CORNELL NOTES
Directions: You must create a minimum of 5 questions in this column per page (average). Use these to study your notes and prepare for tests and quizzes. Notes will be stamped after each assigned sections (if completed) and turned in to your teacher at the end of the Unit for scoring.

UNIT 5: ECOLOGY
Chapter 13: The Principles of Ecology

I. Ecologists Study Relationships (13.1)

A. Ecologists study environments at different **levels of** _____

1. **Ecology**- study of the interactions among living things and their surrounding. Name comes from Greek work "oikos"- meaning "_____".

2. **Levels of organization**- biologist study nature on different levels, from a _____ to a _____ scale

a. _____- a individual living thing

b. _____- group of <u>same</u> species that lives in one area

c. _____- group of <u>different</u> species that live together in one area

d. _____- includes all organisms as well as the climate, soil, water, rocks, and other non-living things in a given area.

e. _____- major regional or global community of organisms characterized by climate conditions and plant communities that thrive there.

B. Ecological research methods include observations , experimentation, and modeling

1. _____- the act of carefully watching something over time.

a. May be _____ term or _____ term studies

b. _____ are used to monitor and observe populations

2. **Experimentation**- may perform experiments in the _____ or in the _____

a. **lab experiments** give researcher more control, but artificial setting does not reflect complex _____ that occur in _____.

b. **field experiments** gives more accurate picture but is more difficult because of numerous _____ at work in _____.

c. **Modeling**- use of _____ or mathematical _____ to describe and model nature based on real data.

1). Can see how one _____ affects another

2). Can create **virtual** _____

II. Biotic and Abiotic Factors (13.2)

A. An ecosystem includes both biotic and abiotic factors

1. **Biotic**- includes _____ things

2. **Abiotic**- includes _____ things such as moisture, temperature, wind, sunlight, and soil

B. Changing one factor in an _____ can affect many other factors

1. **Biodiversity**- the assortment, or _____, of living things in an ecosystem

a. amount depends on many factors

b. **tropical rainforests** have _____ biodiversity

2. _____ **species**- a species that has an unusually _____ effect on its ecosystem

a. loss of this species may cause _____ **effect** felt across entire _____

b. Example- **beaver** changes habitat for many other species by creating _____

III. Energy in Ecosystems (13.3)

A. _____ provide energy for other organisms in an ecosystem

1. **Producer** (_____)- get their energy from nonliving resources (make their own food)

2. **Consumer** (_____)- get their energy by eating other living things such as plants and animals

B. Almost all producers obtain energy from _____

1. Most producers on Earth use **sunlight** as energy source using _____.

2. photosynthesis converts light energy (_____) into chemical energy (_____)

C. _____- organisms make carbohydrates using **chemicals** instead of sunlight

1. Found in _____-_____ **thermal vents** and sulfur-rich marsh flats and hydrothermal pools

2. can be _____ for thriving ecosystems

IV. Food Chains and Food Webs (13.4)

A. **Food chain**- sequence that links species by their _____ relationships.

1. only follows connections between **one** _____ and **single** _____ of consumers

2. simplest way to look at _____ flow in an ecosystem

B. Types of consumers

1. **Herbivores**- eat only _____

2. **Carnivores**- eat only _____

3. **Omnivores**- eat both _____ and _____

4. **Detritivores**- organisms that eat detritus (_____ organic matter)

5. **Decomposers**- _____ _____ organic matter into simpler compounds

a. _____ and **bacteria**

b. Important to stability of ecosystem by returning _____ back into the environment

6. Organism may focus on single organism to feed (_____), or have varying diet (**generalist**)

C. _____ **levels**- level in a food chain

1. _____ always first level

2. **Primary consumers** next level (_____)

3. _____ **consumer**- eat herbivores (carnivore)

4. _____ **consumer**-carnivores that eat secondary consumers.

D. A **food** _____ shows a complex network of feeding relationships

1. **Food web**- organism may have _____ feeding relationships.

2. Stability of food web depends on presence of _____ (forms base of food web)

V. Cycling of Matter (13.5)

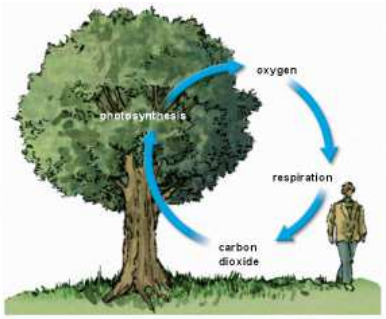
A. Water cycles through the environment

1. **Hydrologic cycle** (**water cycle**)- circular pathway of _____ on Earth

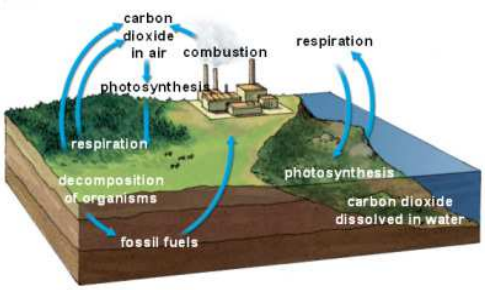
2. Flows from atmosphere to the surface, below ground and back and involves humans and other organisms.

B. Elements essential for life also _____ through ecosystems

1. **biogeochemical cycles**- movement of a particular _____ through biological and geological parts of an ecosystem



a. _____ **cycle**- cycle of photo-synthesis and cellular respiration



b. _____ **cycle**- flow of carbon through environment

1). **Carbon** essential for _____ compounds (carbohydrates, proteins, fats, etc.)

2). Simplest transfer occurs between _____ and _____ (photosynthesis and cellular respiration)

c. _____ **cycle**- conversion of nitrogen gas in atmosphere into compounds that living things canutilize

1). **Nitrogen** _____- converting _____ nitrogen into ammonia (NH_3) (used by certain bacteria)

2). **Denitrifying** _____- convert nitrogen compounds back to nitrogen _____

d. **Phosphorus cycle**- returns phosphorus to environment (phosphorus is _____ factor for plant growth)

VI. Pyramid Models (13.6)

A. An energy pyramid shows the distribution of _____ among _____ levels

1. Ecosystems get energy from _____

2. Some energy is _____ along the way as _____

B. Loss of available energy

1. energy used for many purposes such as **movement** and _____.

2. Your body very _____ at converting food into useful energy

3. Unused material excreted as _____

4. _____- measure of total dry mass of organisms in given area

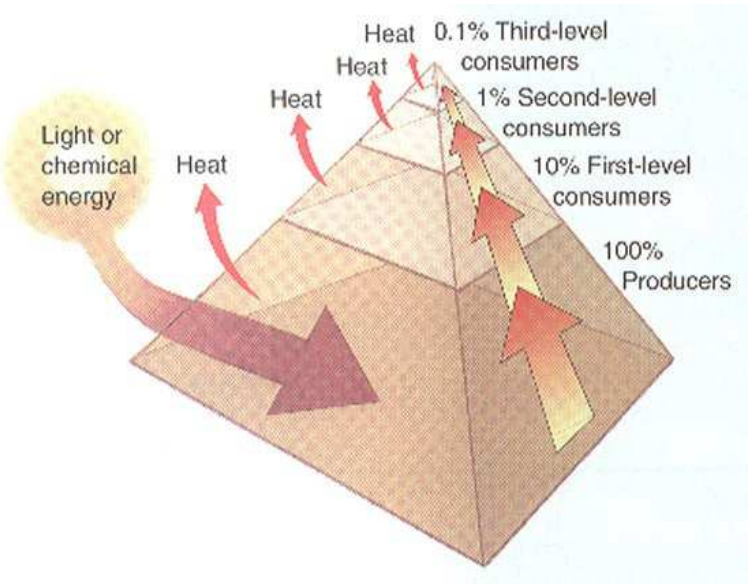
a. When consumer eats producer great deal of energy lost in process as _____ and **waste**

b. **Only ____% of energy is transferred at each trophic level**

C. **Energy Pyramid-** diagram that compares energy used by each _____ level

1. Base made up of _____

2. Energy _____ to each succeeding trophic level



D. Other pyramid models illustrate an ecosystem's biomass and distribution of organisms

1. _____ **pyramid**- diagram comparing biomass of different trophic levels within an ecosystem

2. **Pyramid of** _____- shows the numbers of individual organisms

3. Both types of pyramids may occur in an _____, or _____ down, formation (E.g. pyramid of numbers based on single tree