

Info brief activities

INFO BRIEF 14

PROGRAMS: ST, EST, AST
METHOD: Empirical
CONCEPT: Disturbances
STUDENT BOOK: Chapter 10

A planet in turmoil

Every year, disasters hit populations in all corners of the world. The disturbances may be of human or natural origin, and their repercussions can be far-reaching, lasting for many years and affecting distant regions. In this activity, you will become aware of the scope of disturbances affecting the Earth and its inhabitants.

IDENTIFYING THE RESEARCH SUBJECT

For help in answering questions 1 to 5, read pages 327–329 of your student book.

1. What is a disturbance?

2. Name three variables that differentiate disturbances affecting ecosystems.

• _____ • _____ • _____

3. Give four examples of natural disturbances and four examples of human disturbances.

Natural disturbances	Human disturbances

4. What is the name of the series of changes that occur in an ecosystem after a disturbance?

Name: _____ Group: _____ Date: _____

5. Explain how an ice storm can affect the wildlife in an ecosystem.

PLANNING YOUR RESEARCH

6. What criteria could you use to categorize disturbances?

CONDUCTING YOUR RESEARCH

7. Read the appendix to this activity for help in completing the table below. List 10 major disturbances in chronological order. Indicate the type of disturbance (volcanic eruption, earthquake, oil spill, etc.), the date and location of the event, the consequences and the origin of the disturbance (natural or human).

You must also meet the following criteria:

- Include disturbances that took place in at least four different decades.
- Include at least one disturbance that took place in Québec.
- Include at least four natural disturbances and four human disturbances.

Ten major disturbances

Type of disturbance	Date	Location	Consequences	Natural (N) or human (H)



Type of disturbance	Date	Location	Consequences	Natural (N) or human (H)

Name: _____ Group: _____ Date: _____

REFLECTING ON YOUR APPROACH

8. How can the seriousness of a disturbance be measured?

9. Do you think the frequency of human disturbances will increase over time?

10. Do you think the frequency of natural disturbances will increase over time?

11. What other information sources could you use in your research?

APPENDIX

A HODGEPODGE OF DISASTERS

After slumbering for 500 years, the Pinatubo volcano on the island of Luzon in the Philippines awoke with a vengeance in June 1991, killing between 900 and 1 000 people. Mud and ash covered the region, and all life was extinguished within a 14-km radius of the volcano. Almost 150 km² of forest and 800 km² of rice fields were destroyed, and 800 000 head of livestock and poultry died. The ash expelled into the atmosphere caused a volcanic winter, reducing global temperatures by 0.5°C.

On March 24, 1989, the oil tanker *Exxon Valdez* ran aground off the coast of Alaska, spilling 40 000 tonnes of crude oil. An oil slick measuring more than 7 000 km² polluted 800 km of coastline (2 000 km, if all the islets and inlets along the coast are included). The spill caused the death of more than 250 000 sea birds, thousands of marine mammals and an incalculable number of coastal organisms.

Between July 19 and 21, 1996, heavy rains—275 mm of rainfall in 48 hours—caused flooding in the Saguenay–Lac-Saint-Jean region. Two metres of water swept through the towns of Chicoutimi and La Baie, killing seven people and forcing the evacuation of 16 000 residents. Damages were estimated at \$1.5 billion.

On August 29, 2005, Hurricane Katrina hit the U.S. coast. The Category 5 hurricane, with winds of 280 km/h, caused severe destruction in several U.S. states, including Mississippi and Louisiana, where 80 percent of the city of New Orleans was flooded after the levee system failed. Some 1 500 people lost their lives, and damages totalled tens of billions of dollars.

From December 24, 2001 to January 7, 2002, raging brush fires devastated the area around Sydney, Australia. Largely the work of arsonists, the fires destroyed more than 570 000 ha of bushland. Fortunately, no lives were lost.

The largest earthquake ever recorded, with a magnitude of 9.5 on the Richter scale, occurred on May 22, 1960, in Chile. The earthquake caused a tsunami that devastated the Chilean coast and crossed the Pacific Ocean. Between 3 000 and 5 000 people were killed.

On the night of December 3, 1984, a storage tank at a pesticide plant in Bhopal, India, exploded, releasing 40 tonnes of methyl isocyanate. The chemical first causes temporary blindness before attacking the lungs and causing severe respiratory ailments. Between 16 000 and 30 000 people died in what is known as the world's worst industrial disaster to date.



The ice storm that struck Québec in 1998 killed 25 people. Between January 5 and 10, 1998, freezing rain fell for almost 80 hours, leaving 50 to 100 mm of ice on surfaces throughout southern Québec. The storm destroyed millions of trees, 120 000 km of power and telephone lines, 130 transmission towers and 30 000 wood poles. Three million people—56 percent of the Québec population—were left without power. Some households in Montérégie had to wait six weeks for electricity to be restored.

Hurricane David hit the North Atlantic basin in 1979. The Category 5 hurricane, with winds up to 280 km/h, struck hardest at the island of Dominica in the Lesser Antilles, the Dominican Republic and the United States. Two thousand people were killed, mostly in the Dominican Republic. The hurricane also caused \$4.4 billion in damages.

On June 3, 1979, in the Gulf of Mexico, a blowout on the Ixtoc 1 offshore drilling platform ignited, causing the platform to catch fire. The burning platform collapsed, creating an oil spill. Hydrocarbons leaked from the platform for several months, totalling between 470 000 and 1 500 000 tonnes of crude oil—the largest oil slick ever. It reached the coasts of Mexico and Texas, coating shrimp nurseries, mangroves, beaches and sea birds in oil.

On December 26, 2004, a tsunami hit the coasts of Indonesia, Sri Lanka, southern India and southern Thailand. The tidal wave was caused by an earthquake with a magnitude of 9.1 to 9.3 off the coast of the Indonesian island of Sumatra. The tsunami created waves up to 15 m high that swept away everything in their paths. The loss of human life was catastrophic: between 216 000 and 232 000 people were killed.

In the first two weeks of August 2003, parts of Europe, including France, northern Italy, Portugal and Switzerland, suffered a heat wave. Many temperature records were broken. The town of Auxerre, France, for example, endured seven straight days of temperatures above 40°C. The blistering heat caused an increase in mortality rates compared to previous years, especially among people over 75. France recorded 15 000 more deaths than usual, while 20 000 excess deaths were recorded in Italy, 1 300 in Portugal and 975 in Switzerland. The heat wave also caused droughts and forest fires. The extreme temperatures were apparently due to global warming and, paradoxically, a decrease in air pollution. Pollution creates a screen reducing the penetration of the sun's rays and thus the impact of global warming. Efforts to reduce pollution in recent years have counteracted this phenomenon, allowing the sun's rays to break through more easily.

The largest volcanic eruption in recorded history occurred in April 1815. The Tambora volcano, in Indonesia, produced a column of flames shooting 44 km into the sky. The ash fell as far as 1 300 km away. It is estimated that 11 000 people were killed directly. The tidal waves and famine caused by the eruption claimed another 49 000 lives. The ash released into the stratosphere resulted in the coldest summer ever recorded in Europe (1816), and the ensuing famine caused another 200 000 deaths.



Name: _____ Group: _____ Date: _____

On April 26, 1986, reactor number four of the nuclear power plant in the Ukrainian town of Chernobyl exploded. A radioactive cloud contaminated the entire region and even the rest of Europe. The most serious nuclear accident in history, the disaster had major environmental and health consequences. An area of 160 000 km² was contaminated. Debate still rages about the number of people killed directly or indirectly by cancer following the Chernobyl incident. According to Greenpeace, citing a study by the Centre of Independent Environmental Expertise of the Russian Academy of Sciences, 67 000 people died in Russia between 1990 and 2004 as a result of the disaster.

On March 27, 1964, an earthquake measuring 9.2 on the Richter scale shook the area around Anchorage, Alaska, killing 115 people and sending a tsunami down the west coasts of Canada and the U.S. The tsunami killed another 14 people in California and damaged property all along the coast.