

LESSON 12 How Do We Protect Our Home? =====

Objectives

When students have completed this lesson, they will be able to:

- define a balanced ecosystem in terms of stable population sizes;
- list ways an ecosystem can get out of balance;
- explain what is meant by endangered species and give examples of these species;
- explain the connection between air pollution and global warming.

Exploring Science / Historical Steps

Bald eagles are just one of many species that scientists are trying to help save from extinction by protecting their environment. Much later, in Unit 7 Lesson 1 (page 169), students will learn how other rare and wild animals are being helped by wildlife biologists.

Motivated students might be enticed to read Rachel Carson's classic Silent Spring, and then to meet and discuss this famous book. The biomagnification of DDT should remind students of the story of Minamata Bay (page 20) with its tragic biomagnification of mercury.

You might recommend Jane Goodall's The Book of Hope - A Survival Guide for Trying Times. Students would particularly benefit from reading the section entitled *The Power of Young People* (pages 111 - 134).

In the lesson itself, students will learn some causes of destruction of ecosystems, and steps we can take to make things better.

The answer to the inference question is B. (wetlands).

To Protect Life, Protect Ecosystems

Students should recall (from Lesson 10) the way that the populations of lynxes and hares are related. Although the numbers in a population fluctuate, over long periods of time the average size of each species' population (in a community) remains about the same - unless there is an upset in the balance. Unfortunately, too often humans are upsetting the balance.

Some may argue that extinctions are natural; this is certainly true - for some extinctions. The

key is to point out that the extinctions of recent years are absolutely not natural; they are largely the result of our actions.

The link between pollution and global warming should become obvious to students. Hopefully, there will be little (or no) resistance to accepting the facts and supporting efforts to address this serious problem.

You might suggest that - for most Americans - a reduction in meat consumption would help to protect the planet. Meat is certainly a good source of protein (see page 80), one of the vital nutrients for young bodies. However, the amount of meat now being consumed, particularly in our country, has many environmental drawbacks: methane gas (44 pounds per cow per day); water waste (600 gallons consumed to make one hamburger); nitrate pollution from runoff (particularly from feedlots); fuel consumption to raise crops to feed cattle and pork (most of our corn and soybeans are fed to cattle); pollution from the runoff of pesticides and herbicides added to farmland.

It is vital that students hear the message that humans have the power to change their behavior and to solve the problems that we have created, particularly in democratic nations - where individuals can vote for leaders who acknowledge facts, recognize challenges and allocate the resources to address them.

To Do Yourself

This activity can be done either before or after the main lesson. Using a magnifier, students can observe the smaller particles that can collect on the test-strips, especially near the beginning of the period of time when the activity is carried out. Even if the strips darken only slightly, particles may be seen under the magnifier, a stereoscope, or the low power of a compound microscope.

Questions

1. Results will vary. The darkest strips reveal the location with the most particles.
2. Students may find dust, soot, sand, and other tiny particles. Results will vary.

3. By limiting the amount of dust entering the house, by dusting and vacuuming often, and by reducing particle-producing activities, pollution can be reduced in the home.

Review

Please note: I have not made the answers available online, on the small chance that a student might discover them. Of course, the answers to these questions will be included in the version of the Teacher's Guide provided to teachers who purchase the text.

Reinforce / Enrich

If the following video was not used for Lesson 8, it might be helpful here to reinforce the concept that each level of a biomass pyramid contains about 10X the biomass as the level above it, and to clarify the topic of biomagnification via the story of DDT.

- [Amoeba Sisters / Biomagnification and the trouble with toxins](#) [6:38]

Below are two brief videos that summarize the work of Rachel Carson, and a third more detailed account of her important courageous efforts to protect the environment from the now infamous pesticide DDT.

- [Untold History - Rachel Carson's fight for the environment](#) [2:06]
- [Ted Ed - How one scientist took on the chemical industry \(Mark Lytle\)](#) [4:08]
- [PBS / American Experience - Chapter 1 / Rachel Carson](#) [8:59] The [entire documentary](#) is also available on YouTube [1:54]

Below is a brief video about Jane Goodall, likely the most famous expert on the behavior of chimpanzees, and a globally recognized advocate for environmental protection.

- [Biography - Jane Goodall - Animal rights activist](#) [3:22]

For students interested in going deeper on the topic of the massive extinction due to the asteroid impact of 66 million years ago, the following two videos are excellent.

The first summarizes the steps that led to widespread acceptance of the asteroid explanation (often called the Impact Hypothesis).

The second video focuses on the effect on reptiles and mammals after the impact. It describes the FIMS Hypothesis (fungal infection mammalian selection). The bulk of the video deals with FIMS, but a short overview is presented from the 2:08 to 4:30 mark; this segment also includes a good summary of the commonly accepted post-asteroid sequence, as well as a nice

introduction to the key traits of fungi. Essentially, the FIMS Hypothesis is that the rise of mammals benefitted from the huge growth of fungi that followed the destruction of plants and the elimination of a large percentage of Earth's animals.

- [PBS / Eons / How we figured out an asteroid killed the dinosaurs](#) [12:39].
- [PBS / Eons / Why wasn't there a second Age of Reptiles?](#) [11:04]