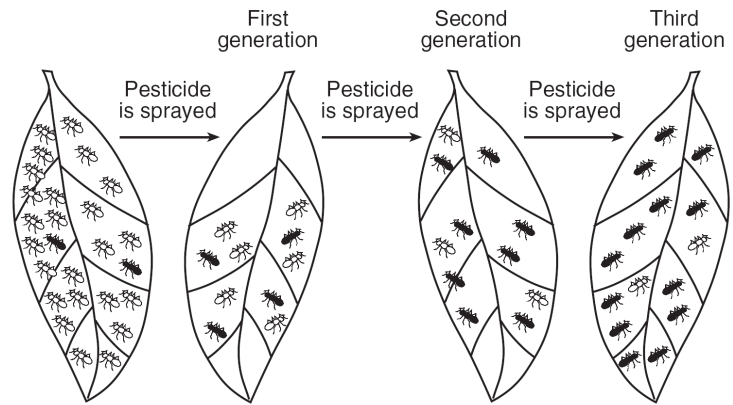


- The theory of biological evolution includes which concepts?
  - species of organisms found on Earth today have adaptations not always found in earlier species
  - fossils are the remains of present-day species and were all formed at the same time
  - individuals may acquire physical characteristics after birth and pass these acquired characteristics on to their offspring.
  - the smallest organisms are always eliminated by the larger organisms within the ecosystem
- Which statement is *most closely* related to the modern theory of evolution?
  - Characteristics that are acquired during life are passed to offspring by sexual reproduction.
  - Evolution is the result of mutations and recombination, only.
  - Organisms best adapted to a changed environment are more likely to reproduce and pass their genes to offspring.
  - Asexual reproduction increases the survival of species.
- The term "evolution" is best described as
  - a process of change in a population through time
  - a process by which organisms become extinct
  - the reproductive isolation of members of certain species
  - the replacement of one community by another

- The diagram below shows the effect of spraying a pesticide on a population of insects over three generations.



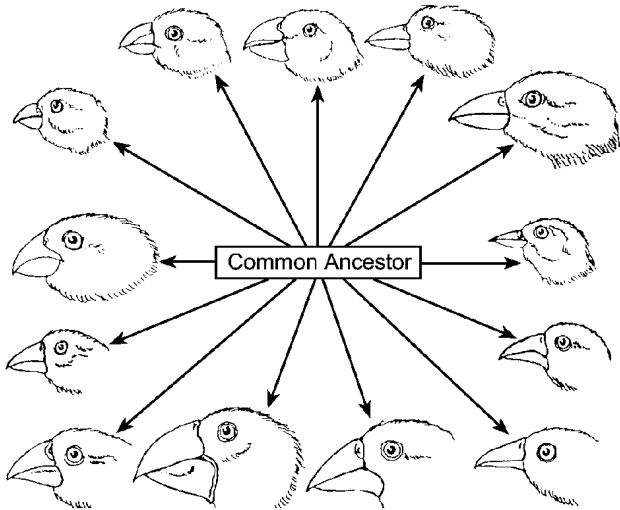
Which concept is represented in the diagram?

- survival of the fittest
  - dynamic equilibrium
  - succession
  - extinction
- The information below was printed on a calendar of important events in the field of biology.
 

1859  
Darwin Publishes  
*On the Origin of Species by Natural Selection*

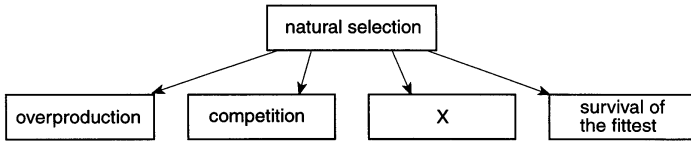
 This information is most closely associated with
    - an explanation for the change in types of minerals in an area through ecological succession
    - the reasons for the loss of biodiversity in all habitats on Earth
    - an attempt to explain the structural similarities observed among diverse living organisms
    - the effect of carrying capacity on the size of populations

6. The diversity within the wild bird species in the diagram below can best be explained by which process?



- A) natural selection
- B) asexual reproduction
- C) ecological succession
- D) mitotic cell division

7. Some of the concepts included in Darwin's theory of natural selection are represented in the diagram below.



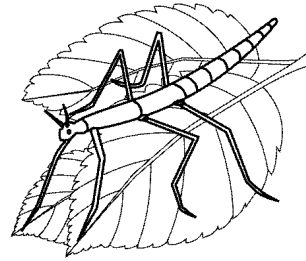
Which concept would be correctly placed in box X?

- A) use and disuse
- B) variation
- C) changes in nucleic acids
- D) transmission of acquired traits

8. Which factor has the greatest effect on the rate of evolution of animals?

- A) environmental changes
- B) use and disuse
- C) asexual reproduction
- D) vegetative propagation

9. The illustration below shows an insect resting on some green leaves.



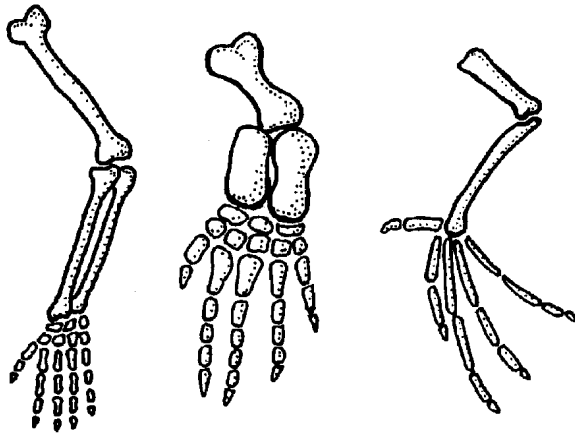
The size, shape, and green color of this insect are adaptations that would most likely help the insect to

- A) compete successfully with all birds
- B) make its own food
- C) hide from predators
- D) avoid toxic waste materials

10. Scientists compared fossil remains of a species that lived 5,000 years ago with members of the same species living today. Scientists concluded that this species had changed very little over the entire time period. Which statement best accounts for this lack of change?

- A) The environment changed significantly and those offspring without favorable characteristics died.
- B) The environment changed significantly, but the species had no natural enemies for a long period of time.
- C) The environment did not change significantly and those offspring expressing new characteristics survived their natural enemies.
- D) The environment did not change significantly and those offspring expressing new characteristics did not survive.

11. The diagrams below show the bones in the forelimbs of three different organisms.



Human

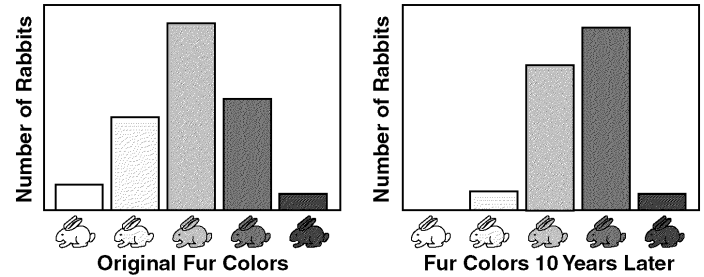
Whale

Bat

Which hypothesis do the differences in the bone arrangements support?

- A) These organisms are members of the same species.
  - B) These organisms may have descended from the same ancestor.
  - C) These organisms have adaptations to survive in different environments.
  - D) These organisms all contain the same genetic information.
12. How does modern evolutionary theory relate to Darwin's concepts of variation and natural selection?
- A) It includes Darwin's concept of variation, but not his theory of natural selection.
  - B) It includes Darwin's concept of variation and his theory of natural selection.
  - C) It does not include Darwin's concept of variation or his theory of natural selection.
  - D) It does not include Darwin's concept of variation, but it includes his theory of natural selection.

13. The diagram below illustrates the change that occurred in the physical appearance of a rabbit population over a 10-year period.



Which condition would explain this change over time?

- A) a decrease in the mutation rate of the rabbits with black fur
  - B) a decrease in the advantage of having white fur
  - C) an increase in the advantage of having white fur
  - D) an increase in the chromosome number of the rabbits with black fur
14. Which statement would most likely be in agreement with Lamarck's theory of evolution?
- A) Black moths have evolved in an area because they were better adapted to the environment and had high rates of survival and reproduction.
  - B) Geographic barriers may lead to reproductive isolation and the production of new species.
  - C) Giraffes have long necks because their ancestors stretched their necks reaching for food, and this trait was passed on to their offspring.
  - D) Most variations in animals and plants are due to random chromosomal and gene mutation.
15. Which statement would most likely have used by Lamarck to explain the development of the long trunk in elephants?
- A) Elephants stretched their trunks to reach food supply and this longer trunk was passed on.
  - B) A mutation occurred and its frequently increased in later generations.
  - C) Elephants with longer trunks had a higher survival rate and the longer trunk was passed on
  - D) Elephants with short trunks were mostly sterile.

## Do Now Unit 7 Evolution & classification

16. A large island in the Pacific Ocean supports isolated populations of two groups of frogs. The following observations of these frogs were recorded by scientists.

- (A) Are different in color
- (B) Excrete different products
- (C) Live in different, isolated habitats
- (D) Can interbreed and produce fertile offspring

Which observation best supports the inference that these frogs belong to the same species?

- A) *A*    B) *B*    C) *C*    D) *D*

17. What would most likely be the result of two subdivisions of a population remaining geographically isolated from each other for several hundred generations?

- A) Variations in one subdivision would differ from variations in the other subdivision.
- B) Variations in both subdivisions would be identical.
- C) Neither subdivision would show any variations.
- D) Both subdivisions would show variations resulting in similar mating patterns.

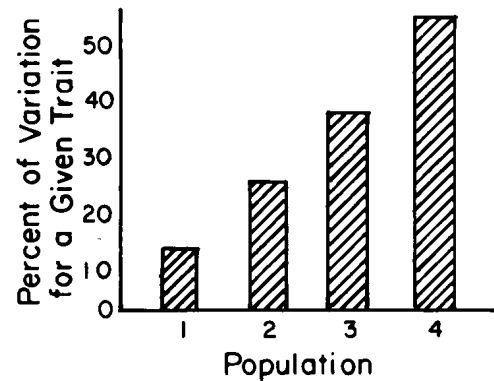
18. Based on modern evolutionary theory, the development of a new species would most likely be associated with

- A) a constant environment
- B) stable gene pools
- C) geographic isolation
- D) a lack of mutations

19. Beak structures differ between individuals of one species of bird. These differences most likely indicate

- A) the presence of a variety of food sources
- B) a reduced rate of reproduction
- C) a large supply of one kind of food
- D) an abundance of predators

20. The graph below represents the percent of variation for a given trait in four different populations of the same species. These populations are of equal size and inhabit similar environments.



In which population is the greatest number of individuals most likely to survive significant environmental changes related to this trait?

- A) 1    B) 2    C) 3    D) 4

21. Which process can produce new inheritable characteristics within a multicellular species?

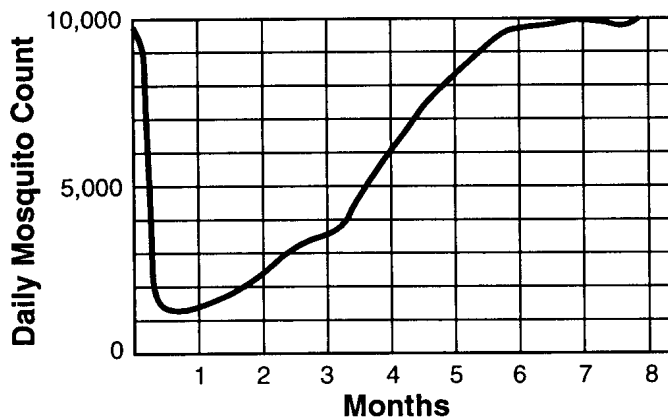
- A) cloning of the zygote
- B) mitosis in muscle cells
- C) gene alterations in gametes
- D) differentiation in nerve cells

22. Which species is most likely to survive changing environmental conditions?

- A) a species that has few variations
- B) a species that reproduces sexually
- C) a species that competes with similar species
- D) a species that has a limited life span

23. Base your answer to the following question on the information and graph below and on your knowledge of biology.

A small community that is heavily infested with mosquitoes was sprayed weekly with the insecticide DDT for several months. Daily counts providing information on mosquito population size are represented in the graph below.



Which statement best explains why some mosquitoes survived the first spraying?

- A) The weather in early summer was probably cool.
  - B) Most of the mosquitoes were of reproductive age.
  - C) Environmental factors varied slightly as the summer progressed.
  - D) Natural variation existed within the population.
24. The embryos of fish, chickens, and pigs have gill slits and a tail. The presence of these features suggests that
- A) all these animals can swim
  - B) pigs developed from chickens
  - C) these animals may have had a common ancestor
  - D) gill slits and tails are required for embryonic development

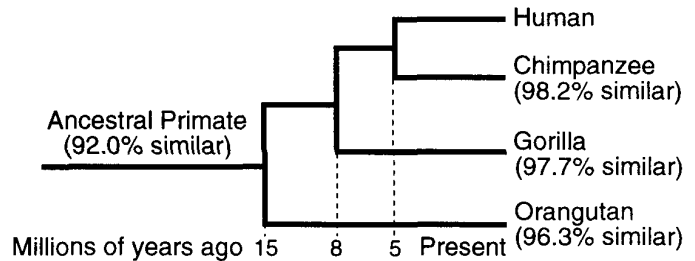
25. A classification system is shown in the table below.

Classification	Examples
Kingdom — animal	△, ○, □, ☆, □, ◇, ⋈, ▽
Phylum — chordata	△, □, ⋈, ☆, □
Genus — <i>Felis</i>	□, ⋈
Species — <i>domestica</i>	□

In this classification scheme, the rectangle represents a species that is most closely related to which other species?

- A) ☆
- B) △
- C) □
- D) ⋈

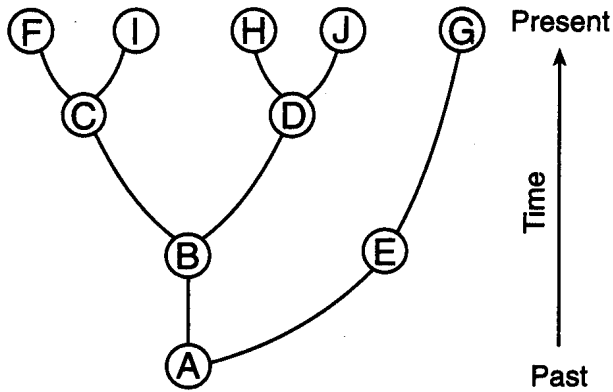
26. The diagram below shows a comparison of nitrogen base sequences in the DNA of some organisms to those of a human.



According to this diagram, humans may be most closely related to the

- A) ancestral primate
- B) chimpanzee
- C) gorilla
- D) orangutan

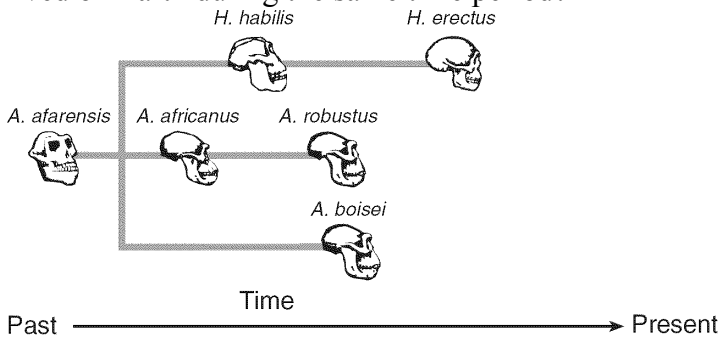
27. Base your answer to the following question on the diagram below that shows some evolutionary pathways. Each letter represents a different species.



If *A* represents a simple multicellular heterotrophic organism, *B* would most likely represent

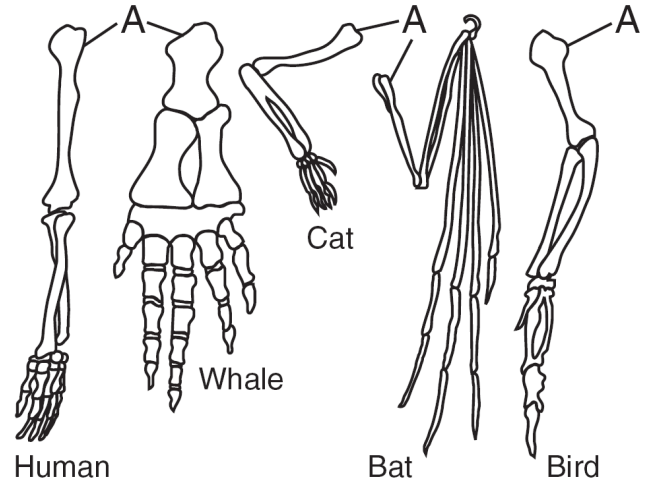
- A) a single-celled photosynthetic organism
- B) an autotrophic mammal
- C) a complex multicellular virus
- D) another type of simple multicellular heterotroph

28. According to the diagram below, which three species lived on Earth during the same time period?



- A) *robustus*, *africanus*, *afarensis*
- B) *habilis*, *erectus*, *afarensis*
- C) *habilis*, *robustus*, *boisei*
- D) *africanus*, *boisei*, *erectus*

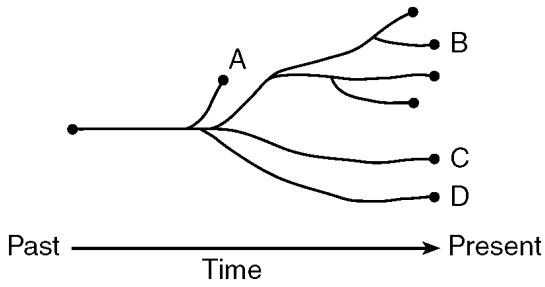
29. Base your answer to the following question on the diagram below.



What do the similarities of the bones labeled *A* provide evidence for?

- A) the organisms may have evolved from a common ancestor
  - B) all species have one kind of bone structure
  - C) the cells of the bones contain the same type of mutations
  - D) all structural characteristics are the same in animals
30. The bones in the wing of a bird, the flipper of a whale, and the arm of a human are considered by many scientists to be
- A) heterotrophic aggregates
  - B) abiotic factors
  - C) complex organelles
  - D) homologous structures
31. A certain species has little genetic variation. What would the rapid extinction of this species most likely result from the effect of?
- A) successful cloning
  - B) gene manipulation
  - C) environmental change
  - D) genetic recombination

32. The diagram below shows the evolution of some different species of flowers.



Which statement about the species is correct?

- A) Species *A*, *B*, *C*, and *D* came from different ancestors.
- B) Species *C* evolved from species *B*.
- C) Species *A*, *B*, and *C* can interbreed successfully.
- D) Species *A* became extinct.

33. Base your answer to the following question on the chart below and on your knowledge of biology.

A	B	C
The diversity of multicellular organisms increases.	Simple, single-celled organisms appear.	Multicellular organisms begin to evolve.

According to most scientists, which sequence best represents the order of biological evolution on Earth?

- A)  $A \rightarrow B \rightarrow C$
- B)  $B \rightarrow C \rightarrow A$
- C)  $B \rightarrow A \rightarrow C$
- D)  $C \rightarrow A \rightarrow B$

34. According to the heterotroph hypothesis, which gas given off by autotrophic activity made the evolution of aerobes possible?

- A) oxygen
- B) hydrogen
- C) carbon dioxide
- D) nitrogen

35. Plants, animals, and bacteria are all

- A) in different kingdoms.
- B) in the same kingdom
- C) have cell walls
- D) have chloroplasts

36. The table below gives both the common and scientific names of five New York State vertebrates.

Vertebrate	Common Name	Scientific Name
<i>A</i>	white perch	<i>Morone americana</i>
<i>B</i>	grass pickerel	<i>Esox americanus</i>
<i>C</i>	varying hare	<i>Lepus americanus</i>
<i>D</i>	American toad	<i>Bufo americanus</i>
<i>E</i>	muskellunge	<i>Esox masquinongy</i>

Which two vertebrates are most closely related?

- A) *A* and *B*
- B) *B* and *E*
- C) *C* and *D*
- D) *A* and *D*

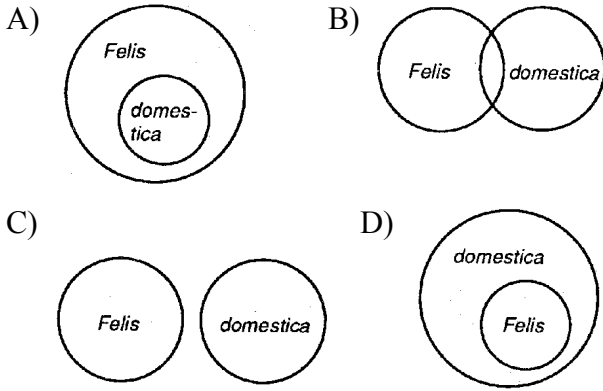
37. In the binomial system of nomenclature, which two classification groups provide the scientific name of an organism?

- A) kingdom and phylum
- B) phylum and species
- C) kingdom and genus
- D) genus and species

38. A major advantage of using the five-kingdom system of classification is that

- A) only biochemical similarities between the kingdoms become evident
- B) only metabolic similarities between the members of a phylum become evident
- C) the evolutionary relationships between organisms become evident
- D) the characteristic behaviors of all organisms become evident

39. In the diagrams below, the circles labeled *Felis* represent all members of the genus *Felis*, and the circles labeled *domestica* represent members of the species *domestica*. Which arrangement of circles best illustrates the relationship between the genus and species of *Felis domestica*, the common house cat?



40. Which groups are arranged in correct descending order according to a modern classification system?

- A) kingdom, genus, phylum, species
- B) phylum, kingdom, species, genus
- C) kingdom, phylum, genus, species
- D) phylum, genus, species, kingdom