**READING GUIDE:**

**General Notes:**

The reading is not long for the next quiz, but it is about natural selection and evolution which are topics that run very deep through all of biology, so they are very important to understand well. Thus, even though the reading isn’t long, I assigned several videos. I still think with all the reading and the assigned videos, it should probably only take 1-2 hours to get through, which means you should plan to STUDY the reading and videos for at least another 1-2 hours to try to learn it well for the quiz and first exam. Again, I don’t expect you to remember everything and I know there may be some stuff that may be difficult to understand on your own, so I will not typically ask questions on a quiz regarding those topics. However, if you don’t try to learn them as much as possible on your own, it can be difficult to follow in lecture and make it harder to learn on your own later, so it is always in your best interest to try to learn difficult topics even if I tell you they will not be on a quiz.

When I assign videos, just like with reading, you should make sure you are not just watching them, but studying them. You should also take notes taking down the times to make it easier to study later. That way if there is a topic you wanted to review, you don’t have to watch the whole video, you can just start it at the time in your notes where the topics starts. Also, if you take good notes of the videos, you can quickly review them by skimming them much easier than trying to rewatch the videos. While each video isn’t long, it can be a lot to have to rewatch when studying for an exam.

**Videos on Evolution and Natural Selection.**

**Evolution by Stated Clearly (8mins):** [**https://www.youtube.com/watch?v=GhHOjC4oxh8**](https://www.youtube.com/watch?v=GhHOjC4oxh8)

1. What is the definition of evolution given in this video?
2. When DNA is copied incorrectly and acquires errors, the genetic information changes. What do we call these changes? (around 2min mark in video)
3. What is the most recent common ancestor to all dogs? In other words, what organisms did dogs evolve from?

**Natural selection by Stated Clearly (9 mins):** [**https://www.youtube.com/watch?v=0SCjhI86grU**](https://www.youtube.com/watch?v=0SCjhI86grU)

1. What is meant by common descent?
2. What are the adaptations – which are traits – that were acquired by tortoises living on islands where their food grew in higher places?
3. What are some other foods related to broccoli and cauliflower?
   1. How did these related foods come to exist? How were they being selected?
   2. Remember, the trait must exist to be selected!!!
4. In natural selection, what is it in nature that selects traits? In other words, how does nature select traits?
5. How is natural selection defined in this video?

**Chapter 1: Biology: Exploring Life**

**1.9 Theme: evolution is the core theme of biology**

1. What explains the unity and diversity of life?
   1. What does the book mean by unity of life?
   2. What does the book mean by diversity of life?
2. What were the two main points of Darwin’s *The Origin of Species*?
3. What was the phrase that Darwin used that captures the ideas of unity and diversity in life?
   1. NOTE: Darwin never used the term “evolution,” instead he used the phrase that is the answer to the question above.
4. What does unequal reproductive success mean?
5. What is the result of unequal reproductive success?
6. How did Darwin propose new species could evolve?
7. Looking at the evolutionary tree of life (fig 1.9c), are seals or dogs more closely related to a red panda?

**1.10 Evolution is connected to our everyday lives**.

1. If in natural selection, the natural environment is causing the selection of some individuals to survive and reproduce more than others, what is causing the selection in artificial selection?
2. What is are the ways humans have had a negative impact on life on earth as described in this section?
3. What are ways that our understanding of evolution can help us

**Video: Got Lactose? The Co-evolution of Genes and Culture**

Watch this video after studying everything else above and more things will click into place giving you a greater understanding of the relevant topics.

1. Watch the interactive video: <https://media.hhmi.org/biointeractive/interactivevideo/gotlactasequiz/>
2. After watching the video above, watch the following to help you understand the benefit of lactose persistence: <https://www.biointeractive.org/classroom-resources/natural-selection-lactose-tolerance>
3. What is lactose?
   1. NOTE: Lactase and lactose are not the same thing.
4. What is lactase?
5. What does lactase persistence mean?
   1. NOTE: This produces lactose tolerance and the when lactase doesn’t persist, it causes lactose intolerance.
6. What are the consequences to adult mammals that drink milk that don’t have active lactase?
7. Thought question (will NOT be on the quiz): How did they know the host was lactase tolerant due to lactase persistence by looking at glucose levels?
   1. In other words, why does the fact that glucose levels rose tell the scientists that the host had active lactase enzymes?
8. When the video discusses DNA it shows a sequence of 4 different letters (A, T, G and C). These letters represent information in DNA that contain the genetic code which is used to build all the different parts of cells and of our bodies.
9. Mutations are permanent changes in the letters of DNA that can change the function of the different parts of cells and our bodies.
   1. In other words, mutations are kind of like “typos” when DNA is copied.
10. How did scientists find evidence that 9 thousand years ago, humans used milk as a food?
11. What was the common cultural similarity between Maasai people in Africa that are lactase tolerant and those lactase tolerant from Europe?
12. What is the advantage to survival and reproduction for those people that are lactose tolerant?