

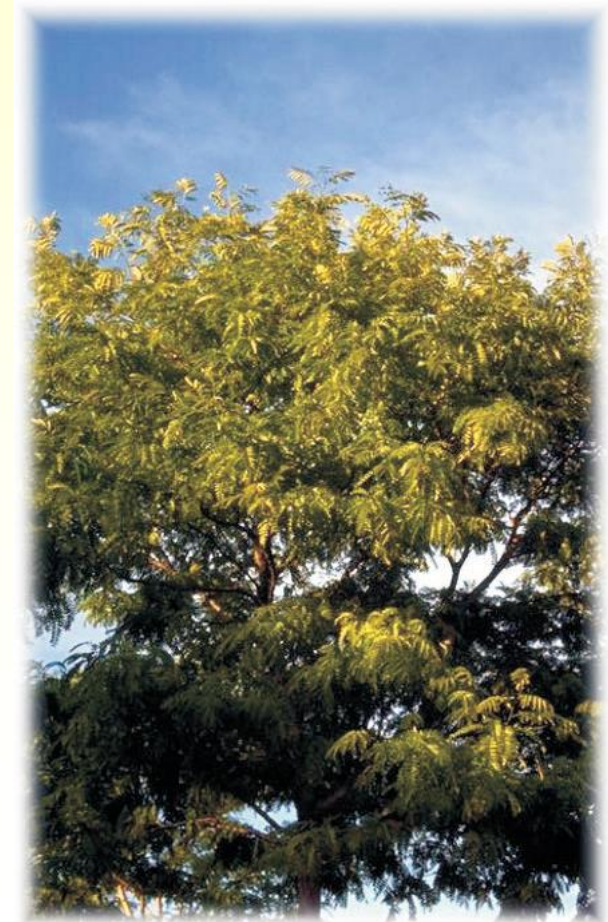


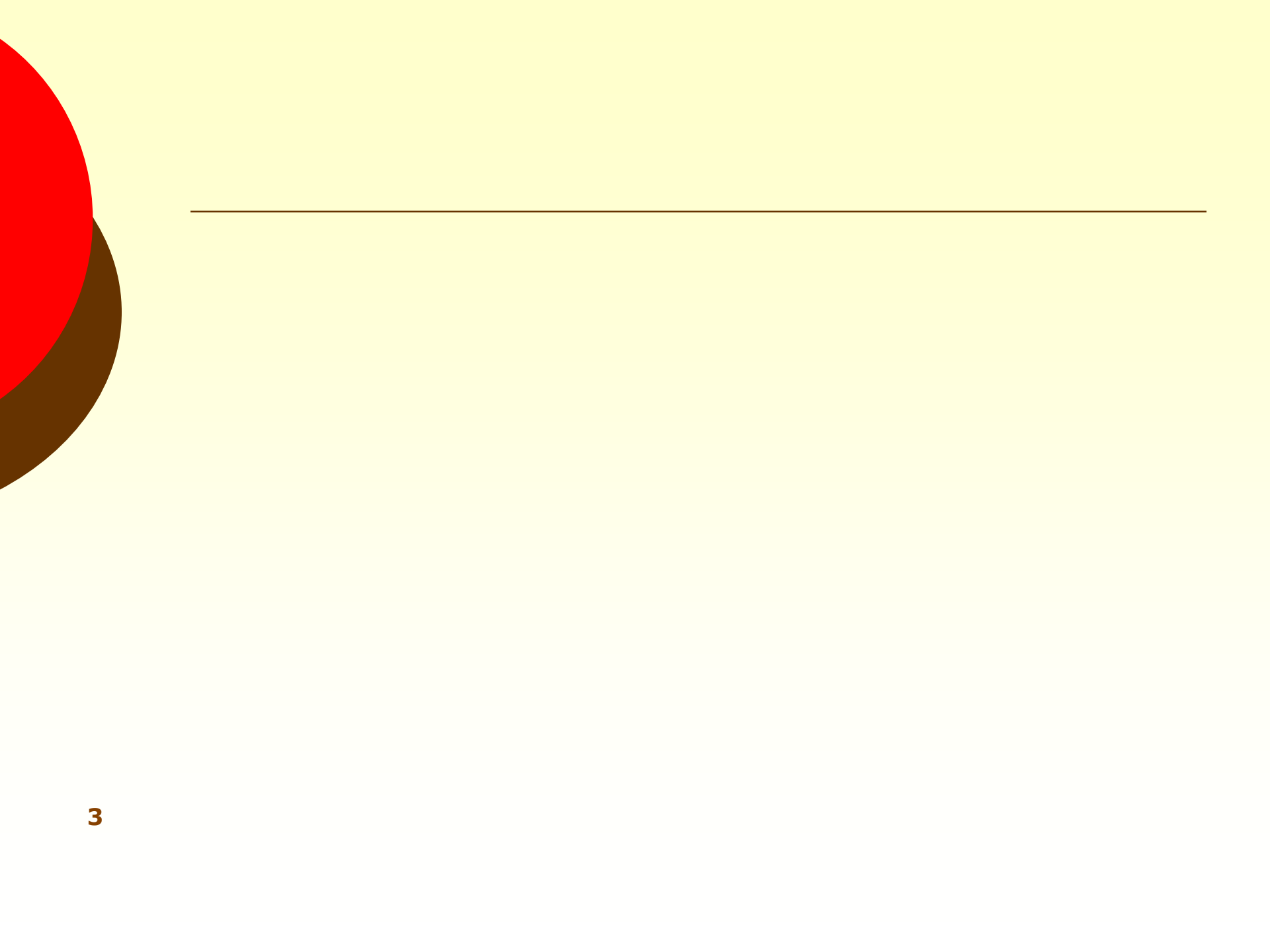
Natural Resources and Environmental Systems

Lesson Plan: NRES A1-1

Anticipated Problems

1. How do natural resources and environmental systems compare?
2. How are natural resources classified?







Terms

- abiotic natural resources
- air
- atmosphere
- biosphere
- biotic natural resources
- climate
- domestication
- environmental systems



Terms

- exhaustible natural resource
- fossil fuels
- hydrosphere
- inexhaustible natural resource
- lithosphere
- minerals
- natural resources
- nonrenewable natural resources

Terms

- renewable natural resources
- soil
- water
- water cycle
- wildlife
- wind



Comparing Natural Resources and Environmental Systems

- Differentiating between natural resources and environmental systems is often not easy.
- They are closely related fields with much overlap.





Comparing Natural Resources and Environmental Systems

- ***Natural resources*** are those things found in nature, such as forests, mineral deposits, soil, and fresh water, that have economic value.
- Air and wind, fossil fuels, minerals, people, soil, sunlight, water, and wildlife are types of natural resources.

Atmosphere



- The ***atmosphere*** is the gaseous layer that encompasses the earth.
- ***Air*** is the mixture of gases that make up the atmosphere.
- ***Wind*** is the movement of air.
- Water vapor, gases, and particulates can be found in the atmosphere.



Fossil Fuels

- ***Fossil fuels*** are fuels formed from the remains of dead animal and plant material deposited in a previous geologic time, typically millions of years ago.

Fossil Fuels

- The energy in the fuels comes from the high carbon and hydrogen content of the deceased animals and plants.
- The burning of fossil fuels produces pollution and carbon dioxide linked to global warming.
 - Fossil fuels come in different forms, including peat, petroleum, natural gas, and coal.





Minerals

- ***Minerals*** are natural inorganic substances on or in the earth.
 - Not living things
 - Mined from the earth
 - Used to produce everything from iron to brick



Other Natural Resources

- People help determine how other natural resources are used.
 - As the human population has increased, there has been a greater demand for natural resources.
 - The wise use of resources is necessary to ensure their future availability.

Soil

- ***Soil*** is the outer layer of the earth's surface that supports life.
 - Plants obtain nutrients, water, and support from soil and convert radiant energy from the sun to chemical energy.
 - Humans and other animals obtain sustenance from plants.





Soil

- Soil takes many years to form, but it can be easily lost by erosion.
 - Therefore, soil must be protected in order for it to continue to be a resource.

Sunlight

- Sunlight is the source of almost all the energy used on the earth.
 - The light from the sun produces solar energy.
 - Plants use this energy in the process of photosynthesis.
 - People can also use this energy if it is harnessed using solar collectors.





Water

- ***Water*** is a tasteless, colorless, liquid natural resource.
 - All living things need water to survive.
 - Naturally occurring compound made up of two atoms of hydrogen and one atom of oxygen
 - Three forms: solid, liquid, and gas

Water Cycle

- The ***water cycle*** is the movement of water from the earth's surface to the atmosphere and back to the surface.





Wildlife

- All the plants and animals that live in the wild are called ***wildlife***.
 - These plants and animals have not been domesticated.
 - ***Domestication*** is the control of plants and animals by humans.

Environmental Systems

- ***Environmental systems*** are all the interactions between climate, the solid earth (lithosphere), water (hydrosphere), and the living things on Earth (biosphere).



FIGURE 3. A climate with low precipitation limits plant growth.



Climate

- ***Climate*** is the average weather conditions in a region over a period of years.
- Elements:
 - Temperature
 - Precipitation
 - Wind
 - Humidity
 - Fog
 - Cloud cover

Climate

- A mixture of
 - Nitrogen (78%)
 - Oxygen (21%)
 - Traces (remaining 1%) of carbon dioxide, argon, water vapor, and other components
- Pollutants produced from natural fires accumulate in the atmosphere.





Lithosphere

- The combination of soil and rock that makes up the earth's crust is called the ***lithosphere***.
 - Thin crust covering the molten part of the earth
 - The upper 1 kilometer of the lithosphere interacts with the biosphere or the living things on Earth.

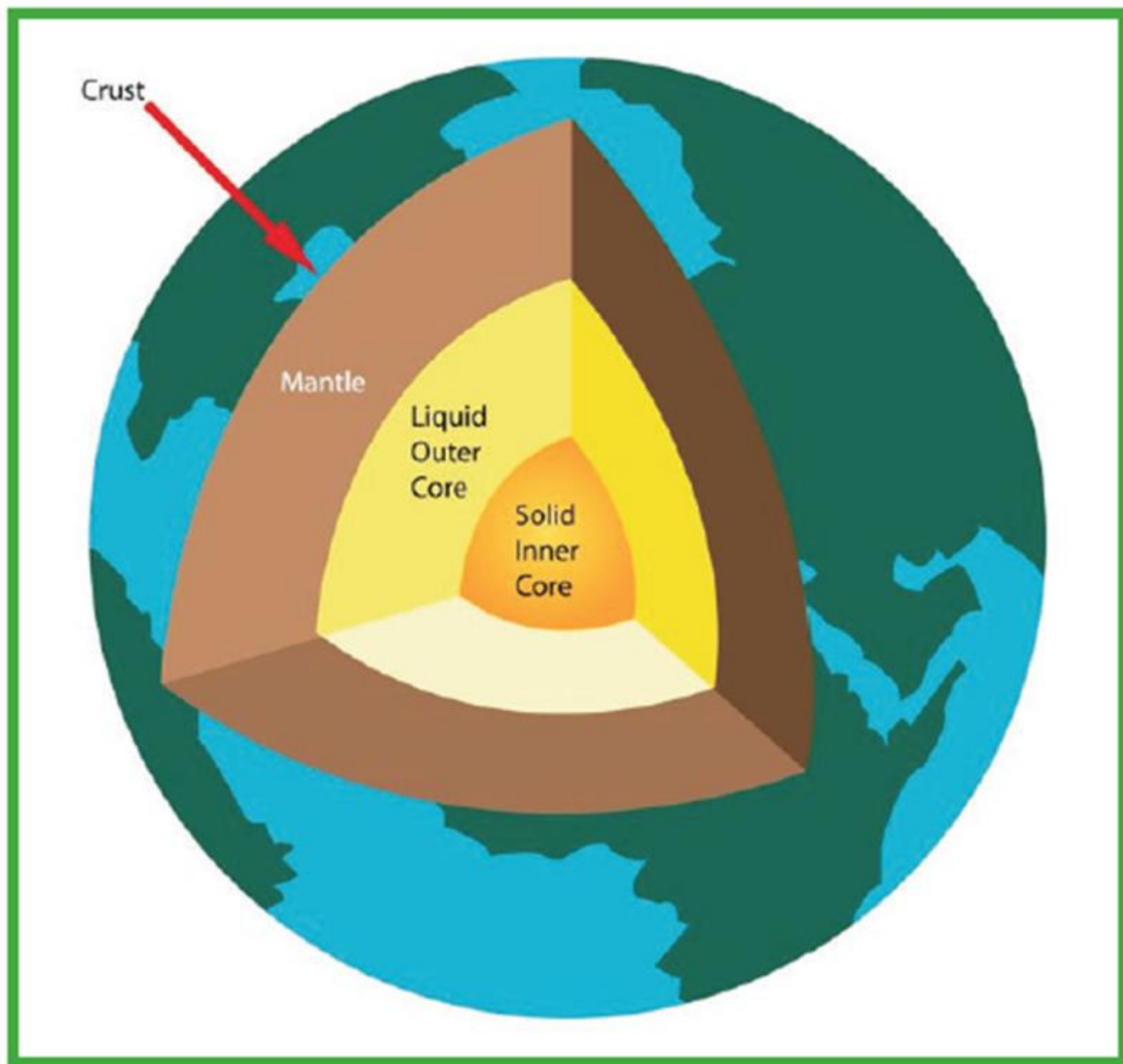
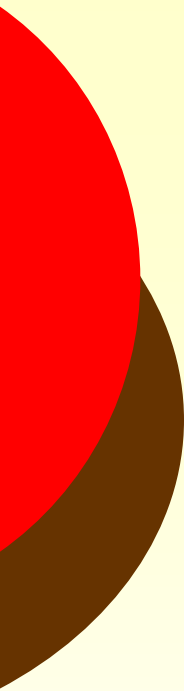


FIGURE 3. The combination of soil and rock that makes up the earth's crust is called the lithosphere.



Lithosphere

- Main constituents of the lithosphere are:
 - Oxygen (47%)
 - Silicon (28%)
 - Aluminum (8%)
 - Iron (5%)
 - Calcium (4%)
 - Sodium (3%)
 - Potassium (3%)
 - Magnesium (2%) in a crystalline state



Lithosphere

- The lithosphere is the main source of pollutants as raw materials are extracted by life and economic activities.
 - Volcanic eruptions are a natural release of some pollutants.
 - Pollutants from fossil fuels are the result of artificial extraction and combustion.



Hydrosphere

- The ***hydrosphere*** is all the water on Earth, whether liquid, solid, salty, or fresh.
 - Serves as a solvent for elements such as sodium, magnesium, calcium, chloride, and sulphate dissolved in it.

Hydrosphere

- The oceans account for 97 percent of water forms, ice for 2 percent, and rivers, lakes, groundwater, and atmospheric vapor for 1 percent.
 - Water is an important accumulator of pollutants.





Biosphere

- All the communities of living things on Earth compose the ***biosphere***.
 - All living organisms, including animals and vegetation, are temporary accumulators (mercury, lead) and sources for pollutants (natural fires).
 - The biosphere also includes dead organisms and decayed organic matter.



Classifying Natural Resources

- One way to classify natural resources is by their source of origin.
 - Biotic
 - Abiotic



Biotic Natural Resources

- Natural resources of biotic origin come from the biosphere.
- ***Biotic natural resources*** are resources that may be living or were living at one time.
 - Trees, animals, and microorganisms are living natural resources.
 - Nonliving biotic natural resources include fossil fuels, such as coal and oil.



Abiotic Natural Resources

- ***Abiotic natural resources*** are resources that come from nonliving, nonorganic materials.
 - Land
 - Water
 - Air
 - Minerals

Inexhaustible Natural Resource

- An ***inexhaustible natural resource*** is a resource that will not run out in the foreseeable future.
 - Few resources are inexhaustible.
 - Sunlight, wind, and geothermal energy





Exhaustible Natural Resource

- An ***exhaustible natural resource*** is a resource that is available in limited quantity and can be completely used.
 - Some exhaustible natural resources are renewable, whereas others are nonrenewable.



Renewable Natural Resource

- ***Renewable natural resources*** are resources replaced naturally.
 - Fresh water, forests and other vegetation, and wildlife. (replenished and used again)
 - Soil is also considered a renewable resource, (may take many years for it to be replenished)
 - If the consumption of renewable natural resources exceeds the regeneration of the resources, they may become exhausted.

Renewable Natural Resource: Fresh Water





Nonrenewable Natural Resource

- ***Nonrenewable natural resources*** are resources that cannot be replaced after use.
 - Minerals and fossil fuels are two types of nonrenewable natural resources.
 - Fossil fuels are replaceable, from a human-use perspective they are considered nonrenewable.

Nonrenewable Natural Resource: Copper



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FIGURE 5. Copper is a nonrenewable natural resource that cannot be replaced after use and after available deposits have been mined.



Review

- What are those things found in nature, such as forests, mineral deposits, soil, and fresh water, that have economic value?
- What are the interactions between climate, the solid earth (lithosphere), water (hydrosphere), and the living things on Earth (biosphere)?
- Name four abiotic natural resources.