Chapter Twenty-one: Environmental Problems and Solutions
Teacher Notes

Lesson One: Environmental Problems

-Pollution-an unwanted change in the environment that is caused by harmful substances, wastes, gases, noise, or radiation.

-anything that causes pollution is called a pollutant

-some pollutants are caused by natural events and others by humans

-Garbage

-average American throws away more trash than in any other nation

-landfills contain medical waste, lead paint, and other hazardous materials

-hazardous waste is waste that can catch fire, wear through metal, explode, or make people sick

-Chemicals

-chemicals that help people can harm the environment

-fertilizers and pesticides pollute water and soil

-CFCs destroy ozone; PCBs poisonous and may cause cancer

-use of CFCs and PCBs is banned

-High-powered Wastes

-radioactive wastes produced by nuclear power plants

-Gases

-Carbon dioxide in the atmosphere has increased trapping heat around the Earth and may be increasing global temperature.

-could result in the melting of polar ice caps and make the ocean rise

-Noise

-affects ability to hear and think clearly; may damage your hearing

-Resource Depletion

-Renewable Resource-a natural resource that can be replaced at the same rate at which the resource is consumed.

-example-solar and wind energy

-Nonrenewable Resource-a resource that forms at a rate that is much slower than the rate at which it is consumed.

-example-fossil fuels such as oil and coal

-Renewable or Nonrenewable?

-some resources thought to be renewable are becoming nonrenewable

-fresh water in some areas is being used faster than it can be replaced.

-Exotic Species

-people carry other species with them; boats, airplanes, and cars carry plant seeds, animal eggs, and adult organisms from one part of the world to another.

-exotic species often thrive in a new location but can drive out native species

-Human Population Growth

-Advances in medicine and farming have caused population to increase

-overall this is beneficial

-Overpopulation-the presence of too many individuals in an area for the available resources.

-scientists think human growth will slow down before this happens

-Habitat Destruction

-when land is cleared for construction, crops, mines, or lumber, and topsoil may erode.

-chemicals may pollute nearby streams and rivers

-Biodiversity-the number and variety of organisms in a given area during a specific period of time.

-if habitats are damaged or destroyed biodiversity is lost

-Forest Habitats

-deforestation-the clearing of forest lands

-today lumber companies often plant new trees to replace the trees that were cut down

-tropical rain forests often can't be replaced with the same biodiversity that was once there; also this soil is often harmed by the clearing.

-Marine Habitats

-point-source pollution-pollution that comes from one source

-example-an oil spill

-nonpoint-source pollution-comes from many different sources

-chemicals wash into rivers, lakes, and oceans

-plastics are also sometimes dumped into marine environments

-is against the law but difficult to enforce

-Effects on Humans

-effects air we breathe, pollutes drinking water, chemicals may cause cancer

Lesson Two: Environmental Solutions

-Conservation-the preservation and wise use of natural resources

-conservation means use fewer natural resources

-helps reduce waste and pollution; helps prevent habitat destruction

-Reduce-to use less

-Reducing Waste and Pollution

-as much as 1/3 of the waste produced by some countries is packaging material

-biodegradable is a material that can be broken down by living organisms

-companies are trying to use less hazardous materials

-farmers not using chemicals on crops but instead using natural methods such as mulch, compost, manure, and natural pest control

-Reducing the Use of Nonrenewable Resources

-scientists looking into other energy sources that can replace fossil fuels.

-looking at wind, tides, and falling water

-electric and hydrogen-fueled automobiles

-Reuse-using items more than once

-Reusing Products

-plastic bags being used to make benches

-building materials that can be reused include wood, bricks, tiles

- -Reusing Water
  - -water can be reclaimed by using organisms to clean the water
    - -include filter-feeding animals
    - -reclaimed water may not be clean enough to drink but can be used to water crops, lawns, and golf courses or can be returned to the groundwater supply

-Recycle-the process of recovering valuable or useful materials from waste or scrap; the process of reusing some items.

- -Recycling Trash
  - -plastics, paper, aluminum, wood, glass, and cardboard are materials that can be recycled
    - -a ½ million trees are used to make Sunday papers
    - -95% of energy needed to change raw ore into aluminum can be saved by recycling cans
- -Recycling Resources
  - -waste that can be burned can be used to generate electricity
  - -resource recovery-using waste to produce electricity

-Maintaining Biodiversity

- -Protecting Species
  - -pass laws like the Endangered Species Act to protect endangered animals
- -Protecting Habitats
  - -entire web needs to be protected including habitat

-Environmental Strategies

- -Reduce Pollution-recycle as much as possible; buy recycled items; don't dump hazardous waste
- -Reduce Pesticide Use-avoid pesticides that might harm beneficial insects; use natural pesticides that interfere with the way certain insects grow, develop, and reproduce; develop biodegradable pesticides
- -Protect Habitats-preserve entire habitats; conserve wetlands; reduce deforestation
- -Enforce the Endangered Species Act-ask the government to protect species that might be endangered
- -Develop Alternate Energy Sources-increase the use of solar power, wind power, and renewable energy sources

-What You Can Do

- -Reduce, Reuse, Recycle!