

**Genetic Change Unit Objectives: by the end of this unit, students will be able to...**

1. Summarize how a trait exhibited by a species is affected by the following: DNA, mRNA, amino acids, protein shape, protein function, and mutation.
2. Define and provide examples of each of the following:
  - a. Mutation
  - b. Natural Selection
  - c. Genetic Drift
  - d. Migration
  - e. Artificial Selection.
3. Summarize the difference between natural selection and evolution.
4. List and describe the four components needed for evolution by natural selection to occur.
5. Use the green anole lizard to illustrate key aspects of evolution including pace, competition, etc.
6. Explain why some species (like alligators and the horseshoe crab) have changed little in millions of years while others (like the green anole) have changed rapidly.
7. Summarize why the woolly mammoth went extinct instead of evolved.
8. Explain the percentage of species that go extinct and have already gone extinct.
9. Compare the current rate of extinction to previous rates of extinction and explain the four factors most responsible for this situation.
10. Compare artificial selection to natural selection based on similarities and differences.
11. Summarize how artificial selection occurs and how it affects species that become domesticated.
12. Explain how the Farm-Fox experiment was conducted and explain what the evidence from this experiment demonstrated.
13. Describe why most domesticated animals tend to have similar traits (wide skulls, short snouts, floppy ears, shorter limbs, less aggression).
14. Define and provide examples of each of the following:
  - a. Genetic Linkage
  - b. Crossing Over
  - c. Independent Assortment
  - d. Meiosis
15. List the two primary reasons for the development of the six major breeds of dairy cattle, and summarize how these breeds came to be.
16. Identify each of the following based on an image or description:
  - a. Holsteins
  - b. Jerseys
  - c. Brown Swiss
  - d. Ayrshire or Guernseys
  - e. Milking Shorthorn
17. Summarize the purpose of the existence of breed associations in the dairy industry.