https://bioweb-cfs.cas.okstate.edu/info/requiredreadings/Marroned%20in%20galapagos.pdf

Marooned in the Galapagos

This trip raises questions about what makes a species or organism successful. Attention to the physical character of these desert islands and animals living there highlights natural selection in action, and how natural selection and other processes lead to speciation, coevolution and adaptive radiation.

Readings about **Evolutionary Processes** can be found in **Chapter 12, 13, & 14.**

Readings about **Natural Selection** can be found in **Chapter 12.**

These first readings should be a REVIEW for you

- We introduced the term adaptation, when we discussed the mechanisms by which organisms thermoregulate and osmoregulate during Fire & Ice. You can review a definition on p. 8 as part of a nice introduction to Evolution and Natural Selection on pp. 7-8 and again or on p. 244 as your read about natural selection.
- We introduced the Concept of Natural Selection at the beginning of Out of the Rainforest. You should have read the description on p. 241 in the context of Darwin's voyage and the observations that supported his ideas. The definition given on that page includes the word genotype, which Darwin would not have known. If that is true for you too, then perhaps you should read pp. 190-191. For now, we will focus on the effect of natural selection on variation in a population.
- It's time to be really sure how natural selection works, so read pp. 244-245.
    - To learn more about what constitutes a population, read p. 750 (we will discuss more about population characteristics and growth later in Emerging Diseases).
    - If you are not sure what is meant by phenotype, see p. 190
    - If you are not sure what an allele is, read p. 169. We are going to discuss them much more in Family Reunion, so don't worry too much about them now, the thing to remember is that alleles are different forms of a gene. So when we say we all have different genes, we really mean we have different forms of the same genes, or alleles.
    - If you are confused by our constant reminder that natural selection (and evolution in general) has no purpose, goal, does not result from need or a desire to survive and is not a way for species to survive, read the explanation on p. 246.
    - If you want to see the importance of understanding evolution and natural selection on human welfare decisions, you might want to read "The Unending War with Bacteria" (p. 237) and "Investigating Life: Size Matters in Fishing Frenzy" (p. 256). These also provide good practice with the types of scenarios that appear on our exams!

Now for the new readings

- If you are not sure what is meant by the statement "**evolution occurs in populations not individuals**", read p. 238

- If you are not sure how natural selection and **artificial selection** compare, read p. 241 and the Apply it now box on p. 242.
- If you are not what we mean by **fitness** or why "survival of the fittest" is so misleading, read pp.246-247.
- To understand how **mutations** contribute to evolution by increasing genetic variation in a population, read p. 253
- Not sure of the difference between **founder effect** and natural selection? Read p. 254
    - While you will <u>not</u> be asked to compare founder effect to other forms of genetic drift, it might help to read about genetic drift on p. 253 or about the bottleneck effect on p. 254 .
- You might hear or read about Hardy-Weinberg Equilibrium and be especially concerned about the math – don't be. The best use of this concept for us is to say that when all the conditions for HWE are met, then no evolution is occurring, But when any processes or events occur that change the genetic variation in a population occur, then evolution has occurred. This is best summarized in **Figure 12.23 on p. 258**

Readings about **Speciation** and **Adaptive Radiation** can be found in **Chapter 14.**

- If you want more explanation about how **plate tectonics** led to formation of islands and continents and contributed to speciation and biodiversity, read pp. 268-270
- If you are not sure what a **species** is, read pp. 282-283
- If you are not sure what **speciation** is or how **reproductive barriers** play a role in the separation of species, read pp. 284-285.
- To learn more about **how speciation occurs**, read pp. 286-289. But don't worry whether you can distinguish among the different types of speciation. Concentrate on allopatic speciation as our model and how **geographic barriers** play a role.
- A nice example of experiments leading to speciation can be found in Investigating Life"**Plant Protection Racket May Stimulate Speciation**" on pp. 300-301
- If you keep asking the question "What is the difference between speciation and **adaptive radiation**?" you will find the answer on p. 290-292.
- And remember that evolution does not always result in population differences, adaptations and new species, it can also result in **extinction**, as you can read about on pp. 292-294.

Readings about **Coevolution** can be found in **Chapter 38.**

If you did not read this for *Out of the Rainforest*, or just want to review, then:

- For an explanation of **coevolution**, see p. 771.
- For examples of coevolution, with the concepts defined specifically, read about **competition** (p. 768); symbiosis, including **mutualism**, commensalism, and **parasitism** (p. 769-770); and herbivory and **predation** (p. 770)

- An elegant example of coevolution among **a plant, a fungus and a virus in Oklahoma** can be found in “Investigating Life: Two Kingdoms and a Virus Team Up to Beat the Heat” p. 784-785