Unit 2, Chapters 7 and 8 - Review

Darwin's contemporaries:

- James Hutton and Charles Lyell (Geology)
- Jean-Baptiste Lamark (Naturalist)
- Thomas Malthus (Population Economist)

Voyage of the *HMS Beagle.*

- Purpose
- Observations
- Galapagos Islands

Darwin's conclusions:

- Artificial selection
- Struggle for survival
- Fitness and adaptations
- Survival of the fittest
- Natural selection
- Descent with modification
- Supporting evidence:
    - fossil record
    - geological distribution
    - homologous body structures
    - embryology

A more modern understanding:

- populations
- causes of genetic variations
    - mutations
    - gene shuffling and crossing over
- Relative frequency
- Hardy-Weinberg Principle
    - 5 Factors necessary for maintaining genetic equilibrium
- 6 patterns of evolution

Review questions:

Ch. 15 p. 389

mc: # 1 - 10
#12, 14, 17, 18, 19, 23, 26, 28, 29, 30

Ch. 16 p. 413

mc: #1, 2, 9
11, 12, 16, 20, 24

Ch. 17 p. 443

mc: # 9, 10
22 - 26, 33

Reviewing Content

1. c	5. d	9. c
2. a	6. b	10. b
3. a	7. a	
4. a	8. a	

12. Darwin observed fossils, some of which resembled living organisms and others that were unlike any organisms he knew; that organisms everywhere seemed remarkably well suited to their environments; and that similar organisms, such as tortoises, were different on each island.

14. Hutton proposed that Earth had to be millions—not thousands—of years old. Lyell argued that the same forces change Earth in the present as in the past, so scientists should explain Earth's history in terms of processes that are observable in the present.

17. Artificial selection is the process by which humans select certain naturally occurring variations to use in breeding new plants and animals. Darwin thought that a similar process in nature could explain how organisms change over time.

18. Fitness, the ability of an individual to survive and reproduce in its specific environment, occurs through ongoing adaptation. An example is an animal that survives through camouflage. An adaptation is any inherited characteristic that increases an organism's chance of survival. Examples include a porcupine's quills and a lion's teeth and claws.

19. In the survival of the fittest, individuals that are best suited to their environment survive and reproduce most successfully.

23. A vestigial organ is an organ, such as the human appendix, that is reduced in size and no longer has a function.

26. Natural selection leads to organisms being better adapted to their environments and explains the diversity of organisms Darwin observed on the Galápagos Islands, which have varied environments.

28. The few mosquitoes that were resistant to DDT survived and reproduced, whereas those that were not resistant were killed by the insecticide. The succeeding populations of mosquitoes were more resistant to DDT.

29. Their survival might depend on how well the turkey could avoid predators and whether there was an adequate food supply.

30. Most endangered species are endangered because human actions have changed or destroyed their habitats. Protecting endangered species—for example, by preserving their habitats or providing them with nesting sites—may restore the natural conditions.

1. a
2. a
9. c

11. The relative frequency of an allele is the number of times that the allele occurs in a gene pool compared with the number of times other alleles occur. For example, there are two alleles for the gene that controls fur color in mice. If one of the alleles is present in half the members of the population, its frequency is 50 percent.

12. In sexual reproduction, alleles can recombine to produce different genotypes, resulting in different phenotypes and hence variation within a population.

16. Evolution can be defined as a change in the relative frequency of alleles in the gene pool of a population.

20. Genetic equilibrium occurs when the allele frequencies in a population remain constant. Five conditions are required to maintain genetic equilibrium: random mating, extremely large population size, no movement into or out of the population, no mutations, and no natural selection.

24. Evolution is likely due to a population of finches becoming isolated independently on each island. The available food and habitat would have driven their evolution through natural selection.

9. c
10. a

22. Disappearance of the dinosaurs enabled the smaller, relatively scarce mammals to flourish and diversify.

23. In adaptive radiation, species evolve into several different forms that live in different ways; examples: dinosaurs, mammals.

24. Punctuated equilibrium is a pattern in which long periods of little or no evolutionary change are interrupted by brief periods of rapid change.

25. Students can use any example from the text to convey the concept of two species evolving in response to changes in each other over time.

26. Homologous hox genes established body plans in organisms that had not shared common ancestors for millions of years.

33. Both processes occur because organisms cannot successfully adapt to changing environmental conditions. In mass extinctions, major environmental changes cause severe selective pressure against many or most species. In other extinctions, environmental changes are smaller or more gradual, generally lead to less severe selective pressure, and affect fewer species.