

# SCI123: BIOLOGY with BOTANY & ZOOLOGY

**THIS COURSE DOES NOT REQUIRE A FINAL EXAM**

## SYLLABUS

**READ THESE INSTRUCTIONS NOW!**

Keep work organized by week, clearly labeled and typed or copy/paste onto your syllabus. Math and hand done projects: photograph, scan or screenshot and copy/paste to your syllabus. Keep images small so your file isn't too large to submit or save work as a PDF. Go to "Student Services" online for any issues with this course. If you need Microsoft Word, request an email from Student Services and follow the steps given to you.

**SUBMITTING WORK: YOU MUST SUBMIT ALL WEEKS AT ONCE on one file.** Your syllabus may be submitted separately if you chose not to add your work to it. Go to the website and select "Submit Work", complete the form and attach your work. You may also share a public link such as Gdocs. You have two attempts at receiving a passing grade of "C" or better so submit your full effort original work. Do not mail work. You will receive a reply in about 5 business days. Do not call or email asking for us to verify your work. All components of your course must be completed by the end of the 8<sup>th</sup> week from the time of your registration; 12 weeks for a 2 credit class. If you have a medical emergency or disability preventing you from completing your class, contact "Student Services" and send an email to request up to a 2-week extension

### **IMPORTANT NOTE:**

*Use your book as a source for understanding, you don't need to read it word for word. This class is based on the Science of Life, how it is explored and experimentation. You will be mostly required to share your thoughts on ethical issues involving controversial topics in biology. Take notes! The textbook for this class is at an IB level – which is a high honor's level, however, notes have been provided.*

### **WEEK 1**

#### **Overview of Biology**

**For this first week, use ONLY THE IOHS BIOLOGY NOTES PROVIDED**

**Read, study, and use for assignment application.**

**INTRODUCTION: THE NATURE OF SCIENCE AND BIOLOGY**

**LAB I: "Adaptive Traits"**

#### **READ TEXTBOOK NOTES**

- 1.) What is meant by "theory", "law", and "hypothesis"?

- 2.) The purpose of a control in a scientific experiment is to \_\_\_\_\_. [a\) provide a basis of comparison between experimental and non-experimental](#); [b\) indicate the dependent variable](#); [c\) indicate the independent variable](#); [d\) provide a baseline from which to graph the data](#).
- 3.) Which of these theories is not a basis for modern biology? a) evolution; b) creationism; c) cell theory; d) gene theory.
- 4.) Mushrooms belong to which of these taxonomic kingdoms? a) Plantae; b) Protista; c) Animalia; d) Fungi; e) Monera
- 5.) Which of these is NOT a living organism? a) cactus; b) cat; c) algae; d) virus; e) yeast
- 6.) The scientist(s) credited with developing the theory of evolution by natural selection were \_\_\_\_\_. a) James Watson and Francis Crick; b) Aristotle and Lucretius; c) Charles Darwin and Alfred Wallace; d) Robert Hooke and Rudolph Virchow; e) James Watson and Charles Darwin
- 7.) When an organism consists of a single cell, the organism is referred to as \_\_\_\_\_. a) uninucleate; b) uniport; c) unisexual; d) unicellular
- 8.) List the five kingdoms of life that are currently recognized by most scientists; tell generally what kinds of organisms are classified in each kingdom.

**ADD RESPONSE/S/ HERE**

#### LAB I

A trait that assists an organism in survival and reproduction in a certain environment is said to be adaptive. Observe **two** different animal species native to your own environment (squirrels, dogs, birds, etc...) What sorts of adaptive traits do you observe? How do they aid in the animal's survival? Write about it (no length requirement).

**ADD RESPONSE/S/ HERE**

**CELLS...** The three cells you will be studying in this unit are prokaryote, animal and plant.

- 1.) What are the primary differences between animal and plant cells?
- 2.) What is the function of the organelles in these different cells?

**ADD RESPONSE/S/ HERE**

#### **MITOSIS and MEIOSIS**

- 3.) Summarize the phases of MITOSIS

4.) What is the function of Meiosis?

**ADD RESPONSE/S/ HERE**

#### **CELLULAR TRANSPORT**

5.) What is meant by Cellular Transport?

6.) Why is transport critical

**ADD RESPONSE/S/ HERE**

#### **CELLS - ORIGINS**

7.) Describe the types of microscopes and the types of information scientists can obtain using each one.

8.) Which of these is not a type of cell? a) bacterium; b) amoeba; c) sperm; d) virus

**ADD RESPONSE/S/ HERE**

#### **CELLS II: CELLULAR ORGANIZATION**

9.) Give the function and cellular location of the following basic eukaryotic organelles and structures: cell membrane, nucleus, Golgi bodies, mitochondria, ribosomes, and cell walls.

**ADD RESPONSE/S/ HERE**

#### **HEREDITY AND DNA**

<https://www.khanacademy.org/test-prep/mcat/biomolecules/mendelian-genetics/v/an-introduction-to-mendelian-genetics>

Use the link above for a video tour of "Genetics" to improve your understanding (watch all four)

#### **HEREDITY**

10.) What is meant by "heredity"?

11.) How do we inherit physical characteristics from our parents?

14.) For what is the Punnett square used?

15.) Summarize the Hardy-Wienberg Principle

**ADD RESPONSE/S/ HERE**

### **DNA REPLICATION ANIMATION**

- 1.) Define DNA.
- 2.) What is the function of DNA?
- 3.) What is the purpose of replication?
- 4.) Explain the steps in DNA Replication.

**ADD RESPONSE/S/ HERE**

### **INTRODUCTION TO GENETICS**

#### **Human Genetics**

- 1.) What happens when there's an abnormality on a chromosome?
- 2.) For what is DNA testing used (may do additional research)?
- 3.) What is the difference between genotype and phenotype

**ADD RESPONSE/S/ HERE**

### **ANIMAL ORGAN SYSTEMS AND HOMEOSTASIS**

#### **READ TEXTBOOK NOTES**

- 1.) List the principal organ systems in humans give its task.
- 2.) List one body system and the types of interactions it has with other body organ systems.
- 3.) Which of these is not a characteristic of living things? a) reproduction and heredity; b) metabolism; c) response to stimulus d) all of the are characteristics of life
- 4.) Control of homeostasis in the body is accomplished by \_\_\_\_\_. a) Nervous system; b) Circulatory system; c) Endocrine system; d) both a and c control homeostasis
- 5.) When we are cold we shiver. This releases heat from which organ system? a) Skeletal system; b) Muscular system; c) Digestive system; d) Circulatory system
- 6.) Heat released when we shiver is transported from its source to the rest of the body by which of these organ

systems? a) Skeletal system; b) Muscular system; c) Digestive system; d) Circulatory system

- 7.) The digestive process consists of three sub-processes. Which of these is not part of the digestive process? a) mechanical breakdown of food; b) circulation of food in the blood and lymph; c) absorption of food into the blood or lymph; d) assimilation of the food into cells of the body
- 8.) Hormones are produced directly by organs and tissues of which of these body systems? a) Endocrine; b) Circulatory; c) Reproductive; d) Nervous
- 9.) The removal of organic wastes from the body is accomplished by the \_\_\_ system? a) Digestive; b) Excretory; c) Circulatory; d) Lymphatic
- 10.) Which of these is part of the central nervous system? a) brain; b) nerve ganglia; c) spinal cord; d) a and b; e) a and c
- 11.) The spinal cord is located on which side of the body? a) dorsal; b) ventral; c) abdominal; d) cranial
- 12.) List the parts of the male reproductive system.
- 13.) Gametes are produced by which of these cell division processes? a) mitosis; b) binary fission; c) photosynthesis; d) meiosis
- 14.) Blood leaves the heart through which of these types of blood vessels? a) capillaries; b) arteries; c) veins; d) lymphatic vessels
- 15.) Storage of important ions such as phosphorous and calcium is done by which of these organ systems? a) Skeletal; b) Muscular; c) Digestive; d) Excretory

**ADD RESPONSE/S/ HERE**

## **NOTE: Key Info – When doing your LABS**

- The scientific method is a way to ask and answer scientific questions by making observations and doing experiments.
- The steps of the scientific method are to:
  - **Ask a Question**
  - **Do Background Research**
  - **Construct a Hypothesis**
  - **Test Your Hypothesis by Doing an Experiment**
  - **Analyze Your Data and Draw a Conclusion**
  - **Communicate Your Results**
- It is important for your experiment to be a fair test. A "fair test" occurs when you change only one factor (variable) and keep all other conditions the same.

## **WEEK 2**

Use your Biology Textbook – with your PDF Downloads

“BIOLOGY CAMBRIDGE” and ‘CELL BIOLOGY”

Read, study, and use for assignment application.

CELLS; CHEMISTRY OF LIFE

ASSIGNMENT: Chapters 2 & 3

**QUESTIONS TO CONSIDER on page 14:** Complete questions 3 and 4 based on your own opinion.

Place your responses below.

**CAN WE BELIEVE OUR EYES on page 27:** Complete all and submit responses based on your observation and reasonings.

Place your responses below.

**LIPID QUESTIONS on page 46:** Complete #s 1 and 2

Place your responses below.

**ENZYMES QUESTIONS on page 57:** Complete #9, 10

Place your responses below.

**QUESTIONS on page 61:** Complete #s 15 & 16

Place your responses below.

**QUESTIONS on page 64:** Complete #18

Place your responses below.

## **PLANTS**

**ASSIGNMENT:** Read Chapter 9

Each section has Assessment Statements which are the key points you are expected to learn as you explore your text. For each section, write down each assessment statement and take notes. Use your notes to complete the assignment below.

**END OF THE CHAPTER QUESTIONS:** Complete questions 1, 6, 7, 8 and 10.

Place your responses below.

**LAB PROJECT 1:** Go to your class downloads and download your “Sample Projects and Activities in Biology”. Complete the lab “Leaf Chromatography”. Include your responses to all questions and include 2 photos of YOU doing your project.

<https://learning-center.homesciencetools.com/article/leaf-chromatography-science-project/> (Alternate Project Link can be used)

Place your responses and images below.

## **WEEK 3**

Use your Biology Textbook – with your PDF Downloads

“BIOLOGY CAMBRIDGE”

Read, study, and use for assignment application.

## GENETICS

### ASSIGNMENT: Chapters 4 & 10

**QUESTIONS TO CONSIDER on page 76:** Complete #s 3 and 4 based on your own morals and reasoning.

Place your responses below.

**QUESTIONS TO CONSIDER on page 88:** Complete #s 3, 4 and 5 based on your own morals and reasoning.

Place your responses below.

**QUESTIONS TO CONSIDER on page 90:** Complete #s 1 and 2 based on your own morals and reasoning.

Place your responses below.

**QUESTIONS TO CONSIDER on page 95:** Complete #s 2 and 4 based on your own morals and reasoning.

Place your responses below.

**QUESTIONS TO CONSIDER on page 250:** Complete #s 1, 2, 3

Place your responses below.

### LAB

**LAB: Complete "Genetic" Activity – Download. Complete and copy/paste below**

**ADD RESPONSE/S/ HERE**

## **WEEK 4**

Use your Biology Textbook – with your PDF Downloads

**“BIOLOGY CAMBRIDGE”**

Read, study, and use for assignment application.

**NUCLEIC ACIDS; CELL RESPIRATION**

**ASSIGNMENT: Chapters 7 & 8**

**QUESTIONS TO CONSIDER on page 172: Complete #s 1, 2, 3, 4**

Place your answers below.

**FOR CHAPTER 7:** Draw and label a diagram showing the structure of a peptide bond between two amino acids. Place a photo of your drawing below.

Place your responses below.

**FOR CHAPTER 7:** List three differences between fibrous and globular proteins.

Place your responses below.

**QUESTIONS TO CONSIDER beginning on page 206: Complete #18, 19, 23, 24 and 30**

Place your responses below.

**CHAPTER 8 :** What is meant by the term ‘limiting factor’?  
List three limiting factors for photosynthesis.

Place your responses below.

## WEEK 5

Use your Biology Textbook – with your PDF Downloads

“BIOLOGY CAMBRIDGE”

Read, study, and use for assignment application.

THE HUMAN BODY

ASSIGNMENT: Chapters 6 & 11

**QUESTIONS TO CONSIDER on page 139:** Complete #s 1 & 2

**ALSO page 140:** Complete #s 6, 7, 8 and 9

Place your responses below.

### Additional QUESTIONS:

- Define ‘pathogen’.
- Explain why antibiotics are effective against bacteria but not against viruses.
- Distinguish between ‘antigens’ and ‘antibodies’.
- Explain antibody production.
- Outline the effects of HIV on the immune system.

**ESSAY:** Research and discuss the cause, transmission and social implications of AIDS. (no minimum page count)

Place your responses below.

**QUESTIONS TO CONSIDER on page 142:** Complete #s 1, 2, 3, 4

Place your answers Below.

**QUESTIONS TO CONSIDER on page 162: Complete #s 1, 2, 3, 4**

Place your answers Below.

**QUESTIONS TO CONSIDER on page 164: Complete #s 1, 2, 3**

Place your answers Below.

**End of the Chapter QUESTIONS on page 164: Complete # 1, 2, 3, 8 and 11**

## **WEEK 6**

Use your Biology Textbook – with your PDF Downloads

“BIOLOGY CAMBRIDGE”

Read, study, and use for assignment application.

ECOLOGY & EVOLUTION

ASSIGNMENT: Chapters 5

**QUESTIONS TO CONSIDER on page 109: Complete #s 1, 2**

Place your answers Below.

**LAB PROJECT 1:** Go to your class downloads and download your “Sample Projects and Activities in Biology”. Complete the lab “Design Challenge: Building a filtration Apparatus”. Include your responses to all questions and include 2 photos of YOU doing your project.

**Copy/Paste all LAB Components Below**

**LAB PROJECT 2:** Go to your class downloads and download your “Sample Projects and Activities in Biology”. Complete the lab “Oil Spill Clean-Up Challenge”. Include your responses to all questions and include 2 photos of YOU doing your project.

**Copy/Paste all LAB Components Below**

**PAPER LAB 2:** You are a respected zoologist that has spent the last ten years studying the animals in the world's rain forests. In all those years, you have not seen one new species of animal - until today. Miles from your base camp this morning you have observed a spectacular animal never before described. You must describe its appearance, determine some of its daily habits, fit it in today's classification system, give it a scientific name, and present your information in a written report.

**ADD RESPONSE/S/ HERE**

**RESEARCHED PERSUASIVE ESSAY:**

Research the question: Should beef from a cloned cow be approved for sale by the FDA? Share a persuasive essay explaining why it should or should not. Provide at least 2 reliable sources and include the citation information. 2 page minimum.

**ADD ESSAY HERE**