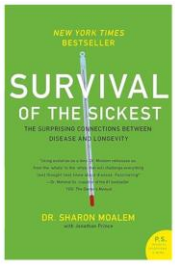
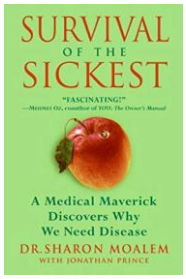
Advanced Biology Summer Homework Assignment 2026

"Nothing in biology makes sense except in the light of evolution."
- Theodosius Dobzhansky

Evolution is one of the overarching themes of biology. This summer, to give you some background knowledge on evolution, you will be reading *Survival of the Sickest: The Surprising Connections Between Disease and Longevity* by Dr. Sharon Moalem. I think you will find this book interesting.





Either edition is fine – new or used.
Amazon: $9-12 paperback or Kindle ebook

Directions: Read the book and answer the questions for each chapter. As you read you should underline, highlight, write notes in the margins, write down questions you have, etc. Anything that will help you recall the information. When you return to school in the fall, you and a partner will be assigned a chapter (or part of a chapter) to summarize to the class.

Your answers must be written in your own words, typed, and submitted by the due dates to TEAMS (if you have access to it) or by email (only if you don't have TEAMS): walkerj@northwoodschool.org If you are unable to send me your work using one of these platforms, contact me and we can work it out.

You may not use AI to answer the questions – this would be considered cheating and will automatically disqualify you from taking this class.

If, for some very good reason, you cannot meet the deadlines, you must communicate with me **prior to the due date** to make an alternate plan. If you know you are going to be busy later in the summer, get the work done ahead of time. Do not work as a group or copy another student's answers! Information must be paraphrased from the book, not copied directly and you may not use AI to answer your questions. Email/message me if you have any questions.

If you do not submit assignments by the due date without a legitimate reason that has been discussed with me prior to the date, you will be dropped from the class.

Due Dates

Introduction and Chapters 1 – 4 **Due Friday, July 17th**
Chapters 5, 6, 8 and Conclusion **Due Friday, August 14th**

The author hopes that you will come away from this book with an appreciation of three things:

- Life is in a constant state of creation.
- Nothing in our world exists in isolation.
- Our relationship with disease is often much more complex than we may have previously realized.

Introduction and Chapters 1 – 4: Due Friday, July 17th

Introduction

1. What sparked an interest in the author leading her to research this subject?
2. How does this condition relate to the author?
3. What is the goal of natural selection?

Chapter 1: Ironing It Out

1. What functions does iron serve in our bodies? Name a molecule that contains iron.
2. Describe hemochromatosis.
3. Why is life more abundant in the North Atlantic than in the Pacific?
4. Explain the relationship among iron in a population, survival of the Bubonic Plague, and hemochromatosis.
5. Explain the symbol of the barber pole.
6. How could being a carrier of cystic fibrosis be an advantage?

Chapter 2: A Spoonful of Sugar

1. Compare and contrast the three types of diabetes.
2. What is the Younger Dryas?
3. Explain how shivering and tingling fingers and toes protect the body.
4. What is cold diuresis?
5. What is *Rana sylvatica* and how does the author use it to illustrate survival?
6. How might your body's response to cold differ depending on your ancestry?

Chapter 3: The Cholesterol Also Rises

1. Describe the role of vitamin D and folic acid in the body and the relationship to skin color and sunlight.
2. Explain how wearing sunglasses can help give you a sunburn.
3. Explain why Inuit Eskimos, despite living in Polar Regions with little sunlight, remain dark-skinned like their equatorial ancestors.
4. What is the ApoE4 gene? What is its role in the body?
5. What is the ACHOO syndrome? How did sneezing help our ancestors?
6. Explain why winter and naturally dark skin are a bad combination for someone in a "Who has the lowest cholesterol?" contest.

Chapter 4: Hey, Bud, Can You Do Me a Fava?

1. What is favism?
2. What are free radicals? How are they harmful? What enzyme in our cells protests against them?
3. What are phytoestrogens and how are they related to birth control?
4. Explain why hot peppers burn our tongues but birds don't feel the heat.
5. What does G6PD have to do with malaria?

Chapter 5, 6, 8 and Conclusion: Due Friday, August 14th

Chapter 5: Of Microbes and Men

1. Describe the effect of the Guinea worm on man. How is it related to the symbol of medicine?
2. Why might antibiotics and yogurt be a good combination?
3. Explain how, through host manipulation, the organism that causes a disease (choose one) helps insure that others like it get into a new victim.
4. Why is the common cold not considered to be very virulent?
5. If you were an extremely virulent (powerful) disease-causing organism, how would you choose to be transmitted from victim to victim?

Chapter 6: Jump into the Gene Pool

1. Edward Jenner created the first vaccine. Describe how a vaccine works.
2. Explain how we are, in a manner of speaking, like a soup made of mammal, bacteria and virus ingredients.
3. Explain the link between sunspots and flu epidemics.
4. Explain how Lamarck got an undeserved bad name.
5. What is "junk DNA" and why is it no longer considered an appropriate name?

Chapter 7: You get to skip this chapter.

Chapter 8: That's Life: Why You and Your iPod Must Die

1. Compare and contrast Hutchinson-Gilford progeria syndrome and Werner syndrome.
2. Why are they referred to as orphan diseases?
3. Explain the Hayflick limit and how it relates to cancer.
4. How does telomerase relate to the immortality of cancer cells?
5. So, why must you and your iPod die? (see p 190)
6. What two ends are accomplished by aging?
7. Describe the three factors that make delivering a baby so different for humans compared to other primates.

Conclusion: "Nothing in biology makes sense except in the light of evolution."

1. How does the book, Survival of the Sickest, support the above quote by Theodosius Dobzhansky, a noted evolutionary biologist?
2. Which chapter did you enjoy the most? Why?
3. Summarize what you learned from this book (generally – not the details of the chapters) in a paragraph.