

Study Questions from the Text

Chap. 13

1. What are the component parts of DNA? Of what is a nucleotide composed? What does a grouping of nucleotides look like? What is the rule about base pairs in DNA? What does complementary mean with regard to base pairs? What does it mean to say that a single strand of DNA is a template for the synthesis of a new single strand? Can you explain how it is that each new double helix is a combination of the old and the new? What is needed to unwind the double helix? What is needed to move along each strand of the double helix joining together nucleotides as they are added? How are mistakes in base pairing corrected? What is the definition of a mutation? What is a point mutation? Why are mutations "fearful?"
2. Generally speaking, what causes a cancerous growth to grow wildly? Why is this condition usually not inherited? Where does the mutation have to occur in order to be heritable? Name 2 causes for mutation. What does evolutionary adaptation have to do with mutation? What did Beadle & Tatum use to induce genetic mutations in the bread mold they worked with? What did they find out about the role of genes and enzymes?

Chap. 14

- How many amino acids are involved in protein formation? What is Transcription? Translation? What are the 3 kinds of RNA? What organelle in the cytoplasm is involved with protein formation? Name 3 differences between the structure of DNA and RNA? What is the difference between base-pairing in DNA replication and mRNA formation? What is the name of the enzyme complex used in transcription? What 2 things does it do? Why is "editing" necessary to get a finished mRNA molecule? How many bases code for a single amino acid? What is a codon? What does tRNA carry? What does it connect to?
2. What is an anticodon? Of what is a ribosome composed - in addition to rRNA? Where are tRNA and rRNA found in a cell? How do they get made? In your own words, can you describe the steps of translation as shown in Fig. 14-9 and Fig. 14-10? What causes the end of the translation process? How fast is protein formation in a bacterium, for example?
 3. Skip section 14.5, but read: "The Importance of the Genetic Code." Read section 14.6. What does it mean to learn that a base triplet code can be the same in a human and in a bacterium? What is the possible consequence of genes from one organism functioning in another?

Chap. 15

1. How is biotechnology defined? What is PCR? What does it accomplish? What 4 aspects of biotechnology are considered in this chapter? What each accomplish?
2. What do restriction enzymes do? What is a plasmid? What is "transformation?" What is recombinant DNA?

3. Name organisms that are transgenic. Is taking a cutting from your favorite garden plant and then rooting it and getting another plant from the cutting - cloning? How, in simple terms, was "Dolly" produced?
4. What does PCR produce? Short sequences of DNA that are repeated over and over help to do what? Modern forensic DNA typing uses how many "short tandem repeats?"
5. What is a stem cell? What are 2 differences between embryonic and adult stem cells? What is the ethical or societal concern about using ESC? What connection does the immune system have with transplanted stem cells? How could the "challenge" to stem cell therapy be overcome? What was the "stunning breakthrough" in 2007 presented by the text author?

Chap. 16

1. What are the 2 principles that lie at the core of evolution? Can you restate them in your own words? Who are the 3 19th C. biologists credited with developing ideas about evolution? What kind of university degree did Darwin get? What experience did he have that influenced his thinking? Before Darwin, who were the 3 scientists that had influential ideas concerning evolution and what contribution did each make? What islands and what organism influenced Darwin's thinking? What did he think about these organisms? What did Malthus' book teach Darwin? How did the lack of knowledge about genetics influence 19th C. scientists' thinking about evolution? What 2 reasons can you give that help explain the opposition to the Theory of Evolution? How do the following 5 sections provide evidence for Evolution: 1. Radiometric Dating, 2. Fossils, 3. Comparative Morphology and Embryology, 4. Evidence from Gene Modification, 5. Experimental Evidence. Can you summarize them in your own words?

Chap. 17

1. What is it that evolves? What is a population? What is a gene pool? What can a change in the frequency of alleles in a population be called? What is the definition of microevolution? of macroevolution? What are the 5 agents of microevolution? Can you describe in your own words how each acts? See table 17.1, p. 303. Which one is considered the most important? Migration is involved with which of the agents? With which is small population involved? The reduction in the number of elephant seals is related to which agent? What is sexual selection?
2. What does adaptation have to do with natural selection? What is the price of inbreeding? See Box, pl 308. What is the biological meaning of "fitness?" What is the conclusion with regard to the change of Galapagos finches and drought? What are the 3 modes of natural selection? Which one is the most common type? Can you give an example for it? Skip the Box on p. 314 - "Detecting Evolution."

Chap. 18

What is a species? Which 2 categories of organisms make a problem with regard to the basic idea behind the species definition? Speciation can begin by the stoppage of what? between 2 populations. What is the role in speciation of geographic separation? What is the role in speciation of reproductive isolating mechanisms? What are the 6 reproductive isolating mechanisms discussed? Can you describe each in your own words? How does polyploidy, in plants, lead to speciation? Which group: specialists or generalists are most likely to show evolutionary change? Which one do horseshoe crabs fit into? Which one do the Galapagos finches fit into? What is adaptive radiation? What organism can be described as fitting into this category? How does convergent evolution "Obscure the Trail?" What are homologies? What are analogies? What are examples of each? What is cladistics? How is it used? Visible physical traits plus what else? are used in determining relationships among organisms?

END.