Food Web and Food Pyramids

{Living World

Ecosystem Ecology

- Examines Interactions Between the Living and Nonliving World
- Ecosystem
  - A particular location on Earth distinguished by its particular mix of interacting biotic and abiotic components.

Ecosystem Boundaries

- Some ecosystems, such as caves and lakes have very distinctive boundaries.
- However, in most ecosystems it is difficult to determine where one ecosystems stops and the next begins.

The Greater Yellowstone Ecosystem

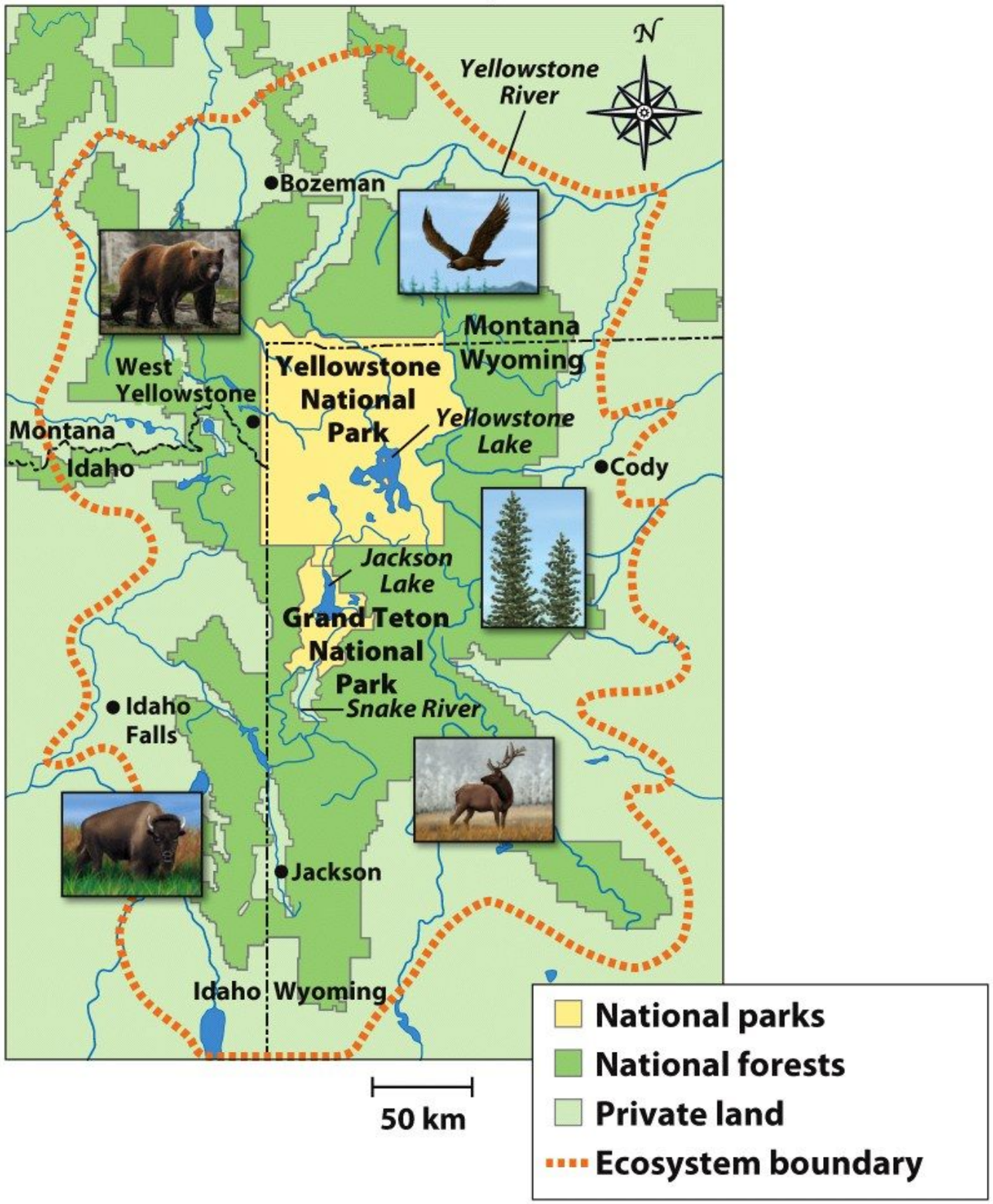


Figure 3.2a
Environmental Science

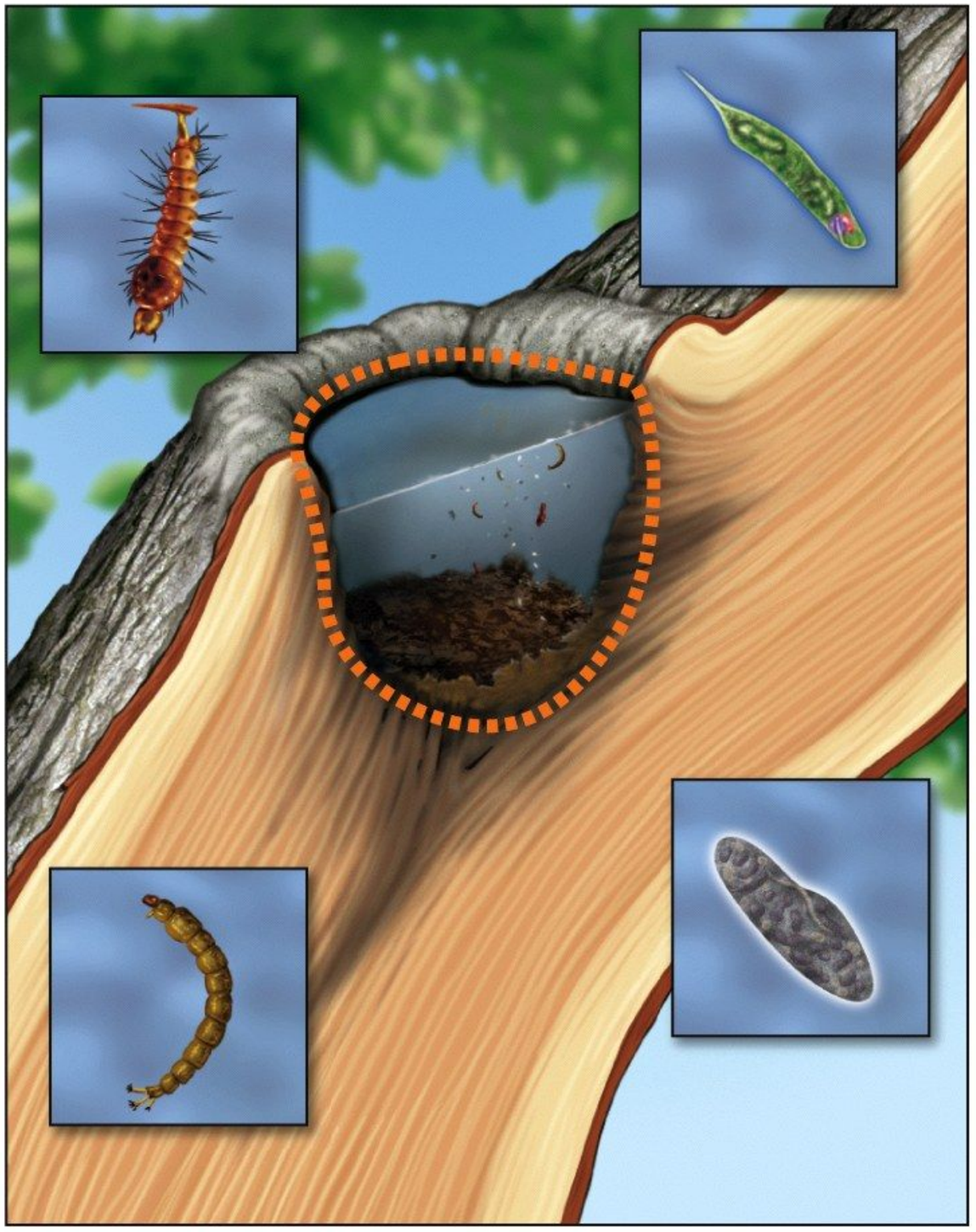
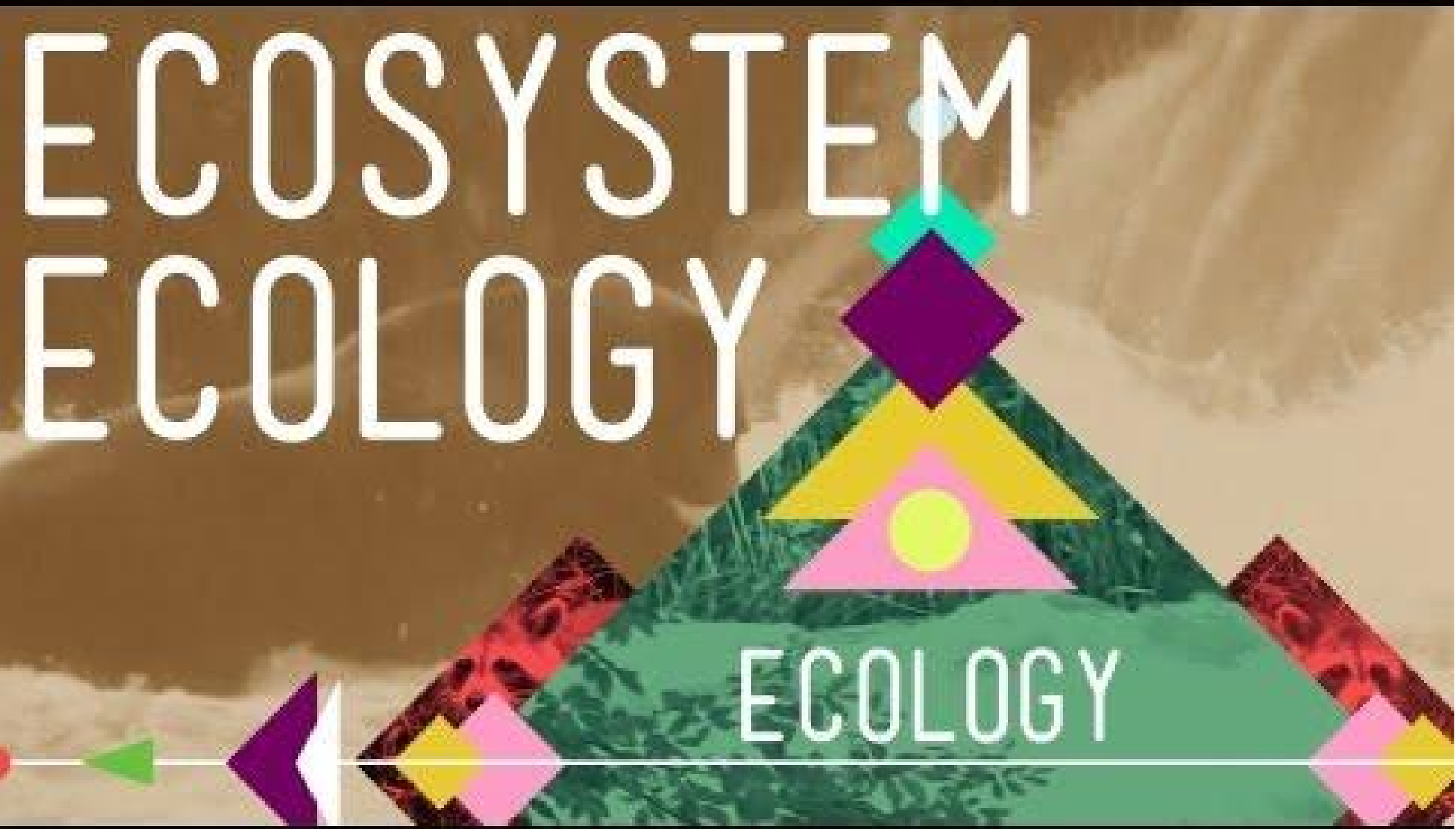


Figure 3.2b
Environmental Science

Ecosystem Processes

- Even though it is helpful to distinguish between two different ecosystems, ecosystems interact with other ecosystems.

ECOSYSTEM ECOLOGY



Energy Flows through Ecosystems

Trophic Levels, Food Chains, and Food Webs

- Consumers (heterotrophs)- obtain energy by consuming other organisms.
- Primary Consumers (herbivores)- consume producers.
- Secondary Consumers (carnivores/omnivores)- obtain their energy by eating primary consumers.
- Tertiary Consumers (carnivores/omnivores)- eat secondary consumers.

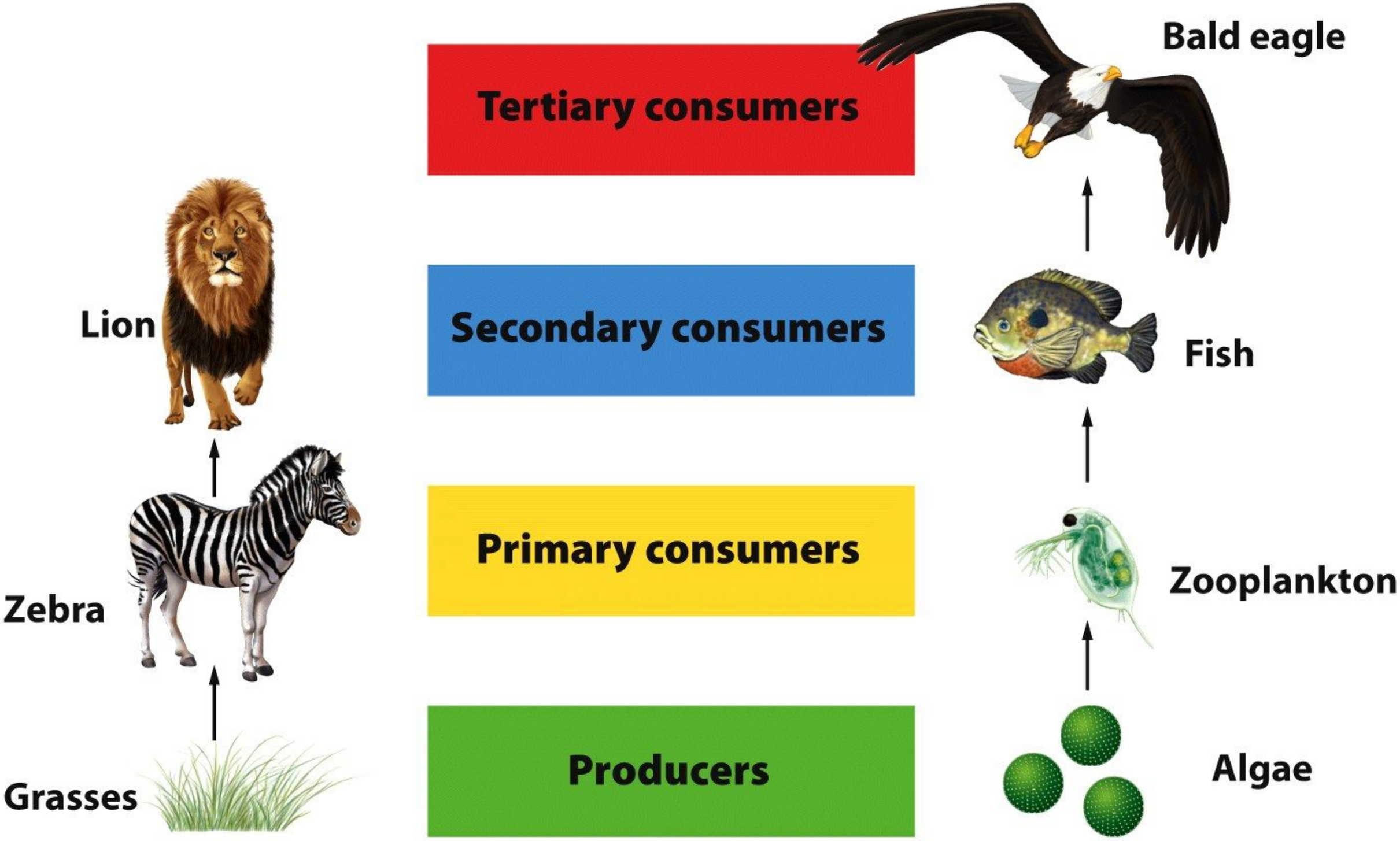


Figure 3.5
Environmental Science

Food Chains vs. Food Webs

- Food Chain
  - The sequence of consumption from producers through tertiary consumers.
- Food Web
  - A more realistic type of food chain that takes into account the complexity of nature- includes all the interacting feeding relationships between organisms.

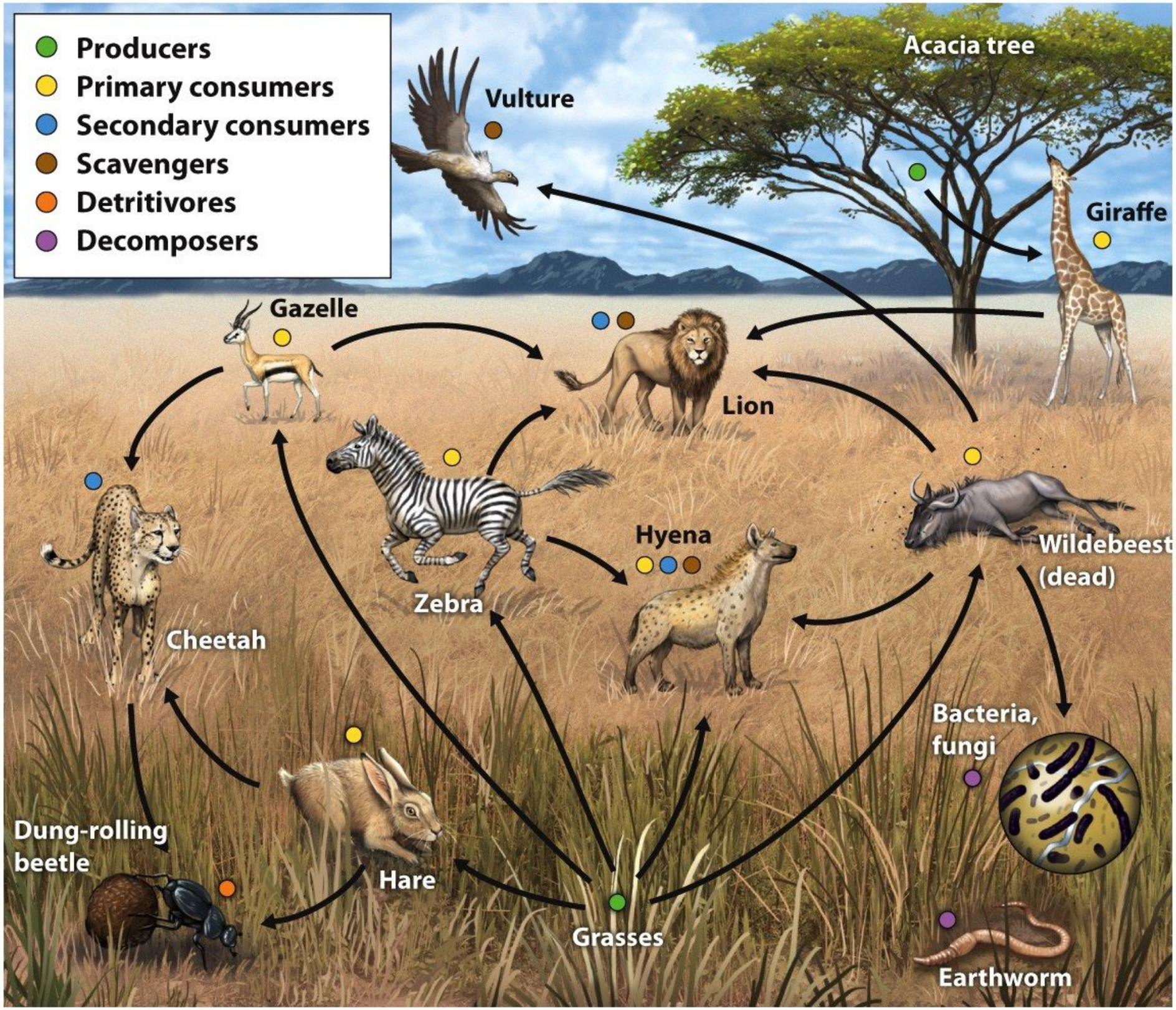


Figure 3.6
Environmental Science

Organisms Recycle Matter

- Scavengers
  - Feeds on dead organisms, especially a carnivorous animal that eats dead animals rather than or in addition to hunting live prey.
  - Hyenas, vultures and wolves

Organisms Recycle Matter

- Detritivores
  - an organism that feeds on dead and decomposing organic matter.
  - Earthworms, Dung Beetles

Organisms Recycle Matter

- Decomposers
  - an organism, especially a soil bacterium, fungus, or invertebrate, that decomposes organic material.
  - bacteria, worms, slugs, snails, and fungi like mushrooms

Ecosystem Productivity

- Gross primary productivity (GPP)
  - The total amount of solar energy that the producers in an ecosystem capture via photosynthesis over a given amount of time.

Ecosystem Productivity

- Net primary productivity (NPP)
  - The energy captured, gross primary productivity (GPP), minus the energy respired by producers.

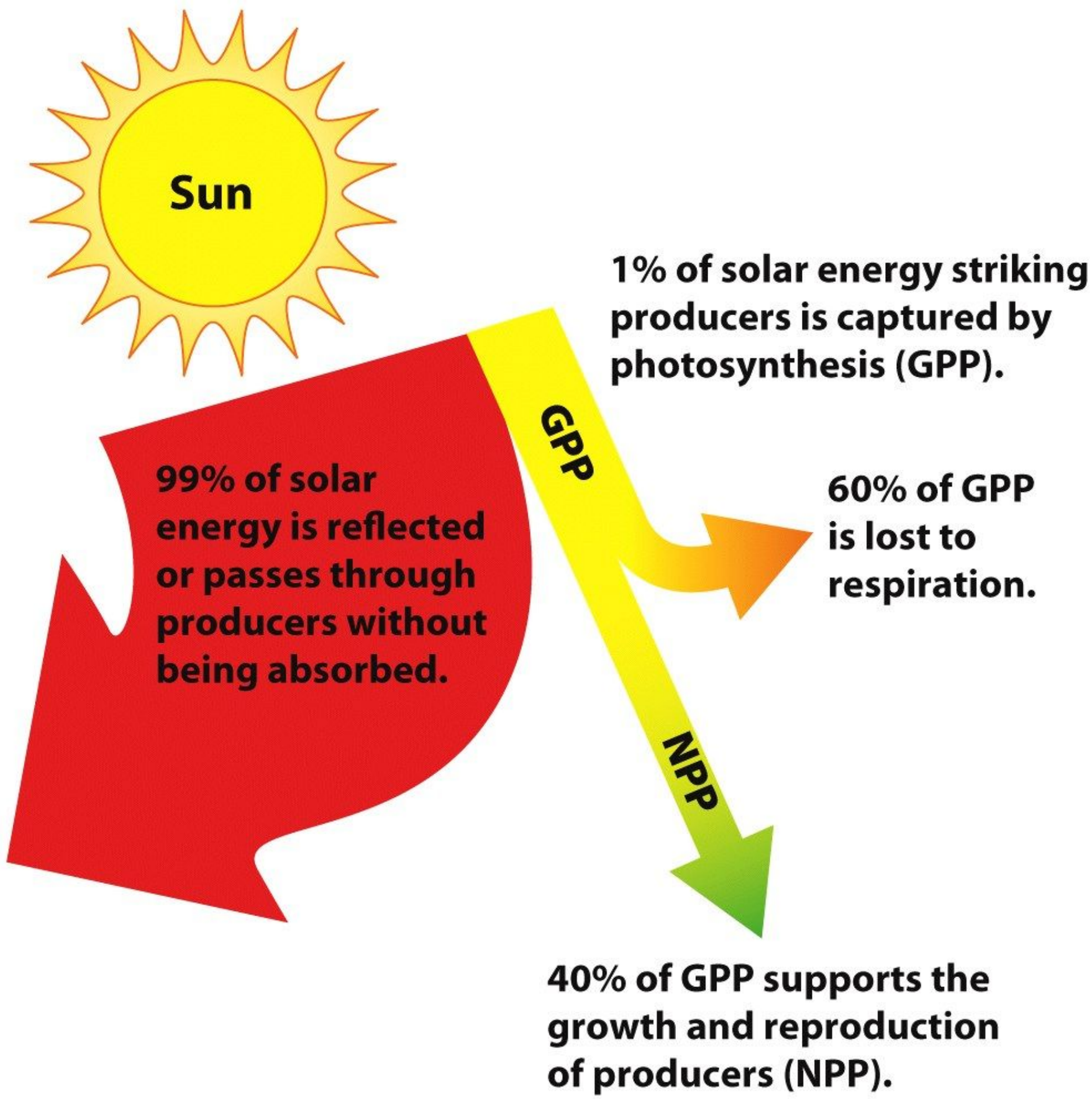
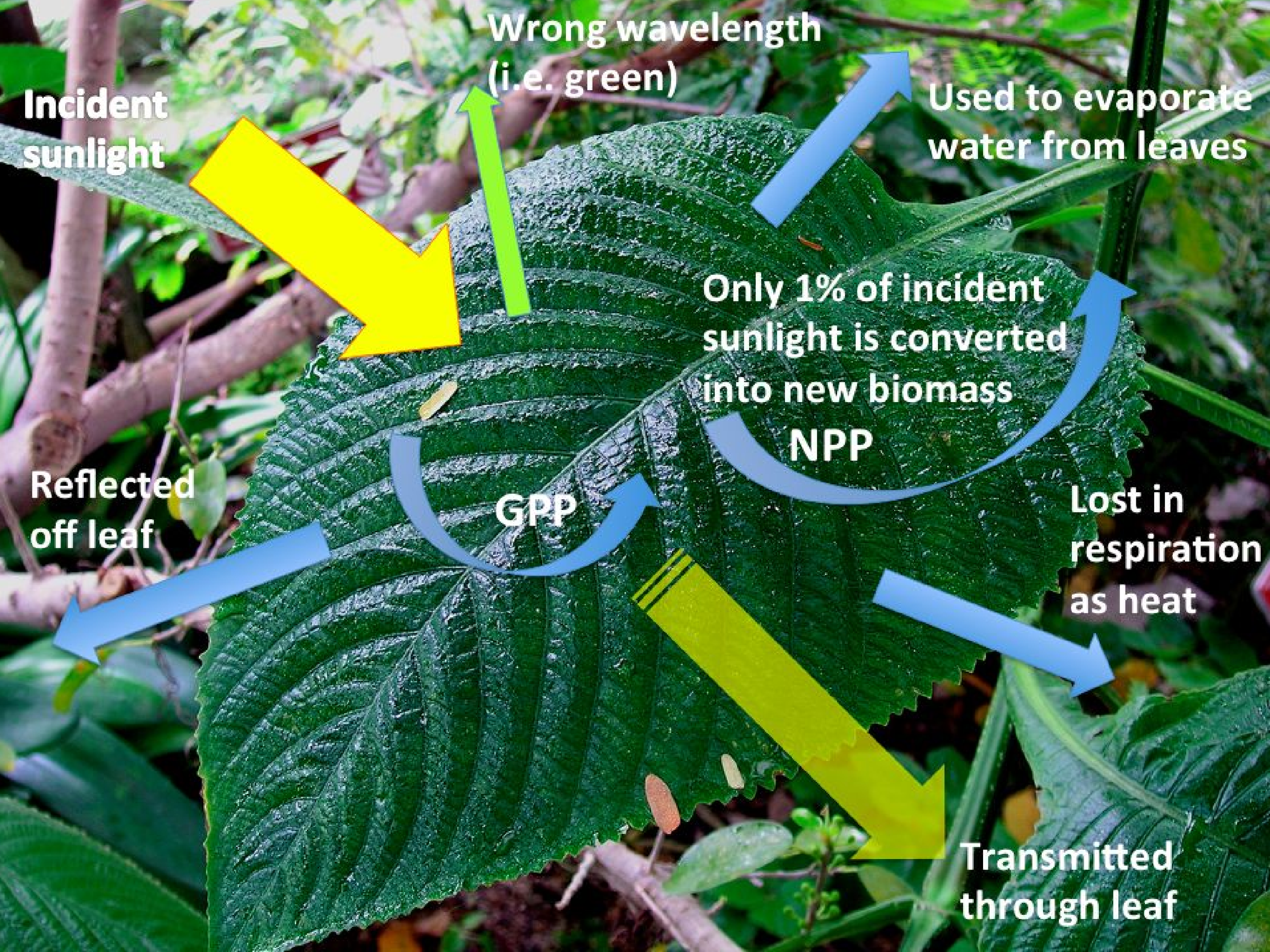


Figure 3.7
Environmental Science


Incident sunlight
Wrong wavelength (i.e. green)
Used to evaporate water from leaves
Only 1% of incident sunlight is converted into new biomass
NPP
GPP
Reflected off leaf
Lost in respiration as heat
Transmitted through leaf

NPP Varies Among Ecosystems

- High NPP-
- Swamps Marshes
- Tropical Rainforest
- Coral Reefs
- Salt Marshes

- Low NPP-
- Open Ocean
- Deserts
- Tundra

Energy Transfer Efficiency and Trophic Pyramids

- Biomass
  - total mass of all living matter in a given area (minus the water)

Energy Transfer Efficiency and Trophic Pyramids

- Standing crop
  - The amount of biomass present in an ecosystem at a particular time- measures the amount of energy in a system at a given time.

Energy Transfer Efficiency and Trophic Pyramids

- Ecological efficiency
  - The proportion of consumed energy that can be passed from one trophic level to another- about 10%

Energy Transfer Efficiency and Trophic Pyramids

- Trophic pyramid
  - The representation of the distribution of biomass among trophic levels.

Matter cycles through the biosphere- Biogeochemical Cycles

- Biosphere
  - The combination of all ecosystems on Earth.
- Biogeochemical cycles
  - The movement of matter within and between ecosystems involving biological, geological and chemical processes.


COMPILATION
FOOD
CHAINS
KIDS