Kingsbury AP Biology Summer Packet

Video Learning-Bozeman Science

You will learn about key practices to succeed in AP biology by watching videos and answering questions about each. We will be using a lot of videos for Bozeman science this year, so this will give you a good introduction to the host, Mr. Anderson, and his videos. Each video is about 10 minutes long, but allow yourself 30 minutes for each to pause video and answer questions.

Each video centers on the 4 Big Ideas of AP Biology:

1. Big Idea 1: EVOLUTION The process of evolution drives the diversity and unity of life.
2. 2) Big Idea 2: Cellular Processes: ENERGY and COMMUNICATION Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.
3. 3) Big Idea 3: GENETICS and INFORMATION TRANSFER Living systems store, retrieve, transmit, and respond to information essential to life processes.
4. 4) Big Idea 4: INTERACTIONS of SYSTEMS Biological systems interact, and these systems and their interactions possess complex properties.

The 4 videos are as follows:

1) Video 1 – Models and Representation <https://tinyurl.com/4nhpm3kw>

2) Video 2 – Using Mathematics <https://tinyurl.com/mr465v6s>

3) Video 3 – Beginner’s Guide for Graphing Data <https://tinyurl.com/mjchv8yx>

4) Video 4 – Scientific Questioning <https://tinyurl.com/2p94fy56>

Video 1 – Models and Representation

A. What is a model?

B. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of how it works is a “Conceptual Model”.

C. What are the four Big Ideas we will be discussing in AP Biology? List below along with the associated example:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - example:

2. Free \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - example:

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - example:

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - example:

D. What are the 5 things you will need to be able to do using models and visual representations? [Please keep in mind, some of the examples that he uses may be unknown to you at this time, focus on the “practice” not the content.]

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a. Relating to beetles, draw/label the final graph he created below:

b. Why do you think there were fewer light-colored beetles when the trees became darker?

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What is going to move in his example?

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ They will give you a model and then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ based on that.

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Means that you are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your knowledge to a visual representation.

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Asking you to \_\_\_\_\_\_\_\_\_\_\_ the knowledge that you have.

E. Models allow us to make \_\_\_\_\_\_\_\_\_\_\_ of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ model.

F. What is the most famous model of all? \_\_\_\_\_\_ That was created by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Video 2 – Using Mathematics NEED YOUR CALCULATOR!!!**

A. All sciences have what at their core?

B. What is “Mathematical Biology” driven by:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: sequencing DNA – what is the trend?

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Theory: being used to predict what?

3. Computing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: computers are getting what?

4. Laboratory experiments in silico (define the following):

a. In vitro:

b. In vivo: c.

In silico: simulating what?

C. Four equations in the four big ideas: want to be familiar with these:

1. Evolution:

2. Free energy:

3. Information:

4. Systems:

D. Understandings in Using Mathematics:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a Mathematical Routine: Pause video, try and do it and then check it. You should do this one no problem. Show your work below.

2. Apply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Routines: Again, try this problem, showing your work below. I think you can do this one based on common sense!

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ quantities that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ natural phenomena.

a. You can absolutely do this, show work.

b. Potatoes: you can do this too! Show work. \_\_\_\_\_\_\_\_\_M Sucrose

Video 3 – Beginner’s Guide for Graphing Data

1. What type of graph uses a best fit line?

2. Explain the difference between a bar graph and a histogram.

3. What type of graph shows change over time?

4. Which type of graph displays a correlation of variables?

5. Distinguish between the independent and dependent variables in an experiment, and where their axes are on a graph.

6. Which type of graph is best for comparing 2 or more different groups?

7. Which type of graph is better for showing distribution of data?

8. Explain when a pie chart/graph should be used and give (draw, label) any example.

9. State at least 5 elements that any graph should always display.

**Video 4 – Scientific Questioning**

1. I should be able to ask you, “How do we….” what?

2. Students should be able to answer, “This is how….” what?

3. What is a good example of how you ask questions all the time?

4. What is the problem with:

a. Smallest bird question?

b. Universe question?

c. Genetically modified food question?

5. Why is the plant growth question more scientific? But what is a problem with it too?

6. Why is the CO2 question a good scientific question?

7. A good question is going to lead to:

a.

b.

8. What are the three things you have to be able to do during the practice of “Scientific Questioning”?

9. Write out one of the three questions he “posed” concerning the phylogenetic tree. (You are just asking, not answering.)

10. When you “refine” a question, you are taking it to another \_\_\_\_\_\_\_\_\_\_\_\_\_.

11. What is the third part of scientific questioning?

12. What can you then do if you are good at scientific questioning?