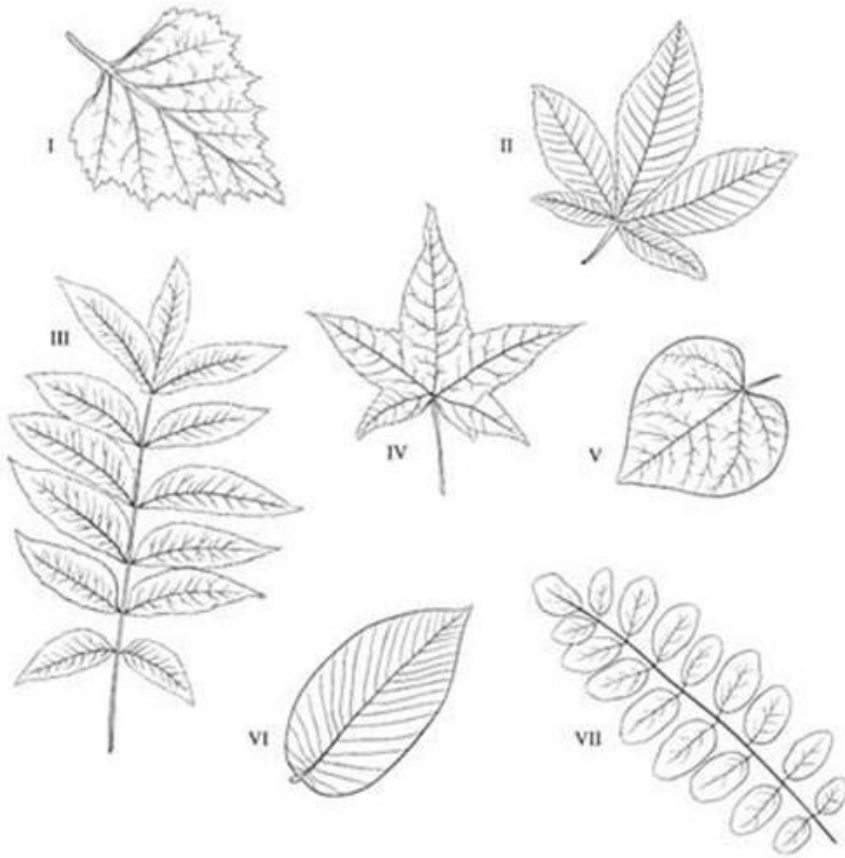


Classification and natural selection test

Use the dichotomous key to find the name of the tree that each leaf belongs. Put the name of the tree in the corresponding numbers at the bottom. You can write the common name if you want. 7



Dichotomous Key for Leaves

1. Compound or simple leaf
 - 1a) Compound leaf (leaf divided into leaflets)go to step 2
 - 1b) Simple leaf (leaf not divided into leaflets)go to step 4
2. Arrangement of leaflets
 - 2a) Palmate arrangement of leaflets (leaflets all attached at one central point)*Aesculus* (buckeye)
 - 2b) Pinnate arrangement of leaflets (leaflets attached at several points)go to step 3
3. Leaflet shape
 - 3a) Leaflets taper to pointed tips*Carya* (pecan)
 - 3b) Oval leaflets with rounded tips*Robinia* (locust)
4. Arrangement of leaf veins
 - 4a) Veins branch out from one central pointgo to step 5
 - 4b) Veins branch off main vein in the middle of the leafgo to step 6
5. Overall shape of leaf
 - 5a) Leaf is heart-shaped*Cercis* (redbud)
 - 5b) Leaf is star-shaped*Liquidambar* (sweet gum)
6. Appearance of leaf edge
 - 6a) Leaf has toothed (jagged) edge*Betula* (birch)
 - 6b) Leaf has untoothed (smooth) edge*Magnolia* (magnolia)

I.

II.

III.

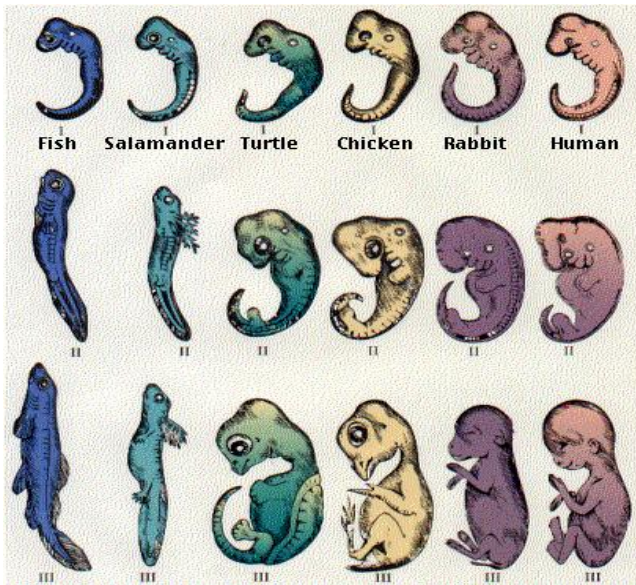
IV.

V

VI

VII.

The picture shows embryonic development of several. Use it to answer the questions below.



1. In stage 1, what is one similarity in the structure of these embryos?
2. Why do these embryos look so much alike, in other words, why do they all have this structure?
3. What kingdom do these organisms belong to?
4. **Why** do they all belong to the **same** kingdom?
5. What is the scientific name for humans?
6. What genus do humans belong to?
7. What species do humans belong to?
8. What is an adaptation that humans have?
9. Which of the following is a scientific name?
 - a. *Felis concolor*
 - b. Cat
 - c. *Loxodonta africana*
 - d. *Canis lupus*

Peppered moths

1. During the past few decades, air-pollution control laws in many areas of England greatly limited the soot and other air pollutants coming from the burning of coal. How will the decrease in soot and other air pollutants most likely influence the survival of the light peppered moth (explain)? 2

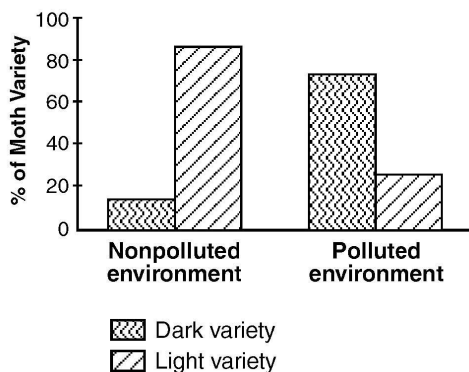
2. **Why** was there a larger number of the dark-colored variety present in the polluted environment? Explain 2

3. What would have happened to the percent of each color of moth if there were no predators for peppered moths in the forest during the Industrial Revolution? Explain. 2

4. Which conclusion can be drawn from the information given?

- a. The trait for light coloration better suits the peppered moth for survival in polluted environments.
- b. The trait for dark coloration better suits the peppered moth for survival in non-polluted environments.
- c. A given trait may be a favorable adaptation in one environment, but not in another environment.
- d. The variation of color in the peppered moth has no influence on survival of the moth.

5. What percentage was the light-colored moths in the polluted environment?



- (1) 42 (2) 24 (3) 76 (4) 16

6. **True or False** The peppered moths suddenly turned from white to black so they could adapt to the dark trees and survive.

7. **True or False** If we lived in water long enough we would suddenly be able to breath under water.

8. **True or False** During the industrial revolution the light moth population increased.

9. **True or False** The light peppered moths turned black from the soot from the factories

Fish Activity

1. Why did the yellow gene decrease from generation 1 to generation 3? 2
2. Why did the green fish decrease from generation 3 to generation 4? 2
3. Yellow genes were recessive to green genes, and green genes were dominant over yellow and red. Which color of genes disappeared faster when the algae died? Why? 2
4. A species of fish from a particular stream have become genetically adapted to their home stream over many generations. What might happen if these fish are used to restock a different stream that has become depleted of fish? Make sure you explain your answer. 2
5. Fish hatchery populations often have less genetic biodiversity than wild populations. How might lowered biodiversity affect a fish population's ability to adapt to environmental disasters? 2

Circle the correct answer.

1. Circle the true statement: A. Elephants had genes that allowed them to grow a trunk, which then allowed them to reach leaves and thus survive.
B. Elephants stretched their trunks so the trunks would get longer in order to reach leaves high in the trees.
2. **True or False** The black peppered moths and the yellow, red, and orange fish are an example of natural selection taking place because the organisms best suited for their environment were able to survive and pass on their genes to the next generation.
3. **True or False** The cheetah population is genetically very similar. In other words, all cheetahs are almost genetically the same. This is a good thing for the cheetah population.

Speciation

1. If a group of pocket mice ended up on an island (does not have access to the mainland). Hundreds of years from now the mice on the island and the mice on the mainland were put together to mate. The two groups of organisms could not have fit offspring.
What **process** has happened?

2. Can the members of two different species interbreed and always have fit offspring?

- a. yes b. no C. maybe D. none of the above

3. Extinction of a species is most often due to what?

- a. geographic isolation b. reproductive isolation C. too much variation D. lack of variation

4. Geographic isolation can lead to what?

- a. post-mating b. speciation C. mortality d. Separation anxiety

5. Reproductive isolation can lead to what?

- a. coevolution b. convergent evolution C. a new species d. nothing