Name: _____ Group: _____ Date: _____

STUDENT BOOK:	**Chapter 10, pp. 310–314**
CONCEPTS:	EXTINCTIONS
	GEOLOGICAL TIME SCALE
METHOD:	FORMATION OF AN OPINION

CREATOR OR DESTROYER?

Mention species extinction and dinosaurs immediately come to mind. Although those species seem to have disappeared in a flash, their extinction probably spanned tens of thousands of years. Scientists in the 21st century believe that we are now seeing first-hand a mass extinction of species, a process attributable to human activity. Is mass extinction a normal evolutionary process? Can human beings be held responsible for the disappearance of numerous species?

IDENTIFYING THE CONTROVERSY AND EXPRESSING YOUR VALUES

1. What question does this issue raise?

2. Do you believe that today's species extinctions result from human causes or natural causes? Briefly, explain why.

Name: _____ Group: _____ Date: _____

3. Rank the following five consequences of your everyday activities by order of importance (1 being unimportant and 5 being very important).

☐ Consequences for my own quality of life.

☐ Consequences for the quality of life of others.

☐ Consequences for the surrounding animal and plant life.

☐ Consequences for the global climate.

☐ Consequences for my savings.

4. Based on your answers to question 3, do you attach a great deal of importance to the environmental effects of your everyday activities? Explain why.

GATHERING INFORMATION

Read pp. 310–315 in your student book and the appendix to this activity for help in answering questions 5–9.

Complete the table on the next page as you read. Remember to cite your sources of information.

5. What is the extinction of a species?

Name: _____ Group: _____ Date: _____

6. What is the largest mass extinction of species ever to occur on Earth? Why is it considered the largest one?

7. Name three or more natural factors that could have triggered this mass extinction of species.

- _____
- _____
- _____

8. Based on your sources of information, give two arguments explaining why human beings are to be blamed for extinctions of species.

- _____
- _____

9. Name two reasons why you do not believe that humans are responsible for extinctions of species.

- _____
- _____

Name: _____ Group: _____ Date: _____

Sources of information

Source	Source reliable or not?	Reason	Source impartial or not?

FORMING YOUR OPINION

10. Based on the information you gathered, take a position and write a short opinion piece on the following issue:

Are mass extinctions normal evolutionary processes or are humans the main culprits in the disappearance of many species?

Name: _____ Group: _____ Date: _____

REFLECTING ON YOUR APPROACH

11. What other information would help form your opinion about this issue?

12. Is your opinion about this issue the same as when you began this activity? Explain why.

13. In your opinion, can humans take measures to prevent species extinction? If so, give some examples.

Name: _____ Group: _____ Date: _____

APPENDIX

1. MASS EXTINCTION OF SPECIES—HUMANS ARE THE CULPRITS

Disappearance of the dinosaurs 65 million years ago was the fifth mass extinction of species. An animal or plant reportedly vanishes every 20 minutes. Are we embarking on the sixth crisis in the life of species?

Species are disappearing at an ever faster pace. In fact, the rate of vertebrate and plant extinction is already 100 times greater than in the geological eras going back tens of millions of years. This rate should increase another hundredfold in coming decades. ... During historic mass extinctions, up to 95 percent of species may have vanished in a flash over several million years. We are obviously dealing here with paleontological time. I am not certain that we can equate that past with what is happening today. Nevertheless, the scientific community is sounding a loud alarm: we are altering natural systems to the point where mass extinctions could extend to all groups of living beings, from fungi to gorillas.

Why is the pace quickening?

Large animals, including herbivores, have been disappearing on most continents since human societies dawned thousands of years ago. But today's quickening pace, which began with the Industrial Revolution, results mostly from habitat destruction: deforestation, urbanization, changing land uses and so on.

In addition to all this, the expansion of international trade is ferrying species from one continent to another, with alien species becoming predators or highly effective parasites that make themselves at home on indigenous species. This in turn may decimate local fauna and flora.

What about climate change?

This is the third threat to biodiversity. ... Whereas species could perhaps adapt, it is certain that climate change will play a critical role.

How will this affect human society in the year 2050?

Presumably the consequences of biodiversity loss will not be noticeable for a while. Then, disasters will strike in the form of invading new species, emerging human and animal diseases, loss of ecosystem productivity and so on. ...

Will there be a world shortage of agricultural resources?

This will be a problem in some countries, but I do not believe it will be worldwide. There is considerable room for manoeuvre: there is still unused land and more efficient agricultural practices can be introduced. But natural habitats will be destroyed to accommodate agricultural demand and that will further accelerate biodiversity loss and climate change.

Name: _____ Group: _____ Date: _____

1. MASS EXTINCTION OF SPECIES—HUMANS ARE THE CULPRITS (*continued*)

How can we enhance biodiversity?

First and foremost, habitat destruction must be stopped. This is an urgent necessity. In the longer term, humans must learn to live alongside nature again. I believe this is possible while preserving a modern lifestyle. It involves rethinking the organization of urban and rural spaces. We either manage to merge these spaces more fully or else we fashion more user-friendly cities.

In a globalized world, individuals should be encouraged to think of themselves not as people isolated in a particular space, but as links in a chain that connects them to nature. If we could educate both children and adults to think this way, we would all be much more connected to nature and also to other people.

In 2050 the world population will approach nine billion, or 50 percent more than now. Will we manage to reverse the process of biodiversity destruction?

These are critical times when everything is unfolding at extraordinary speed. We are fully into destruction and natural systems have no time to adapt. We are starting to see how our actions affect the climate and the productivity of fisheries and agriculture. Concurrently, the population will mushroom. Nature can accommodate stress up to a point, but not infinitely.

Source: Hervé Kempf, *Le Monde*. January 7, 2006. [*Translation*]

Name: _____ Group: _____ Date: _____

2. HUMANS NOT THE ONLY CAUSE OF SPECIES EXTINCTION

Humans can be charged with all manner of ill at times, including threatening the biological diversity of Earth. Although our behaviour is rightly debatable much of the time and has caused (or accelerated) the disappearance of certain species through negligence or greed, humans take a distant second to nature when it comes to mass extinctions.

Climate change, erupting volcanoes, earthquakes, meteorite bombardments, natural fires, human and animal epidemics and so on—all these-called natural disasters—... have exterminated many more species and temporarily impoverished biodiversity far more than have humans who arrived on the scene barely three million years ago. Natural selection is at work and animals are equally at cause in the extinction of their own kind. ...

It is certain that humans cannot be blamed for the mass extinctions in the late Permian period and the Triassic and Cretaceous periods. It is also certain that Mother Nature is blind and decimates humans, too, through disasters that sometimes strike entire populations. Should we grumble about these temper tantrums that the planet throws? I daresay we should not because without them there would assuredly have been no human race.

Source: Tatoufaux website. November 23, 2004, accessed August 22, 2009. [*Translation*]

Name: _____ Group: _____ Date: _____

3. THESE ARE TIMES OF MASS EXTINCTION

Never has Earth been home to so many different species. At the same time, never has biological diversity experienced such rapid losses. This is the paradox, the present crisis brought about primarily by humans.

On September 28, 2000 the International Union for Conservation of Nature (IUCN) published its updated Red List, a world inventory of all threatened animal and plant species. Since the earlier edition of the inventory dating from 1996, conditions for many species have worsened considerably. The number of "critically endangered" mammals increased from 169 to 180, and there are very few remaining individuals in this category. The patchy population of the Iberian lynx, for example, consists of only 600 individuals at this point. ...

A new species every square metre

How can the experts compare present events with historic episodes that triggered the extinction of 90 percent of existing marine species? "Extinction is a natural process," Nicolas Perrin points out. "The average existence of a species is estimated at a few million years. Given constant diversity, evolution offsets extinction by creating equal numbers of new species. That balance has now been disrupted. The present rate of extinction far exceeds nature's capacity to create." ...

Humans, suspects on several counts

We need not look far for the cause of modern extinctions. Humans are the answer. As mammals, we stand out from the pack by our amazing ability to alter our environment. This ability did not wait on the population explosion or industrialization. ... In clearing land for farming and colonizing territory for habitat or transportation routes, humans disrupted natural settings, isolated populations or introduced foreign species into fragile environments. These indirect influences, compounded by population booms, have unquestionably wiped out more species than predation has managed to do.

Diversity is incompatible with climate change

We are now faced with global warming, a new stress that humans have added to this longstanding mix. The expected temperature gain of 1.5 to 6 degrees between now and 2100 will probably affect diversity. ... Paleontologists also see in climate change and its corollary of changing sea levels a probable cause of many extinctions of the past. ...

Source: Jean-Luc Vonnez. *Allez-savoir* (University of Lausanne), No. 19, February 2001. [*Translation*]