1. b) Correct, the modern apes and humans are all descended from the hominoid ancestor.
   c) No. The apes came from the Old World Monkeys.
2. d) Correct. In order, the three "gorilla" terms are the genus, the specific epithet, and the subspecies.
3. b) Correct. It is thought that all humans are so closely related to each other that there is only one human species, and it has no subspecies.
4. c) Correct. These two are the only pair that are in the same species. The biological species definition says that a species is a group of organisms that can potentially interbreed.
   d) No. This could actually be true, but we cannot conclude this without more information than just the species names.
5. b) Correct. The two groups of gorillas are sedentary and widely separated. Without gene flow between them, their allelic frequencies will probably diverge as different mutations accumulate in each group.
6. a) Correct. 225 kg x 2.2 pounds/kg = 495 pounds, almost 500.
7. c) Correct. The ulna and humerus are in the arm. The femur is the thigh bone. The two lower leg bones are the tibia and fibula.
8. a) Correct. Myosin binds to actin, and then the bending of the myosin heads slides the myosin along the actin.
   b) No. Actin never curls into a helix.
   c) No. There is no such thing as actomyosin.
9. a) Actually, rods do initiate action potentials when they become hyperpolarized, but rods cannot see color.
   b) Correct. The fruit is absorbing all colors except red, so the fruit is red. Red cones are picking up the red reflected light from the fruit and are notifying the gorilla's brain about a red object.
   c) and d) No. An object to which all cones responded equally would be white.
10. c) No. The lens must bend light rays so light rays from a point of light come to a point on the retina. Parallel light rays wouldn't work.
    d) Correct. The more densely the cones are packed, the more high-resolution the image.
11. b) No. This happens, but only later in the action potential.
    c) Correct. This is positive-feedback depolarization, and happens as soon as the neuron reaches threshold depolarization.
12. c) No. Glucose would be the energy source.
    d) Correct. Oxygen accepts electrons and hydrogen ions and becomes water.
13. a) Correct. The mitochondrion carries out aerobic respiration.
14. a) No. The Krebs cycle does not produce pyruvate, and does not operate in anaerobic conditions anyway.
   b) **Correct**. Electron transport stops in anaerobic conditions. Lactate is produced by the reduction of pyruvate.
   d) No. Fermentation starts, not stops.

15. a) **Correct**. Clearly, when oxygen is high, CO₂ should be low, and when oxygen is low, CO₂ should be high. This is the only graph that shows this relationship. An exhausted gorilla would be a position 1 (low oxygen and high CO₂).
   d) No. Fermentation starts, not stops.

16. d) **Correct**. Each CO₂ concentration is now found with a lower oxygen. This is a line to the left of the existing line.

17. b) **Correct**. As long as they're eating preformed organic matter, they're heterotrophic. It makes no difference whether the organic matter came from plants or animals.

18. d) **Correct**. Fruits are ripened ovary walls.

19. a) **Correct**. The purpose of fruits is to disperse and protect the seeds.
   b) and c) No. Pollination and fertilization have already occurred.
   d) No. Whether a tree reproduces or not has little influence on whether it lives to the next year.

20. a) No. Xylem brought water and minerals to the growing fruit.
   b) **Correct**.

21. d) **Correct**. Photosynthesis does not use O₂, and certainly does not use NH₃.

22. a) No. CO₂ is the electron acceptor in the Calvin cycle.
   c) **Correct**.
   d) No, the light reactions use sunlight as their activation energy.

23. a) **Correct**. The young gorilla maintained relatively constant internal conditions despite a greatly increased level of activity.

24. a) No. The adrenal cortex does not secrete norepinephrine.
   b) **Correct**.

25. a) **Correct**.
   A = right atrium
   B = right ventricle
   C = left atrium
   D = left ventricle
   E = vena cava
   F = aorta
   G = pulmonary vein
   H = pulmonary artery
   I = body other than lungs
   J = lungs

26. d) **Correct**. Sucrose is glucose joined to fructose.

27. c) **Correct**. Rugae are the folds in the lining of the stomach, and villi are in the small intestine.

28. a) **Correct**. The stomach is more acid than the fruit because its pH is lower. If the stomach pH was 2.5 it would
be 10x more acid, and if it were 1.5 it would be 100x more acid. 30 is the only answer between 10 and 100.

29. a) No, there are no glucoses shown, so starch could not have been the source.
   b) Correct. The molecules are an amino acid, a fatty acid, and glycerol.
   d) No. No part of a nucleic acid is shown.

30. a) Correct. Antigens are on the surfaces of the red blood cells and antibodies are in the plasma.

31. a) No. Social dominance is important, but only because it assures the silverback’s mating success.
   b) No. This may actually be happening, but it is not the reason for the silverback’s actions.
   d) Correct. The silverback is putting much effort into protecting the young of the troop. He wants to be sure that the young bear his DNA and not some other male’s. If he takes over the troop, he wants to get the females pregnant with his young as quickly as possible, even if this means killing the young of the previous silverback.

32. d) Correct. Ovulation will occur in the middle of the 30-day cycle, at about day 15.

33. b) Correct. The number of possible arrangements is $2^n$ where n is the haploid chromosome number. $2^{24}$ (for gorillas) is twice as large as $2^{23}$ (for humans).

34. a) Correct. In telophase, the gorilla cells will hav 48 unreplicated chromosomes (monads), which is the same as having 48 DNA molecules. However, they will have no chromatids because a chromatid must be linked to another chromatid.

35. a) No. If this were true, why does mating long x short give all medium?
   b) No. There is no evidence for two loci. Also, if medium has no dominant loci, why does medium x medium produce some long and some short noses? There is excellent evidence for the next hypothesis, however.
   c) Correct. Let’s call the nose length alleles A and a. AA = long, Aa = medium, and aa = short.

36. b) Correct. Long noses are sometimes wide and sometimes narrow. Narrow noses can be medium, long, and short. Length and width seem to be independent of each other and cannot be controlled by the same locus.

37. d) Correct. Any of these situations could mean that a change in DNA sequence would not result in any change in the final protein amino acid sequence.

38. a) Correct. You want to open up the plasmid, and insert a segment of gorilla DNA into it. You don’t want to cut the gene into many pieces, and you certainly don’t want to cut the plasmid into many pieces.

39. a) No. Bringing together new combinations of alleles here will reduce differences between populations.
   b) Correct. Speciation is slowed when populations or troops maintain gene flow and reduce their differences in allelic frequencies. This female practice will tend to mix female alleles from one troop with male alleles from other troops.

40. c) Correct. The smaller the population is, the greater fluctuations in allelic frequencies will be. There is a chance that low allelic frequencies will fluctuate to zero and genetic diversity will be lost forever.