How Do We Protect Our Home? U-1 L-12

Exploring Science / Historical Steps

There's No Place Like Home. What happens when the "home" ecosystem of a species is seriously damaged or destroyed? After a forest fire, for example, the surviving animals seek nearby habitats. If they do not find enough food, shelter, or mates, they are not able to reproduce. Their species begins to die out. If a particular species lived only in this specific forest, that species may disappear entirely. This has been the story for many organisms. But the story doesn't always end this way.

In 1963, the number of breeding pairs of bald eagles in the US dropped to 417. It seemed that this species would soon disappear. Fortunately, more and more people read Silent Spring, **Rachel Carson's** 1962 book. Carson warned the public of the danger caused by a chemical called **DDT**.

Farmers were using DDT to kill insect pests. DDT "moved up" the food chain - from insects, to fish, to small birds, to larger birds. So, predators (like eagles) ate the most DDT. This is another example of biomagnification. (See page 20). The DDT caused eagles to lay eggs with shells that were much too thin. The shells easily broke, killing the growing eagles.

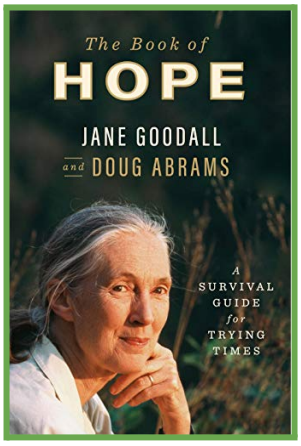
Thanks to Rachel Carson, people demanded that leaders pass laws to ban DDT. Gradually things improved. There were over 71,000 breeding pairs of bald eagles by 2020!

➢ The 1973 **Endangered Species Act** helped save species like the American alligator. Before this law, what is one type of habitat that was being poorly protected?

A. forests **B.** wetlands **C.** mountains

➢ How might you help our planet?
Read **Jane Goodall's** The Book of Hope: A Survival Guide for Trying Times (2021).

Rachel Carson (nature author)



Jane Goodall (chimpanzee ethologist)

Bald eagle with large fish

Chimpanzees showing affection

To Protect Life, Protect Ecosystems

Recall the lynx and the hare from the last lesson? In a **balanced ecosystem**, populations may go up and down. However, over time, the average size of the populations remains steady.

Sometimes the long-term balance of an ecosystem can be upset. If a species' numbers drop, but then remain very low, scientists label it an **endangered species**. When *all* individuals of a species are eliminated, that species is **extinct**. How might this happen?

Computer generation of an extinct woolly mammoth

NATURAL EXTINCTIONS

Since the Earth is always changing, some species *naturally* become endangered, and some go extinct. During the last 3 billion years, there have been five long periods of extreme cold - called **ice ages.** Many species went extinct during these five ice ages.

You may have learned that a large meteor hit the Earth about 66 million years ago. The biosphere was drastically changed. Most large organisms, including dinosaurs, died off.

Even in recent times, if a species lives only in a small area, it can become extinct. A volcanic eruption or a forest fire could wipe out such a species.

HUMAN-CAUSED EXTINCTIONS

Unfortunately, many extinctions are not "natural." Humans have caused many species to become endangered or extinct. In most cases we do this by destroying these organisms' habitats.

There are now over 8 billion people on Earth. Sometimes, when we build our towns and farms we eliminate wetlands and forests (including rainforests). To get coal for our energy, we have destroyed hundreds of mountains. To build our dams, we have turned miles of rivers into lakes.

In addition, harmful gases from our cars, power plants and factories **pollute** the air. Some types of air pollution (such as carbon dioxide) slow the loss of heat from the earth. The result is **global warming** (often called **climate change**). Many ecosystems are in danger because of climate change.

The good news is that scientists are finding ways to meet humans' needs while protecting ecosystems. Cleaner vehicles are being built. More energy-efficient heating and lighting systems are being designed and sold. Methods to grow more of our foods without chemicals are being developed. In 2021, researchers found that adding kelp (an algae) to cows' diets greatly reduced the amount of methane gas in cows' burps. This gas contributes to global warming.

Most importantly, we are getting more and more of our energy from the sun, the wind, the tides, and other ways that don't pollute our air. These energy sources are **sustainable** - meaning we can use them without running out of them, and without doing serious harm to our planet.

Solar panel next to wind-generated turbine

But it's not just up to scientists. Millions of people are now recycling and buying products (including foods) that better protect the environment. It is vital that humans, especially our leaders, continue to make decisions that protect our planet - for all living things.

➢ To Do Yourself

Where is the most pollution?

You will need: Adhesive tape; cardboard; a stapler; scissors; a ruler

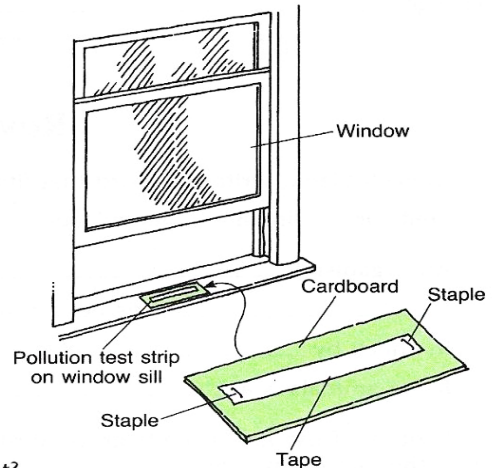
1. Decide if you want to test indoor or outdoor air. You will make test strips.

2. Cut several pieces of cardboard, 5 cm wide by 15 centimeters long.

3. Cut several 12 centimeter long pieces of adhesive wrapping tape. Staple these, sticky side up, to each cardboard strip.

4. Place your test-strips near windows or doors - wherever you would like to test for dust or soot.

5. Check your test-strips each day. Record your observations in a notebook.



Questions

1. Which areas have the most dirt, dust, and soot? _____

2. What particles of pollution did you find?_____

3. What are some ways that you (or your family) might reduce pollution? _____

_____

REVIEW U-1 L-12

I. In each blank, write the word that fits best. Choose from the words below.

pollutes **warming** **ecosystem** **endangered** **balanced** **extinct**

In a _____ ecosystem, the average size of a population does not change. Adding harmful things to air, water, or land _____ them. An _____ species is in danger of dying out. When a species dies out, it becomes _____ . Global _____, also called climate change, is a threat to many ecosystems.

II. Write **N** for each way that nature can upset an ecosystem's balance.
Write **P** for each way that people can upset the balance.

A. ____ oil spills
B. ____ fumes from cars
C. ____ forest fires
D. ____ storms
E. ____ trash
F. ____ digging mines
G. ____ building dams
H. ____ volcanoes

III. How might humans become an endangered species?