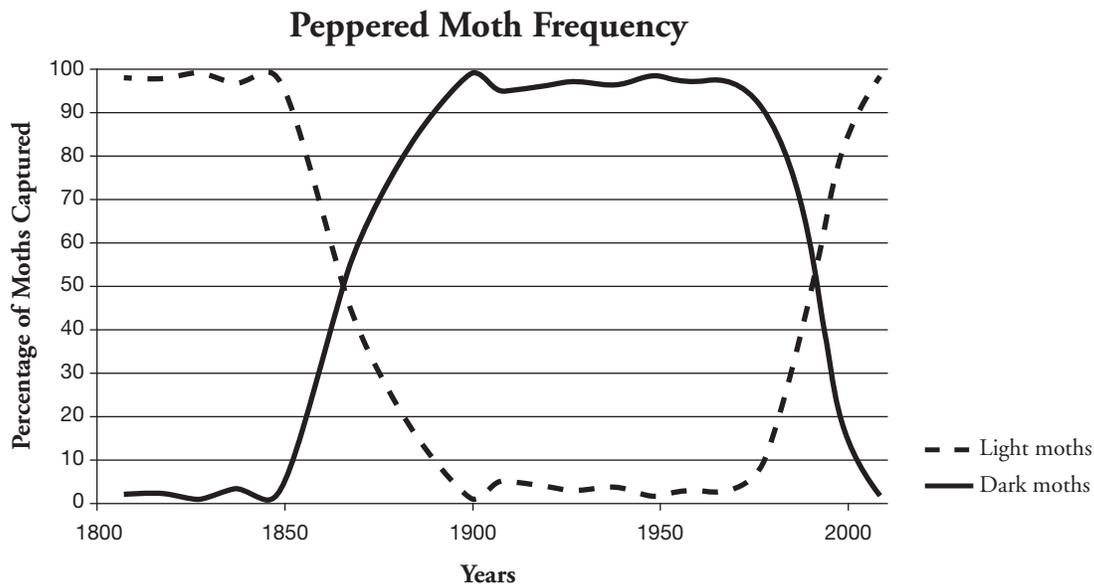


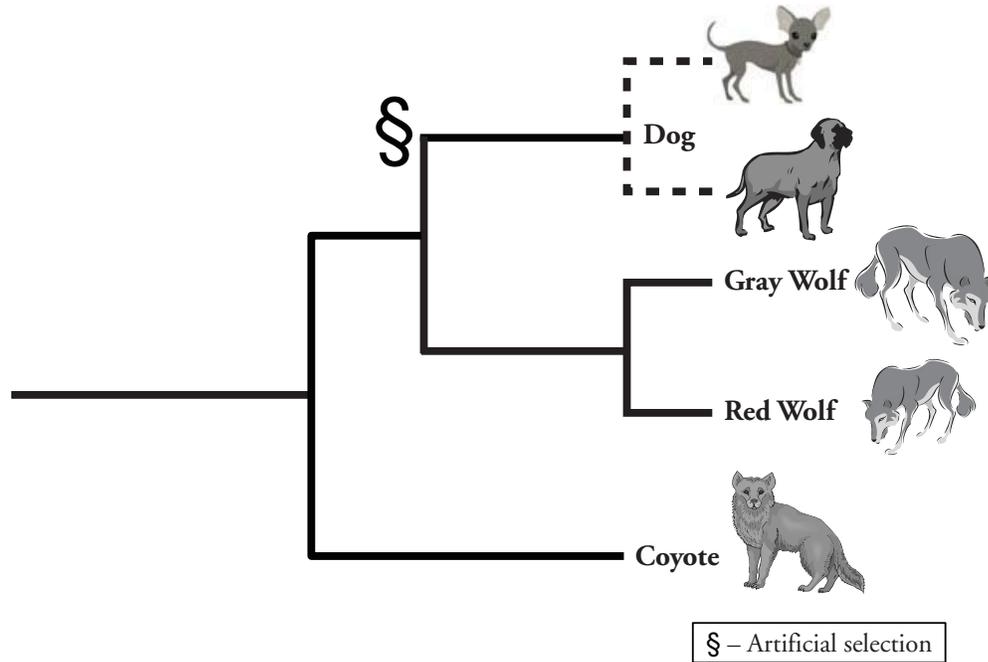
## Model 2 – Color Variations in Moths in Great Britain



8. Refer to the graph of Peppered Moth Frequency in Model 2.
  - a. Which moth color was more prevalent before 1850?
  - b. Which color was more prevalent between 1900 and 1950?
9. Describe the change in the percentage of light-colored moths and dark-colored moths between 1850 and 1900.
10. Describe the change in the percentage of light-colored moths and dark-colored moths between 1950 and 2000.
11. During the Industrial Revolution through the mid-20th century, factories and power plants, which burned coal, produced large quantities of soot and smog. Near industrialized areas, black powder covered surfaces, including the moth habitat.
  - a. Which color moth would have a better chance of surviving predation (better camouflage to hide from predators) on this dark surface?
  - b. How does this help explain the change in the colors of the moth population shown in Model 2?

12. Clean Air Acts were passed by governments of industrialized nations beginning in the mid-1950s. Use this information to explain why the color of the moth population shifted again.

### Model 3 – Natural vs. Artificial Selection



13. Model 3 traces the lineage of what organisms?
14. How does Model 3 indicate that all three types of organisms came from a common ancestor?
15. According to Model 3, wolves (gray and red) are more closely related to what other group—dogs or coyotes? Explain your answer.
16. Think about the characteristics of the organisms above.
- What are some differences that you note between wolves and dogs?
  - What similarities can you identify?

17. Modern domesticated dogs arose from wolves through selective breeding by humans.
  - a. What traits might humans have selected in the common ancestor of dogs and wolves that would account for the differences between dogs and wolves?
  - b. According to Model 3, what is the name of this type of selection?



## Read This!

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The events that lead to changes in groups of organisms are called **selection** by evolutionary biologists. Charles Darwin (1809–1882) is the person credited with carefully outlining how various changes in populations of organisms might occur through time. He called this process **natural selection**. Humans participate in selection through selective breeding of plants and animals. This is referred to as **artificial selection**.

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18. Is the selection that led to the development of wolves and coyotes an example of natural selection or artificial selection? Explain your choice.
19. Refer to Model 1. Is the selection leading to changes in the *E. coli* variants natural or artificial selection? Explain your choice.
20. Two differences between red and gray wolves is their color and size. What environmental conditions might have resulted in selection for red wolves and gray wolves?



21. Refer to Model 2. Is the selection of moths that blend in to their environment an example of natural or artificial selection? Explain your choice.