Dear Future AP Biology Student,

Although it is the end of the school year, and not the beginning, I would like to take a moment to welcome you to next year's AP Biology class, and help you to prepare for this upcoming challenge. AP Biology involves much hard work, but it can be incredibly rewarding. I have lots of fascinating labs and inquiry activities planned, and I am looking forward to an exciting year with all of you. Below you will find your summer assignment. If you have any questions feel free to contact me at reberly@runnels.org.

Part One: Survival of the Sickest
You will be reading one text this summer. It is written on a college level, but is engaging and interestingly written.

- Moalem, Sharon. *Survival of the Sickest*. New York: HarperCollins, 2007
- While the book is very readable and intended for a general audience, you should allow yourself about two weeks of reading 15-20 minutes a day to complete the assignment.
- Complete the attached reading guide questions.

Part Two: Cricket Food Choice Investigation

- See attached guidelines for Cricket Food Choice Experiment.
- Prepare a slide show presentation on your investigation to be presented the first week of school.
- See guidelines for slide show presentation.

Your presentation should include the following sections:

- Title
- Introduction - include background information about the experiment and state the purpose of the investigation.
- Hypothesis
- Materials - list the specific materials and equipment used.
- Procedure - explain step by step procedures used.
- Results - data should be illustrated as charts, tables, graphs, &/or diagrams.
- Analysis - explain your independent variable, dependent variable, control group, experimental group, and constants. Refer to your graphs/data collected and explain what it shows. Include an error analysis - include any important factors that may have affected your results.
- Conclusion - Does the data support the hypothesis? Provide a possible explanation for why the results turned out the way they did. Explain the significance of the results.

Name _____

Evolution Reading Assignment: Survival of the Sickest

The following questions should be answered on a ***separate piece of paper*** *and attach to this assignment page.*

Introduction

1. What is the "big" question the book will attempt to answer?

Chapter I

2. The author points out many ways in which iron impacts life. Identify/describe at least five.

3. In the context of this chapter, explain the author's reference to Bruce Lee and to the barber pole.

Chapter II

4. Distinguish between each of the three types of diabetes.

5. What did the ice cores of 1989 reveal about the Younger Dryas?

6. Describe the body's "arsenal of natural defenses" against cold.

7. Describe the connection between *Rana sylvatica* and diabetes.

8. In Chapters I and II several inherited disorders were discussed. Create and complete a chart with the following information: Disease/Disorder, Symptoms, Evolutionary Advantage

Chapter III

9. Why do we need Vitamin D? Cholesterol? Folic acid?

10. Briefly describe the connection between the two concepts:
    a. tanning beds; birth defects
    b. sunglasses; sunburn
    c. hypertension; slave trade
    d. Asian flush; drinking water
    e. skull shape; climate
    f. body hair; malaria

11. What's so *fishy* about the Inuits skin color?

12. Explain the good and the bad of ApoE4.

Chapter IV

13. Explain the role of G6PD.

14. Briefly describe the connection between the two concepts:
    a. European clover; Australian sheep breeding crisis of the 1940s
    b. Capsaicin; birds and mammals
    c. Malaria; air conditioning
    d. Fauvism; fava beans

15. Explain the following statement found on page 87: "Life is such a compromise."

Chapter V: "Of Microbes and Men"

16. Complete Parasite Chart (go to end of assignment)

17. Identify 3 ways in which microbes/parasites move from host to host.

18. For each pathway listed in question #2, explain the relationship of the mode of transmission to the virulence of the invader.

19. What is our advantage in the survive-and-produce race?

Chapter VI: "Jump into the Gene Pool"

20. Briefly discuss the following terms/scientists:
    a. Jenner
    b. vaccine
    c. antibodies
    d. B-cells
    e. "junk DNA"
    f. Lamarck
    g. McClintlock
    h. retroviruses

21. What is the Weissman barrier?

22. Make connections between the following terms:
    a. transposons; viruses; evolution
    b. sunspots; flu epidemics

23. Humans have about 25,000 genes and more than a million different antibodies. How is this possible?

24. What is a *persisting virus*?

Chapter VII: "Methyl Madness"

25. Make connections between the following terms:
    a. vitamin supplement; agouti mice
    b. snakes; long-tailed lizards
    c. Barker Hypothesis; fathers who smoke
    d. Smoking grandmothers; asthmatic children
    e. Betel nut chewing; cancer

26. Epigenesist may be partially responsible for the childhood epidemic of obesity. Explain.

27. "Good times mean more boys. Tough times mean more girls." Explain.

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

28. Make connections between the following terms:
    a. Progeria; lamina A
    b. Hayflick limit; telomeres
    c. Cancer cells; stem cells
    d. Size; life expectancy
    e. Risky child birth; big brains and bipedalism

29. Explain the author's iPod and aging analogy.

30. Identify the 5 lines of cancer defense.

31. What are the two accomplishments of biogenic obsolescence?

32. Compare and contrast the *Savanna* and *aquatic ape* hypotheses.

Conclusion

33. 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.

On a personal note, what would you add to his list?

34. "Nothing in biology makes sense except in the light of evolution." How does the book, Survival of the Sickest, support this quote by Theodosius Dobzhansky, a noted evolutionary biologist?

Parasites: Survive and Reproduce!

Parasite	Host/s	Manipulative Adaptation	Evolutionary Advantage
Dracunculus medinensis Guinea worm			
Hymenoepimecis argyraphaga wasp			
Dicrocoelium dentriticum Liver fluke			
Spinochordodes tellinii Hairworm			
Rabies virus			
Toxoplasma gondii			
Pin worms			
Cholera			
Plasmodium Malaria			

Inherited Genetic Disorders

Disease/Disorder	Symptoms	Evolutionary Advantage

Cricket Food Choice Experiment

Your job as a summer scientist is to perform a replicated experiment to determine some of the food choices of crickets. Crickets are available at most pet stores and bait stores. Before you buy them, research how to keep them and what to do with them when you are finished. Please do not release them.

I will meet with you and explain the experiment further if need and show you a home-made choice chamber. Try not to stress over this. Use your imagination and have fun.

Instructions on how to write up your experiment in a power point is included with this packet.

I will be glad to answer any questions you have about the instructions at any time this summer over email or google classroom but I will not help you set up your experiment.

Requirements

- Research the kinds of food crickets eat.
- Pick four of those foods and determine experimentally which they like best.
- All conditions other than the foods should be the same.
- Use the 2 L bottle or other choice chamber of your design.
- Repeat all food pairings at least once. Reproducibility makes for believability. It is better to do fewer pairings and more repetitions.
- Test **at least 4** foods.
- Use 12 crickets in each experiment.
- Think through your design well before you start but don't be afraid of trial and error.
- Make a table of your data.
- Graph your data.
- If you know how to perform chi square, do so to see if your hypothesis is accepted or rejected. If you are not familiar with chi square it is OK, we will cover that in the course.

Cricket Food Choice Experiment

- The null hypothesis will be that there is no preference.

Hints

- if you use the 2 liter bottle choice chamber, put the crickets in first, then use the caps on each end to place the different food inside.
- Give the crickets a five minutes or so (your decide how long) to get oriented before starting the amount of time you give them to choose a food.
-You can use a different chamber each time, take apart the chamber and clean it each time or use your imagination in how to introduce the food with enough room for all the crickets to have access **without contaminating** the bottle for the next experiment.

This is a version of a choice chamber used for fruit flies. I suggest something similar with two liter bottles.