

**History and Organization of Biological Diversity**  
**Section 14.1 Fossil Evidence of Change**  
**Objectives 1-2**

**Vocabulary:** Define the following terms:

**extinction** - \_\_\_\_\_  
\_\_\_\_\_

**fossil** - \_\_\_\_\_  
\_\_\_\_\_

**paleontologist** - \_\_\_\_\_  
\_\_\_\_\_

**relative dating** - \_\_\_\_\_  
\_\_\_\_\_

**Law of Superposition** - \_\_\_\_\_  
\_\_\_\_\_

**radiometric dating** - \_\_\_\_\_  
\_\_\_\_\_

**half-life** - \_\_\_\_\_  
\_\_\_\_\_

**Main Idea - Clues in Rocks (Pages 393-396)**

Rocks cannot provide information about the Earth's \_\_\_\_\_  
but they are an important source of information about the \_\_\_\_\_

of life that \_\_\_\_\_ on the planet. Organisms buried  
\_\_\_\_\_ in \_\_\_\_\_ rock are preserved as fossils.

**Identify** six types of materials in which fossils are found.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

**List** the four steps to fossilization:

1. \_\_\_\_\_  
\_\_\_\_\_

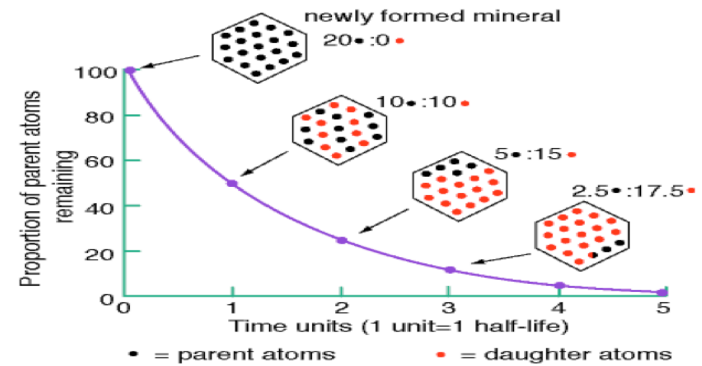
2. \_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_

4. \_\_\_\_\_  
\_\_\_\_\_

**Compare** relative and radiometric dating by providing three facts about each, using the table below.

Relative Dating	Radiometric Dating
1.	1.
2.	2.
3.	3.



**Analyze** the graph above:

1. Percent of the original material is left after one half-life \_\_\_\_\_
2. Percent of the original material is left after two half-lives \_\_\_\_\_
3. Percent of the original material is left after three half-lives \_\_\_\_\_
4. Percent of the original material is left after four half-lives \_\_\_\_\_

### History and Organization of Biological Diversity Section 14.2 Origin of Life Objectives 3-5

**Vocabulary:** Define the following terms:

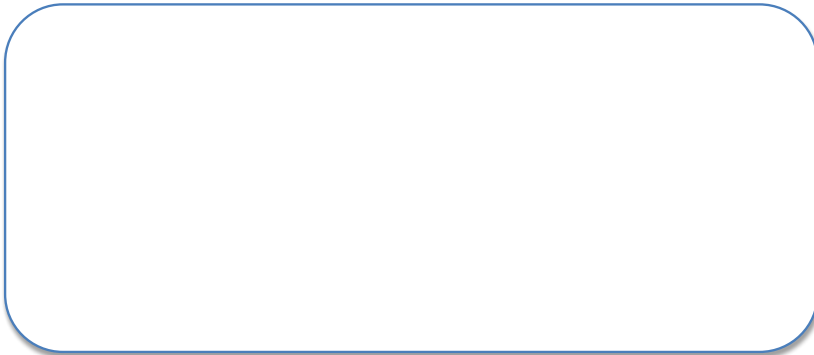
**spontaneous generation** - \_\_\_\_\_

**theory of biogenesis** - \_\_\_\_\_

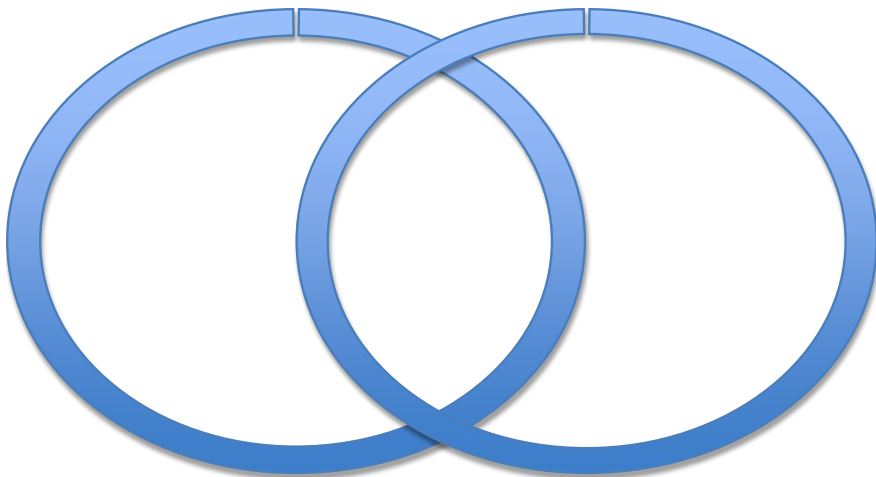
**endosymbiont theory** - \_\_\_\_\_

**Main Idea – Origins: Early Ideas (Pages 401-402)**

**Illustrate** Redi's experiment that disproved spontaneous generation.

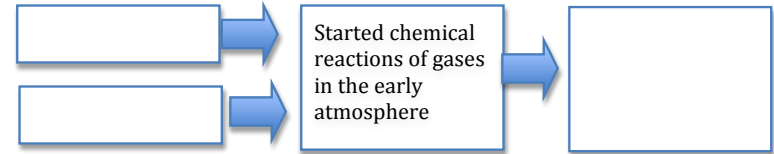


**Compare** spontaneous generation and biogenesis in the Venn diagram.



**Modern Ideas (Pages 402-404)**

**Model** Oparin's primordial soup hypothesis for the formation of simple organic molecules by completing the graphic organizer.



**Discuss** the importance of the work by Miller and Urey and Sydney Fox

**Miller-Urey** - \_\_\_\_\_

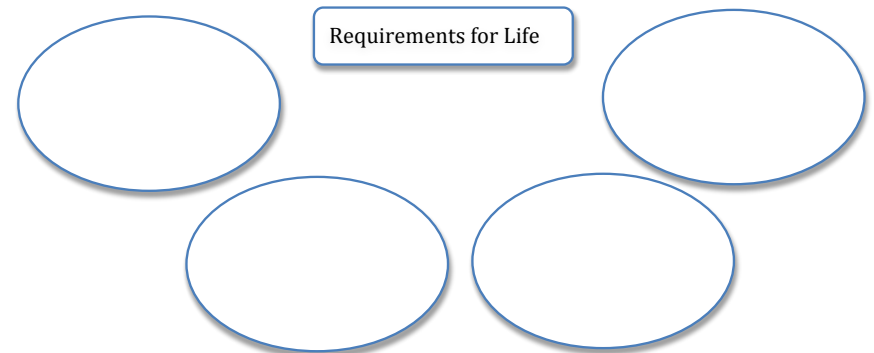
\_\_\_\_\_

\_\_\_\_\_

**Sydney Fox** - \_\_\_\_\_

\_\_\_\_\_

**Identify** four requirements for life using the concept map below .



**Main Idea – Cellular Evolution (Pages 405-407)**

**Sequence** how O<sub>2</sub> accumulated in the atmosphere its affect on life.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

**Identify** three properties that mitochondria and chloroplasts share with prokaryotes.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Analyze** the endosymbiont theory in the evolution of plant cells by completing the sequence chart.

1.	2. bacteria evolved into mitochondria	3.	4.
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**Summarize** the sequence of hypothesized events that lead from a lifeless Earth to the presence of a eukaryotic cell.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

**History and Organization of Biological Diversity  
Section 15.1 Darwin’s Theory of Natural Selection  
Objectives 6-7**

Define the following terms:

**Selective breeding** - \_\_\_\_\_

**artificial selection** - \_\_\_\_\_

**evolution** - \_\_\_\_\_

**natural selection** - \_\_\_\_\_

**Main Idea – Developing the Theory of Evolution (Pages 418-421)**

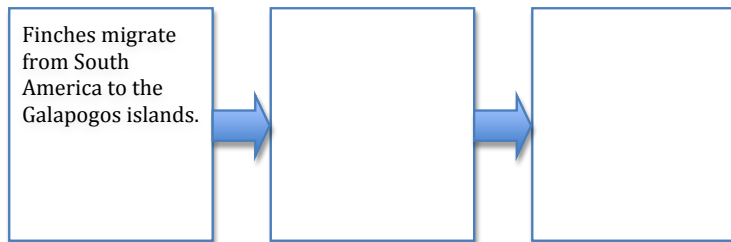
**Summarize** 3 observations Darwin made in his research on the South American mainland.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Identify** 3 organisms from the Galapagos Islands and their distinguishing characteristics.

Organism	Variation

**Analyze** Darwin’s hypothesis on the origin of Galapagos finches by filling in the flow chart.



**Summarize** 3 observations Darwin made in his research with pigeons.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Identify** the four principles of natural selection.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_
4. \_\_\_\_\_  
\_\_\_\_\_

**Summarize** natural selection by completing the sentences.

Natural Selection

Organisms with \_\_\_\_\_  
traits are able to \_\_\_\_\_  
and pass their traits on to their \_\_\_\_\_  
\_\_\_\_\_, who then reproduce.

Those without such favorable traits are  
more likely to \_\_\_\_\_  
before reproducing.

**History and Organization of Biological Diversity**  
**Section 15.2 Evidence of Evolution**  
**Objectives 8-9**

**New Vocabulary:** Use your book to write the correct vocabulary term for each blank.

**Analogous structures** - \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**ancestral trait** - \_\_\_\_\_  
 \_\_\_\_\_

**biogeography** - \_\_\_\_\_  
 \_\_\_\_\_

**camouflage** - \_\_\_\_\_  
 \_\_\_\_\_

**derived trait** - \_\_\_\_\_  
 \_\_\_\_\_

**embryo** - \_\_\_\_\_

**fitness** - \_\_\_\_\_  
 \_\_\_\_\_

**homologous structures** - \_\_\_\_\_  
 \_\_\_\_\_

**mimicry** - \_\_\_\_\_  
 \_\_\_\_\_

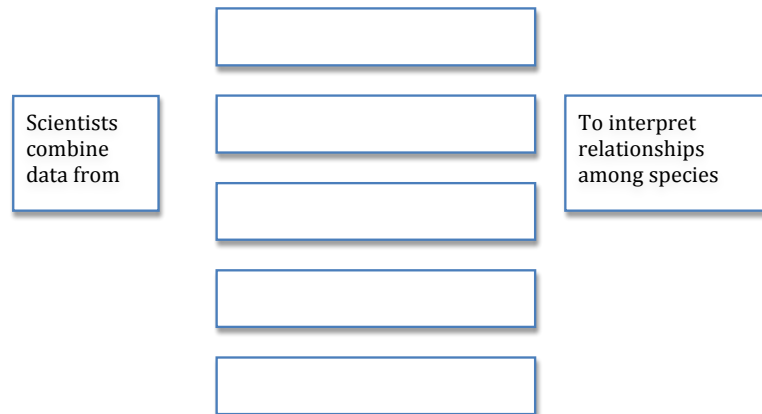
**vestigial structure** - \_\_\_\_\_  
 \_\_\_\_\_

**Main Idea – Support for Evolution (Pages 423-428)**

**Summarize** the role anatomy plays in the teaching us about evolution.

<b>Structure</b>	<b>What is it?</b>	<b>Example</b>
Homologous Structure		
Analogous Structure		
Vestigial Structure		
Embryo		

**Identify** ways scientists interpret relationships among species.



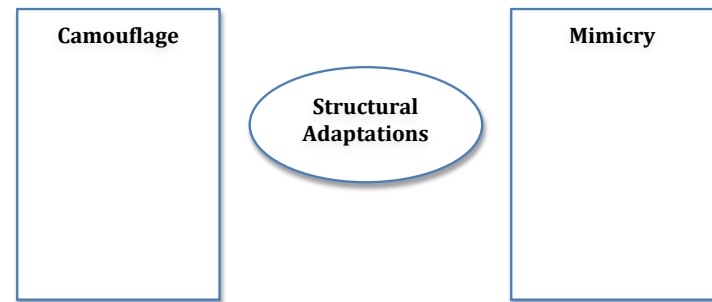
**Main Idea – Adaptation (Pages 428-430)**

**Compare** similarities and differences between adaptations and non-adaptations. Give an example of each.

Characteristic	Adaptations	Non-Adaptations
Inherited traits	yes	yes
Increase survival or Reproduction		
By-products arising from other evolutionary changes		
Example		

**Apply** Give examples of how animals use camouflage and mimicry in order to protect themselves. Use examples **NOT** found in your book.

- \_\_\_\_\_
- \_\_\_\_\_



**Analyze** how antibiotics can lose their effectiveness over time.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Summarize why fossils are important tools in understanding evolution.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**History and Organization of Biological Diversity**  
**Section 15.3 Shaping Evolutionary Theory**  
**Objectives 10-15**

**New Vocabulary:** Use your book to write the correct vocabulary term for each blank.

**Hardy-Weinberg Principle** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Founder effect** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**bottleneck** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**prezygotic isolating mechanism** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**genetic drift** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**stabilizing selection** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**postzygotic isolating mechanism** - \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
**directional selection** - \_\_\_\_\_  
\_\_\_\_\_

**disruptive selection** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**sexual selection** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**allopatric speciation** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**sympatric speciation** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Main Idea - Mechanism of Evolution (Pages 431-436)**

**Sequence** the steps associated with genetic equilibrium.

\_\_\_\_\_ make up a \_\_\_\_\_ at a  
certain \_\_\_\_\_ which over time  
results in \_\_\_\_\_.



**Identify** three ways the genetic equilibrium can be disrupted.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Main Idea – Reproductive Isolation (Page 437)**

**Contrast** geographic isolation and reproductive isolation.

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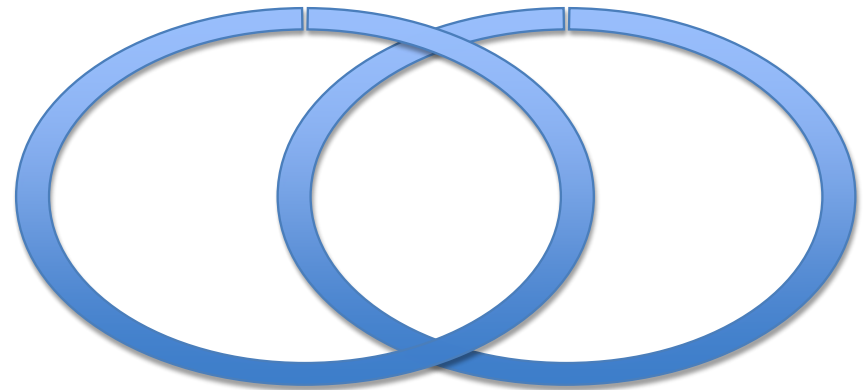
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**Compare** natural selection and sexual selection by completing the table.

	<b>Species Changes Based on</b>	<b>Increases Fitness?</b>
Natural Selection		
Sexual Selection		

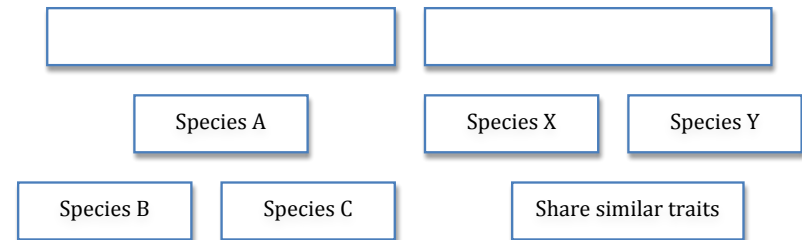
**Main Idea – Speciation (Page 438)**

**Compare** allopatric and sympatric speciation.



**Main Idea – Speciation and Patterns of Evolution (Page 439-441)**

**Label** each model as representing divergent or convergent evolution.



**Summarize** the two ideas concerning the rate of speciation.

<b>Gradualism</b>	<b>Punctualism</b>

**History and Organization of Biological Diversity**  
**Section 17.1 The History of Classification**  
**Objectives 16-17**

**New Vocabulary:** Use your book to write the correct vocabulary term for each blank.

**morphology** - \_\_\_\_\_  
 \_\_\_\_\_

**Binomial nomenclature** - \_\_\_\_\_  
 \_\_\_\_\_

**class** - \_\_\_\_\_  
 \_\_\_\_\_

**classification** - \_\_\_\_\_  
 \_\_\_\_\_

**family** - \_\_\_\_\_  
 \_\_\_\_\_

**genus** - \_\_\_\_\_  
 \_\_\_\_\_

**kingdom** - \_\_\_\_\_

\_\_\_\_\_

**order** - \_\_\_\_\_  
 \_\_\_\_\_

**phylum** - \_\_\_\_\_  
 \_\_\_\_\_

**taxon** - \_\_\_\_\_  
 \_\_\_\_\_

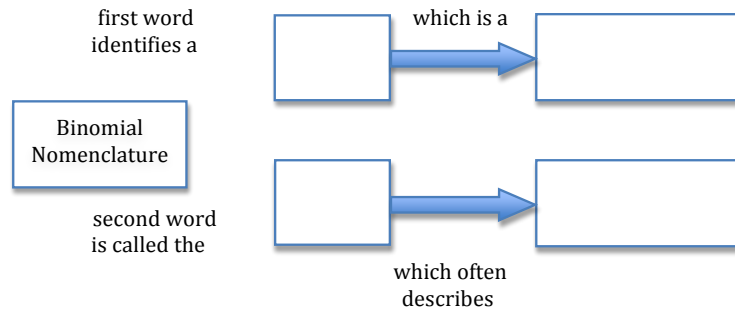
**taxonomy** - \_\_\_\_\_

**Classify** your vocabulary terms as being part of Linnaeus' two-word naming system or a taxonomic group. Do not use terms marked with a\*.

Linnaeus' System	Taxonomic Group

**Main Idea – Early Classification Systems (Pages 484-486)**

**Identify** the parts of Linnaeus’ two-word naming system by completing the graphic organizer below.



**Distinguish** the genus and specific name, or epithet, for the species name of modern humans.



**Main Idea – Taxonomic Categories (Pages 487-488)**

**Compare** the data to determine which organisms are closely related.

Classification of Selected Mammals				
Kingdom	Animalia	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Chordata	Chordata
Class	Mammalia	Mammalia	Mammalia	Mammalia
Order	Cetacea	Carnivora	Carnivora	Carnivora
Family	Mystceti	Felidae	Canidae	Canidae
Genus	Balenopora	Felis	Canis	Canis
Species	B. physalis	F. catus	C. latrans	C. lupus
Common Name	Blue Whale	Domestic cat	Coyote	wolf

**Sequence** the taxa in order from most specific to least specific.

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**Analyze** the figure of taxonomic groups, then identify the classification for humans.

Domain: \_\_\_\_\_

Kingdom: \_\_\_\_\_

Phylum: \_\_\_\_\_

Class: \_\_\_\_\_

**Main Idea – Systematics Applications (Page 489)**

**Summarize** how a dichotomous key works.

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**Explain** why a name like seahorse is not a good scientific name. Analyze why scientific names are better.

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**History and Organization of Biological Diversity**  
**Section 17.2 Modern Classification**  
**Objectives 18-20**

**New Vocabulary:** Use your book to write the correct vocabulary term for each blank.

**characters** - \_\_\_\_\_  
 \_\_\_\_\_

**cladistics** - \_\_\_\_\_  
 \_\_\_\_\_

**cladogram** - \_\_\_\_\_  
 \_\_\_\_\_

**molecular clock** - \_\_\_\_\_  
 \_\_\_\_\_

**phylogeny** - \_\_\_\_\_  
 \_\_\_\_\_

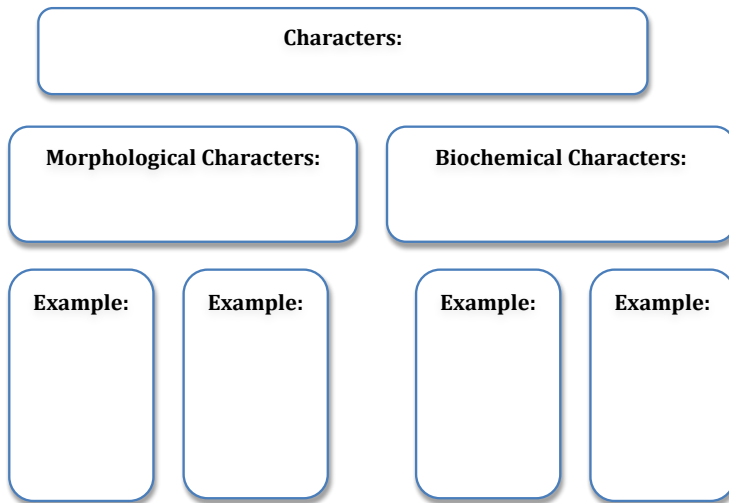
**Main Idea – Determining Species (Pages 490-491)**

**Compare** the four concepts that biologists have used or are using to classify organisms.

<b>Concept</b>	<b>Basis of Classification</b>	<b>Limitations</b>
Typological		Does not account for variations in species or the fact that species change over time
	Group of organisms that can interbreed in a natural setting and have fertile offspring	
Evolutionary species concept		
		Unknown evolutionary histories for some species

### Main Idea – Characters (Pages 492-495)

Identify and give examples of the two types of characters in the concept map.



### Main Idea – Phylogenetic Reconstruction (Page 495-498)

Describe cladograms by completing the paragraph

A \_\_\_\_\_ is a branching diagram that represents the proposed \_\_\_\_\_ or evolution of a \_\_\_\_\_ or group. The groups used in the cladograms are called \_\_\_\_\_. To develop a cladogram, \_\_\_\_\_ characters are identified. Then the \_\_\_\_\_ of various species is identified based on the absence or presence of the derived characters in the \_\_\_\_\_. In making a cladogram, \_\_\_\_\_ assume that groups that \_\_\_\_\_ more derived characters have a more \_\_\_\_\_ ancestor.

### UNIT SUMMARY:

#### A. Evidence of Common Ancestry and Diversity

1. Biological evolution, the process by which all living things have evolved over many generations from shared ancestors, explains both the unity and diversity of species. The unity is illustrated by the similarities found in species; which can be explained by the inheritance of similar characteristics from related ancestors. The diversity is also consistent with common ancestry: it is explained by the branching and diversification of lineages as populations adapted, primarily through natural selection, to local circumstances.
2. Evidence for common ancestry can be found in the fossil record, from comparative anatomy and embryology, from the similarity in cellular processes and structures, and from comparisons of DNA sequences between species.
3. The understanding of evolutionary relationships has recently been greatly accelerated by using new molecular tools to study developmental biology, with researchers dissecting the genetic basis for some changes seen in the fossil record.

#### B. Natural Selection

1. Natural selection occurs only if there is both 1) variation in the genetic information between organisms in a population and 2) variation in the expression of that genetic information – that is trait variation- leads to differences in performance among individuals.
2. If the trait differences do not affect reproductive success, then natural selection will not favor one trait over the others. The traits that positively affect survival are more likely to be produced and thus are more common in the population.

#### C. Adaptation

1. Natural selection is the result of four factors: 1) the potential for a species to increase in number, 2) the genetic variation of individuals in a species due to mutation and sexual reproduction, 3) competition for an environment's limited supply of the resources that individuals need to survive and reproduce, and 4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment.
2. Natural selection leads to adaptation – that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment.
3. Adaptive changes due to natural selection, as well as the net result of speciation minus extinction, have strongly contributed to the planet's biodiversity.
4. Adaptation also means that the distribution of traits in a population can change when conditions change.
  - a. Changes in the physical environment, whether naturally occurring or human induced, have contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline - and sometimes the extinction of some species.
  - b. Extinction occurs because species can no longer survive and reproduce in an altered environment. If members cannot adjust to change that is too fast or too drastic, the opportunity for the species' evolution is lost.