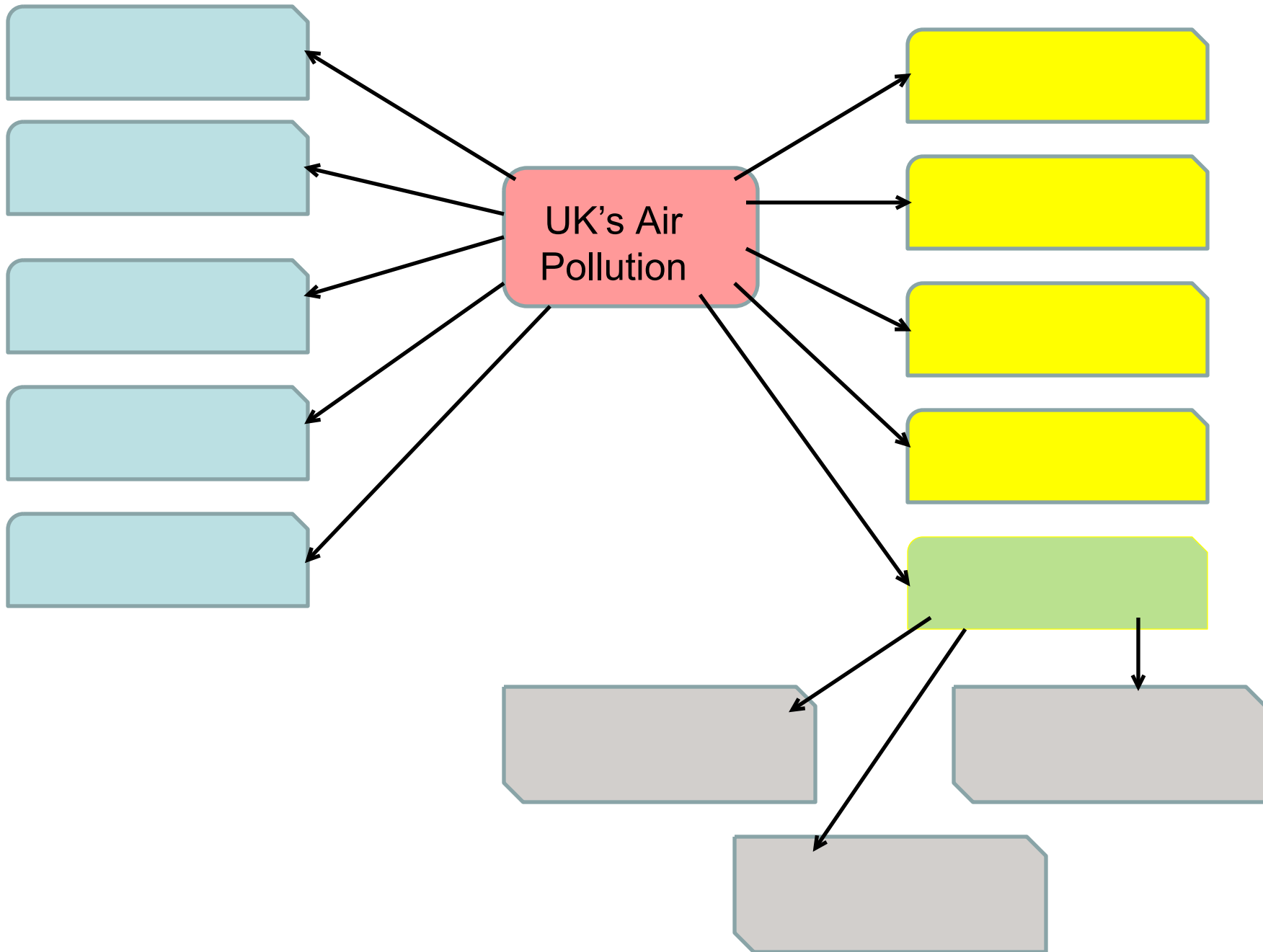
- What is happening?

European Union members have agreed to the Kyoto Protocol, or reduce emissions of greenhouse gasses

**All of these “fixes” cost money!!**

# Europe's Environmental Issues: SS6G9

| What is it?  | Causes   | Affects on the Environment   | Affects to the people   | Solutions to the problem  | Real Historical Examples  |
|--|--|--|---|---|---|
| <b>Acid Rain</b><br><br>Air Pollution (smog/ NOx) mixes with Rain Clouds | Air Pollution & Smog<br><i>(see smog notes)</i><br><br>Excessive Burning of Fossil Fuels (NOx) | Destruction of Buildings, statues, monuments ...etc.<br><br>Diseased soil = toxicity in crops<br><br>Diseased Animals & fish | Contaminated food & Water sources<br><br>Massive \$ loss (repairs, can't sell exports for as much \$) | Cut down on the pollution<br><i>(see smog notes)</i><br><br>Use of Clean Energy & Clean Fuels | Germany - Monuments & Buildings eroding<br><br>-Black Forrest destroyed (= oxygen loss) |



# Chernobyl Media

- What Really Happened:  
<http://www.youtube.com/watch?v=BfKm0XXfiis>
- 10 Interesting Facts:  
<http://www.youtube.com/watch?v=eWwhRjGBNb4>
- (Timelaspe) Radiation Animation:  
[http://www.youtube.com/watch?v=\\_USpAPkAd5A](http://www.youtube.com/watch?v=_USpAPkAd5A)
- Websites:
  - [http://www.paperlessarchives.com/chernobyl\\_nuclear\\_accident\\_doc.html](http://www.paperlessarchives.com/chernobyl_nuclear_accident_doc.html)
  - <http://www.wagingpeace.org/menu/action/urgent-actions/chernobyl/>

# More footage...

cool videos that actually work at school:

<https://vimeo.com/22681222>

<https://www.youtube.com/watch?v=9DWnjcSo9J0>

<https://www.youtube.com/watch?v=oZ74Rqh7yDE>

<https://vimeo.com/126041728>

informative websites:

<http://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/chernobyl-accident.aspx>

<http://chernobylgallery.com/chernobyl-disaster/timeline/>

Opening: Answer these ?s in complete sentences  
in your Go2 book:

- 1) *Notice the geography locations of Germany & the UK; as well as the wind currents between them...* How does Air Pollution in 1 place create Acid Rain in another?
- 2) Would it be fair to blame the people of the UK for the effects from the Acid Rain that Germany has? Why, or why not?
- 3) Would it be reasonable to charge those people of the UK renovation taxes (\$\$)? Why, or why not?

# Chernobyl's Nuclear Disaster

- **Nuclear power**, or **nuclear energy**, is the use of exothermic nuclear processes, to generate useful heat and electricity
  - These plants were created as a way of eliminating the use of fossil fuels to cut down on pollution.
  - It is a cheaper & more doable method ... as long as everything works correctly...

# Take notes AS you watch the following drone footage...

<https://www.youtube.com/watch?v=EcC54jTnX5I>

- 1) What is your prediction of what happened here?
- 2) What symbols or items that you see in this drone footage give you clues to this place and time in history?

# Compare & Contrast...

## Both news reports aired on the same date in April 1986.

### **Soviet Union News**

- <https://www.youtube.com/watch?v=RuWlIiTLbFM>

### **USA News**

- [http://www.liveleak.com/view?i=982\\_1337806970](http://www.liveleak.com/view?i=982_1337806970)

•

**CIA Explaining the Incident  
about a month later:**

<https://www.youtube.com/watch?v=sFevQANQjOI>

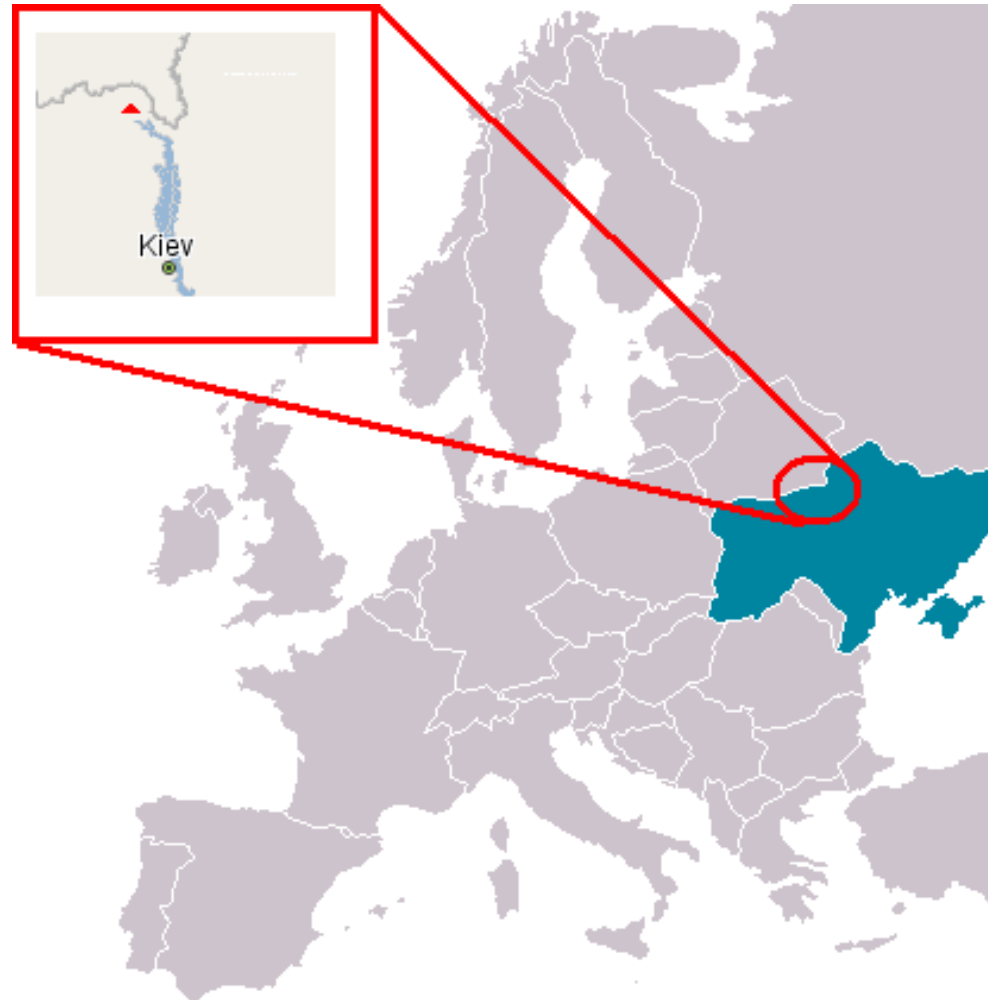
# Chernobyl

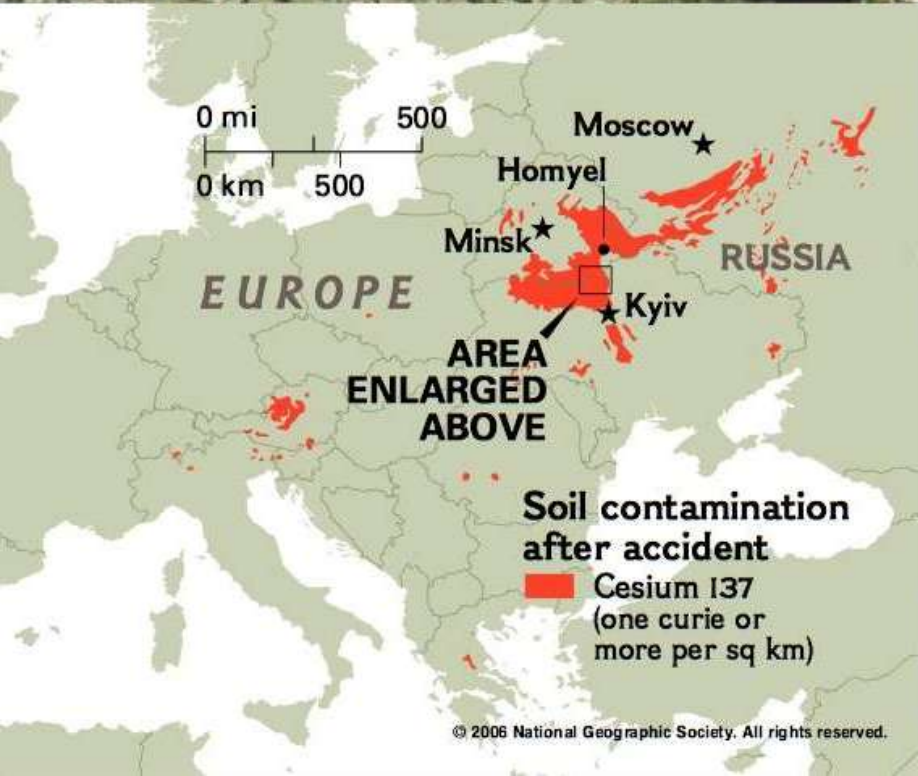
- Chernobyl is a power plant in Pripyat, Ukraine.
- April 26, 1986, this nuclear power plant had the worst nuclear disaster in world history.
- An radioactive explosion occurred when scientists were doing an experiment.
- The release of this material resulted in bad long term consequences in Ukraine and other countries across Europe.

# Warm-Up 9/12/2016

- Write in your agenda
- Answer the following 4 Questions:
  - What are the main causes of air pollution?
  - What are the main causes of acid rain?
  - What are the main effects of air pollution?
  - What are the main effects of acid rain?

# Chernobyl



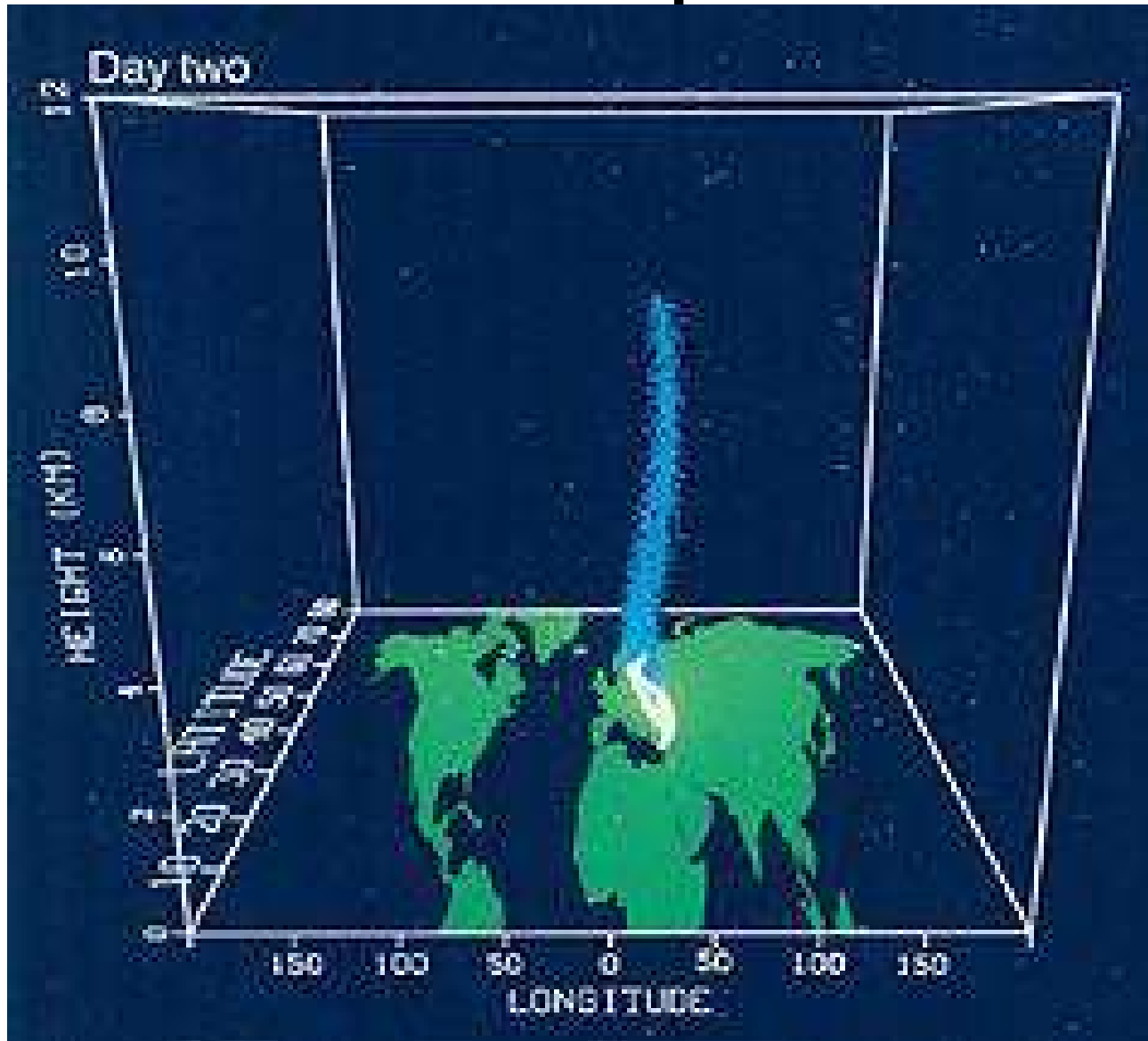


The Chernobyl tragedy is the largest peacetime radiation catastrophe that has ever occurred on this planet. Considered to be **the worst man made nuclear disaster in world history**. The Chernobyl nuclear accident is a global environmental event which has left thousands of refugees and long term contamination of the land, water and air.

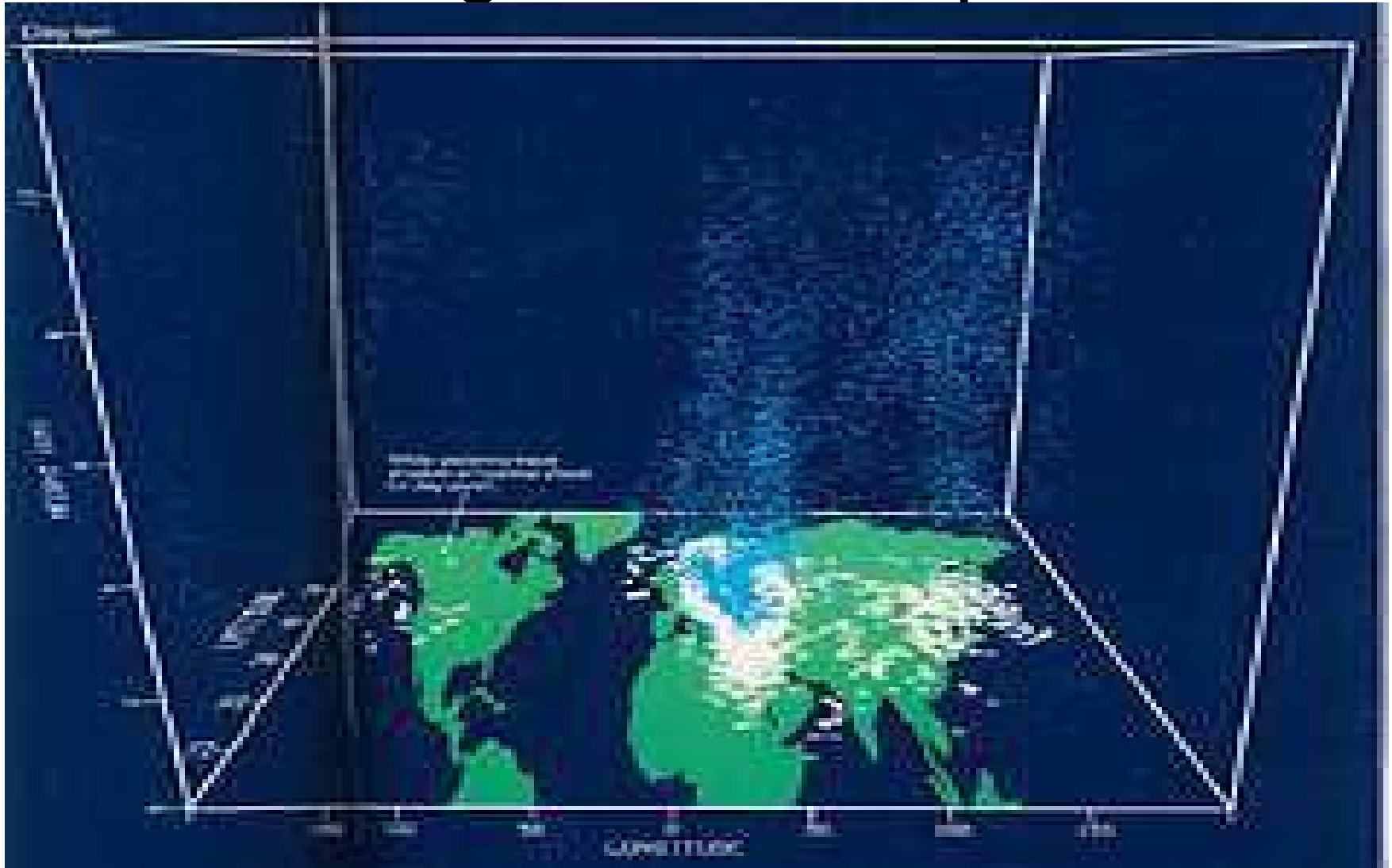
# How Did The Disaster Happen?

- had four *nuclear reactors* (devices that produce and control nuclear energy) in service
- operators shut off several safety systems and began to power down the fourth reactor for a test of the plant's emergency electrical power supply
- power surge caused fuel in the reactor to overheat, resulting in a steam explosion and fire
- produced a radioactive cloud more than 3,280 feet in height
- radioactive substances spread over parts of what are now Ukraine, Russia, and Belarus
- Winds carried the radioactive material into northern and central Europe.

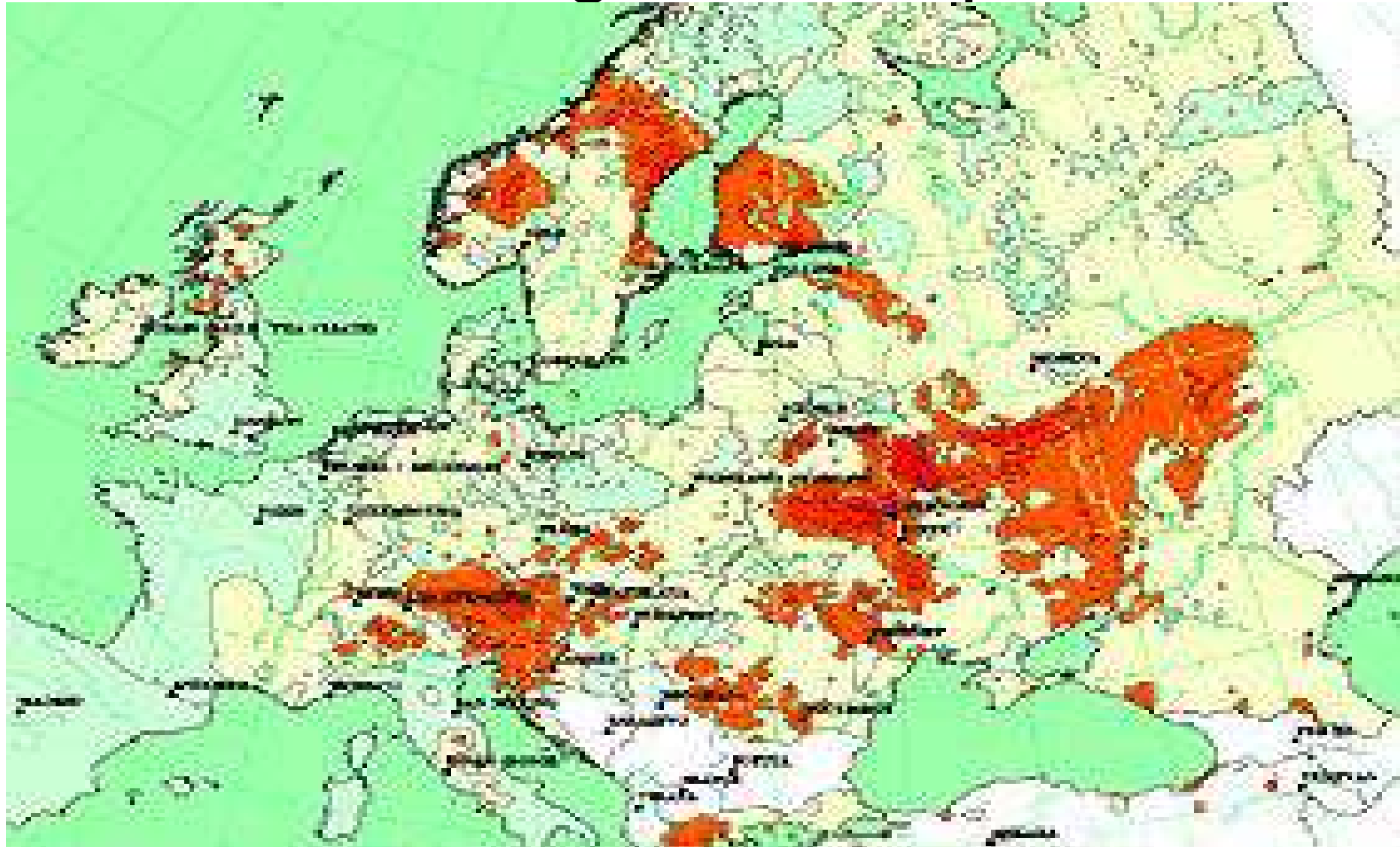
# Radiation from Explosion, Day 2



# How Radioactive Materials Spread Through the Atmosphere



# General Map of Chernobyl Fallout Throughout Europe



**Figure 31. Radiation Hotspots Resulting From the Chornobyl' Nuclear Power Plant Accident**



1996

# Amusement Park planned to Open (at the same date of explosion)





# Chernobyl Disaster, cont.

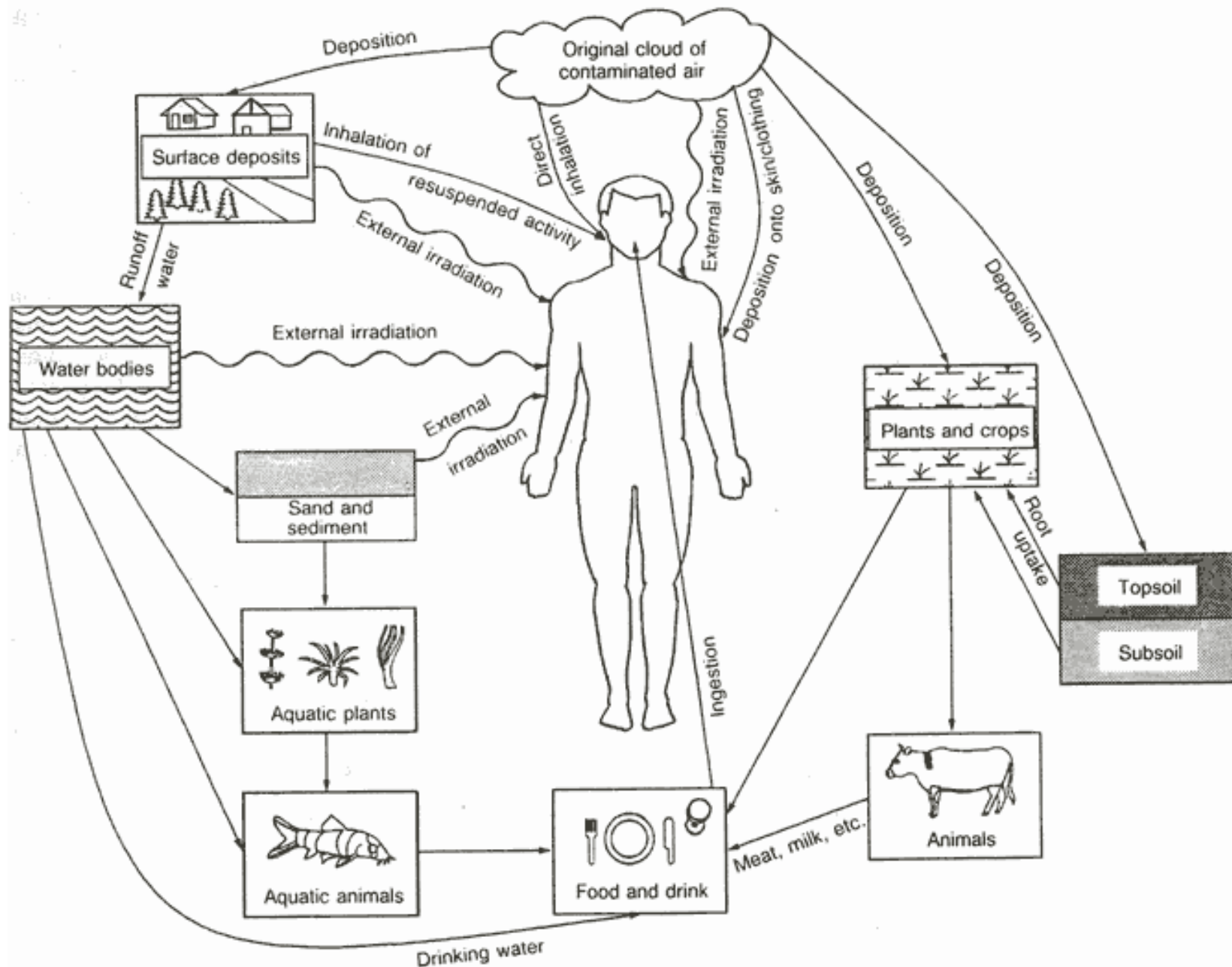
- Most deaths were attributed to nuclear fallout which was more than 400 times more than the amount of nuclear fallout caused by the bomb over Hiroshima.
- Evacuation and resettlement of over 360,000 people... didn't start until 3<sup>rd</sup> day after explosion!
- The Soviet Union tried to cover up the critical nature of the accident.
  - Firefighters did not know that the fire they were fighting contained deadly amounts of radiation poison.
    - Most of these men died within 3 months after the accident.

# Chernobyl Disaster, cont.

- The residents of the city of Pripyat, where the reactor was located, were told that the evacuation would only be temporary. To this day there are still personal belongings in homes in the city.
- Radioactive fallout experienced as “pieces” on peoples clothes all over Europe.
- By December, 1986, a huge concrete dome had been constructed to entomb the reactor.

# Effects of Chernobyl Disaster

- 31 people reportedly died from radiation sickness or burns
- more than 200 others were seriously injured
- *Fallout* (radioactive material) from the accident caused a number of health and environmental problems
- increased rate of cancer, skin diseases, respiratory ailments, and heart problems



**Main environmental pathways of human radiation exposure**

[Source : IAEA technical report ISBN 92-0-129191-4 Vienna 1991]

How do these major environmental issues effect the economies and population of Europe TODAY?

- Chernobyl

People don't really know how much damage was done.

Agriculture in other parts of Europe suffered.

Affected land useless in the Soviet Union.

Payments to victims

Loss of jobs due to closed reactors

High medical costs.

# Warm-Up 9/13/2016

- Write in your agenda.
- Answer the following question in your warm-up journal.
  - Why did the Soviet government cover up how bad Chernobyl really was?

# Chernobyl Nuclear Disaster

## April 26, 1986

- What were the consequences of the disaster?

Evacuation

Land Contamination

Economic impact on East and North

Europe farmers

Health issues- cancer, birth defects, death

- Did not effect just Chernobyl, but spread to surrounding countries by air currents.
- This disaster still effects people and land TODAY.
- This nuclear disaster was the worst in history.

Health Effects Video (4 min)

<http://www.youtube.com/watch?v=bPs2GSgeV6I>

# The Cover-Up

- Soviet leaders concealed the accident from the public for nearly two days and refused outside help
- Eventually, nearby towns were evacuated
- Cleanup workers covered the reactor with a concrete shell

- The Cover Up
  - <http://www.ippnw-students.org/chernobyl/coverup.html>
- Soviet Leaders Accused of Chernobyl Cover-Up
  - [http://articles.latimes.com/print/1991-12-23/news/mn-710\\_1\\_chernobyl-disaster](http://articles.latimes.com/print/1991-12-23/news/mn-710_1_chernobyl-disaster)
- Facts & Figures re: the cover up:
  - <http://www.chernobyl-international.com/about-chernobyl/facts-and-figures>

# The USSR Gov'. covered it up!

- Video:

<http://www.youtube.com/watch?v=bPs2GSgeV6I>

- Secret Documents:

<http://www.dianuke.org/secret-chernobyl-documents-expose-the-cover-up/>

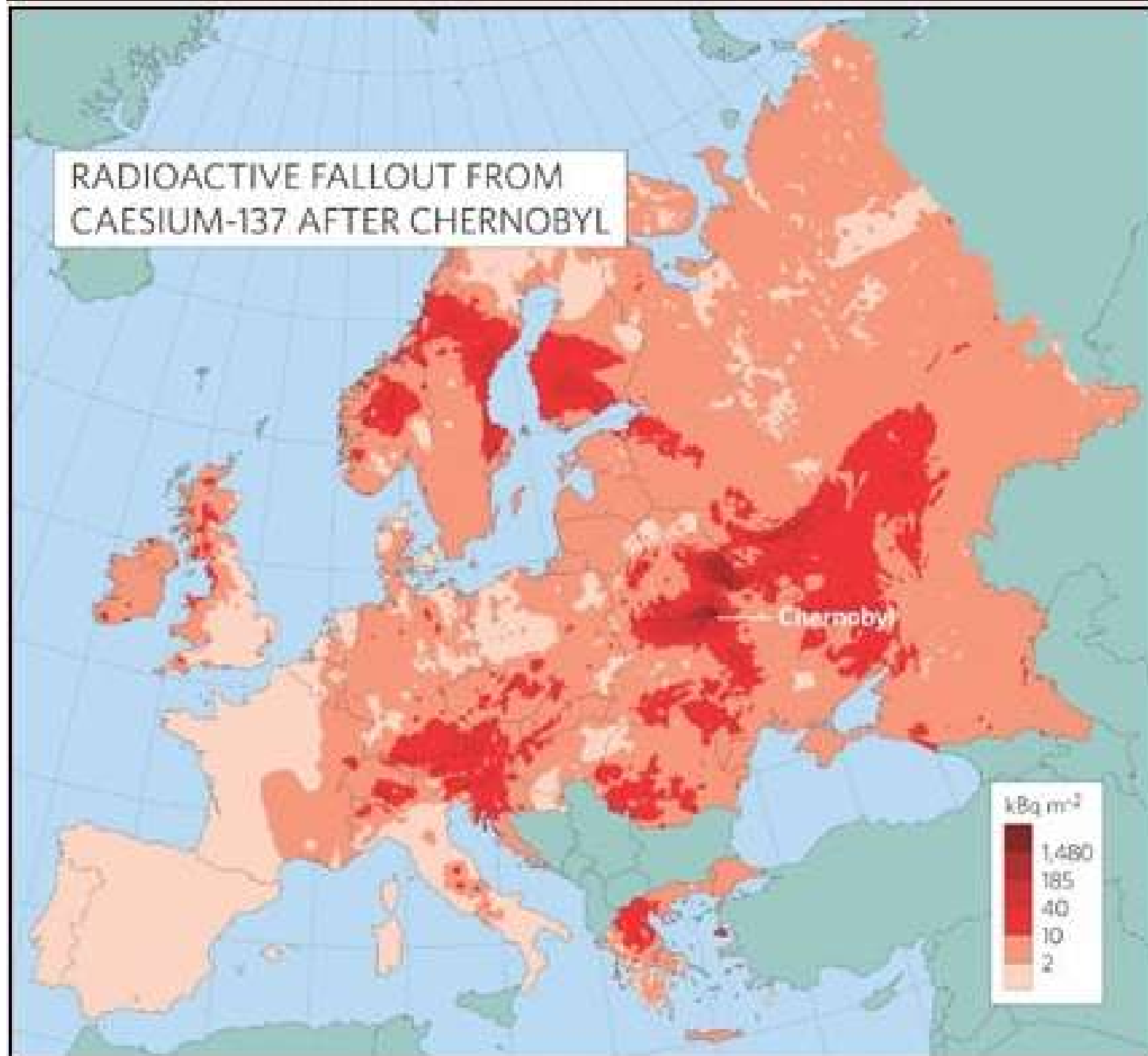
- Articles:

<http://www.scientificamerican.com/article.cfm?id=worlds-largest-movable-structure-seal-chernobyl-reactor>

# Europe's Environmental Issues: SS6G9

| What is it?      | Causes   | Affects on the Environment   | Affects to the people   | Solutions to the problem  | Real Historical Examples   |
|------------------|--|--|---|---|--|
| Nuclear Disaster | Nuclear Power Station, creating cleaner & cheaper energy, made a mistake and one of the 4 reactors blew up filling the air with radiation. | <p>Everything contaminate d (water, plants, animals, food...etc.)</p> <p>Deformed plants and animals</p> <p>*Spread all over Europe contaminatin g other countries</p> | <p>-Cancers &amp; other sicknesses&amp; diseases</p> <p>- Had to move (refugees)</p> <p>-Mental &amp; physical disabilities</p> <p>-Gov. acted too slow</p> | <p><i>*Long wait time in tasking action against the problem caused bad effects.</i></p> <p>- Evacuation</p> <p>-wearing gas masks</p> <p>-Spreading info</p> <p>-Laws</p> | Chernobyl in Pripyat, Ukraine: April 26, 1986 → nuclear power plant exploded spreading toxic air all over Europe |

RADIOACTIVE FALLOUT FROM  
CAESIUM-137 AFTER CHERNOBYL



J. SMITH & N. A. BERESFORD CHERNOBYL: CATASTROPHE AND CONSEQUENCES  
(PRAXIS, CHICHESTER, 2005)

# Photos of the Effects of the Chernobyl Disaster





Birth defects were the norm for years following the Chernobyl incident



Children in Belarus, Russia and Ukraine have been suffering from the effect of the radiation released in 1986. The Rechitsa orphanage in Belarus has been caring for the huge population of sick children.

*Photo Credit: Julien Behal/Chernobyl Children's Project*



Articles:

• <http://www.nuclear.com/archive/2012/07/03/20120703-002.html>

• <http://news.bbc.co.uk/2/hi/europe/4925838.stm>

• [http://www.wecf.eu/english/press/coverage/2011/fresh\\_outlook-nuclearwecf.php](http://www.wecf.eu/english/press/coverage/2011/fresh_outlook-nuclearwecf.php)



The reactor disaster in Chernobyl took place on April 26, 1986. The reactor was encased as a temporary solution to secure the site for only 20-30 years.

*Photo Credit: Julien Behal/Chernobyl Children's Project*



Mentally handicapped children exposed to radiation

*Photo Credit: Alex Emes/Blacksmith Institute*

# Your Graded Assignment:

Draw a picture of the EFFECTS that this issue has had on the environment and/ or people.

Draw a picture of the environmental ISSUE/ problem.

Write a 5 sentence paragraph caption that explains the issue and effects based on your pictures above.

- Must complete 2 papers: Chernobyl, & pollution or acid rain (*can do them on the same paper using front & back- each topic takes 1 complete side of the paper*)
- Formative Grade
- Must be in color (*colored pencils are best*) or shaded as a pen/ pencil sketch
- Must be neat and readable
- Must clearly explain the problem and effects it has had.
- **Due by Friday Sept. 19 at the very latest... You will have a little time in class & for HW.**