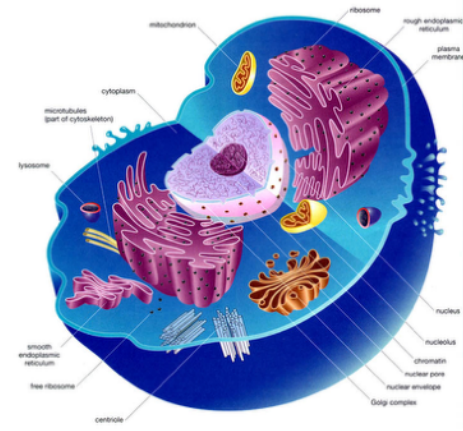


# Biology Study Session and Laboratory for High School 2019-20

Thursdays 9 to 11 am

## Life is Good

California science standards require all students to take biology. The reason is simple. A rudimentary knowledge of biology is important for all citizens of our society. An appreciation for how biology works will instill an understanding of life that will help us make rational decisions in our future. Life is good, especially when you understand it at the genetic level!



## One-Stop Shopping: A Class and Lab Bonded Together

This is a year-long course that supports biology for high school students. The course is a 1-hr study session, usually followed by a 1-hr lab. In the study session, students will be able to ask questions from the instructor regarding the homework problems or concepts in the chapter. After the question and answer period, there will be a weekly quiz on the chapter's material. We will study the biology text from Glencoe (Biology 2017, zebra head on cover). Questions will be assigned from each chapter for homework. There are no exams, unless the student is seeking UC laboratory course accreditation (see below). There will be 30 weeks of classes over 3 sessions throughout the year.

## Hard Work is Required, Understanding of Life is the Goal

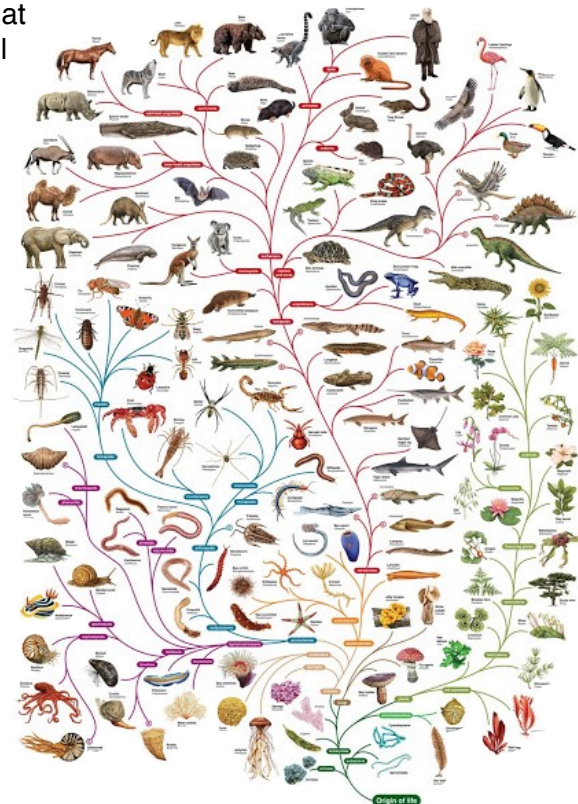
This is a challenging class and the student's schedule should be organized accordingly. Time should be made available for reading the chapter, reading the lab handout, and answering the questions each week. A prudent student will allow for an additional 2-3 hours a week for this homework. Hard work will be rewarded. In this course, your student will have the opportunity to develop study habits that will give them confidence, and at the same time, they will cultivate an understanding of the miracle of life. Biology is not an easy course. The challenge is that life is very diverse. The miracle is that amongst all of the diversity, all of life is connected at the genetic level. We share our most fundamental traits with mice, plants, and even bacteria. The blue whale and the bacteria in its gut both abide by the same genetic rules.

## UC "d" Approved Laboratory Course

This course fulfills a University of California a-g lab course requirement if mid-term and final exams are passed. Alternatively, the exam requirement could be replaced by a 5-8 page research report and a 5-10 minute presentation on a topic in biology.

## The Lab

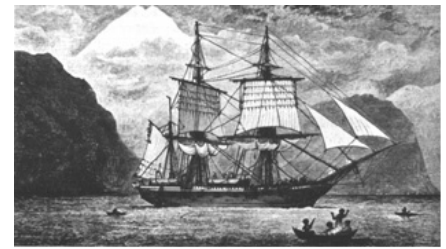
We use laboratory kits, and the labs are coordinated with the study sessions so students can immediately connect theory with practice. We will use the laboratory kit from Home Scientist, LLC (<http://www.thehomescientist.com/kits.html>). In addition, the lab course includes 5 biotechnology labs from the Amgen Biotechnology Experience (<https://www.amgenbiotechexperience.com>). Students are expected to be prepared for each lab by reading the handout for the week. Reports will be required for some of the labs. There are a few optional, but highly recommended, dissection labs.



# Biology 2019-20

## Tentative Topics (Chapter)

## Laboratory



*H.M.S. Beagle in the Strait of Magellan*

### Session 1

#### General Biology

Intro & Ecology (Ch 1, 2)  
Ecosystems and Populations (3, 4)  
Biodiversity (5)  
Chemistry in Biology (6)  
Cellular Structure (7)  
Cellular Energy (8)  
Cellular Reproduction (9)  
Sexual Reproduction (10)  
Inheritance and Heredity (11)  
Molecular Genetics (12)

Biology Lab Procedures and Safety  
The Microscope  
Cell Staining: Slide Preparation  
Pond Water Microscopy  
Molecular Modeling  
Acids, Bases, and Buffers  
Photosynthesis - Chlorophyll Extraction  
The Cell  
Amgen Lab 1: Dog Drool DNA  
Amgen Lab 2: Restriction Digestion

### Session 2

#### Life's Diversity

Biotechnology (13)  
History of Life & Evolution (14,15)  
Primate Evolution (16)  
Life's Diversity (17)  
Bacteria & Protists (18, 19)  
Fungi (20)  
Intro to Plants (21)  
Plants (22,23)  
Animals (24)  
Worms and Arthropods (25,26)

Amgen Lab 3: Electrophoresis  
Genetics: Dihybrid Crosses  
Modeling DNA Replication  
Tasty Genetics: PTC  
Amgen PCR Lab 1: PCR Reaction  
Amgen PCR Lab 2: Electrophoresis  
Hardy-Weinberg Population Genetics  
Bacteria Media/Antibiotics  
Bioluminescent Bacteria  
Worm Dissection

### Session 3

#### Fish to Humans

Echinoderms and Fish (27, 28)  
Reptiles & Birds (29)  
Mammals (30)  
Animal Behavior (31)  
Humans: Skin, Bone, Muscle (32)  
Nervous System (33)  
Blood, Breathing & Waste (34)  
Digestion & Hormones (35)  
Reproduction & Development (36)  
Immune System (37)

Mantids and Flies  
Microscope Explorations  
Biopolymers  
Computational Biology  
Reaction Time, Knee Jerk  
Cow Eye Dissection  
Blood Typing and Heart Rate  
Lung Function Lab  
Drug Discovery  
Modeling Viruses, Disease

