



Course Title: Accelerated Biology - 9th Grade

Instructor: Mrs. Ullyott, Mr. Lim

Instructor Availability: Tuesday/Thursday 3:15-4:30pm

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## Course Description:

Biology is the study of living organisms, divided into many specialized fields that cover their morphology, physiology, anatomy, behavior, origin, and distribution. The Accelerated Biology curriculum is an introductory course taught in the two semesters of ninth grade. The main objective of the course is to provide students with a fundamental understanding of modern biology and scientific processes, building a foundation for success in the college level AP courses to follow. Accelerated Biology is recommended for high-achieving students and for students who have a particular interest in biology and the natural sciences. The Accelerated Biology curriculum differs from the regular Biology curriculum. The Accelerated course places a higher priority on developing critical thinking skills by examining real world problems. The Accelerated curriculum examines topics with more depth and includes more advanced resource material in addition to the adopted text. Laboratory investigations play a more prominent role in the Accelerated course. Labs are more sophisticated than in the regular curriculum and students are expected to design and carry out experiments using appropriate methods and resources.

## GPA Grading Guidelines:

Category	Grading Criteria	Percentage
Classwork/Participation	<ul style="list-style-type: none"><li>• Completion/Quality</li><li>• Effort/Engagement</li></ul>	30%
Demonstrations of Learning	<ul style="list-style-type: none"><li>• Key Course Assignments</li></ul>	35%
Homework/Independent Learning	<ul style="list-style-type: none"><li>• Any work assigned to a student in which they complete on their own outside of class.</li></ul>	10%
Quarter Finals	<ul style="list-style-type: none"><li>• Quarter finals are course specific, standards based assessments that cover content from the 9 week quarter.</li></ul>	25%



Prerequisites: Recommendation from 8th Grade Science Teacher

Course Materials:

1. Readings
2. Textbook
3. Access to Google Classroom

Course Structure:

This is a lab-based course with a considerable amount of reading/writing and discussion. Most of the activities will be hands-on and the background information will be provided via readings, lectures, videos and demonstrations.

Course of Study:

I. Biophilia (Weeks 1-3)

A. Lab Skills

1. Mini Olympics
2. Observation Journal
3. Amgen Lab
  - a) Micropipetting
  - b) Gel Electrophoresis

B. Being a Scientist

1. Facebook Poster
2. Webquest and Roomquest
3. Introduction to Science Fair

II. Chemistry of Life (Weeks 4-7)

A. Atoms

1. Water
2. Macromolecules
  - a) HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
  - b) HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

B. Enzymes

1. Uses in the body



C. pH

1. Acids
2. Bases

III. Cell Biology (Weeks 8-11)

A. Cell Structure

1. Prokaryotic vs. Eukaryotic

B. Cell Boundaries

1. Passive vs Active Transport
2. Diffusion
3. Osmosis
4. Water Potential

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C. Cellular Metabolism

1. Respiration

- a) HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
- b) HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

2. Photosynthesis

- a) HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
- b) HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

D. Mitosis

- a) HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

IV. Genetics (Weeks 12-15)

A. DNA Structure

1. Base Pairing

- a) HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.



2. Forensics
  - B. Protein Synthesis
    1. Replication
    2. Transcription
      - a) HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
    3. Translation
  - C. Mendelian Genetics
    1. Alleles
      - a) HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
      - b) HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
    2. Crosses
      - a) Monohybrid Cross
      - b) Dihybrid Cross
        - (1) HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
    3. Genetic Disorders
- V. Ecology (Weeks 16-20)
- A. Community Interactions
    1. Cycles
      - a) HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
    2. Niches
    3. Food Chain/Food Webs
  - B. Biomes
    1. Terrestrial
      - a) Earth cycles
        - (1) HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
        - (2) HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.



- (3) HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
2. Aquatic
- C. Populations
1. Dynamics
    - a) HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
    - b) HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
  2. Human Impact
    - a) HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
    - b) HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
- D. Resources
1. Renewable
    - a) HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
    - b) HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
    - c) HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
  2. Nonrenewable
    - a) HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
    - b) HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
    - c) HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.



## QUARTER FINAL

### VI. Evolution (Weeks 21-24)

#### A. Darwin's Theory of Evolution

##### 1. Mechanics of Evolution

- a) HS-LS4-2. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
- b) HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.

##### 2. Natural Selection

- a) HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
- b) HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- c) HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

##### 3. Artificial Selection

#### B. Speciation

- a) HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

#### C. Hardy Weinberg

- a) HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

### VII. Biodiversity (Weeks 25-29)

#### A. San Diego as a Biodiversity Hotspot

##### 1. Field Biology

- a) HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

#### B. Microorganisms and Fungi

#### C. Plants



- D. Invertebrates
- E. Chordates

## VIII. Body Systems (Weeks 30-34)

### A. Cellular Organization

- a) HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

### B. Homeostasis

- a) HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

### C. Body Systems

1. Skeletal
2. Muscular
3. Circulatory
4. Nervous

### Course Specific Student Expectations:

- Students are expected to adhere to LAB SAFETY protocol
- Students are expected to maintain a Science Notebook throughout the course
- Students are expected to design an experiment for the San Diego Science Fair

### GPA Student Expectations:

**Homework Completion** - As a College Prep school, all GPA students are expected to complete their daily/weekly assignments. Students who fail to complete their homework assignments on time, and are unexcused, will be required to attend lunch and after school tutoring support daily until completed. Until all assignments are completed, students may not be eligible for athletics, clubs, and other extracurricular activities.

**Electronic Device Policy:** Cell phones, smart watches, and other electronic communication devices that can send and/or receive data are not permitted to be visible, heard, or used in any manner during school hours except by approval of school authorities. Any violation and/or disruption of the learning process will result in the confiscation of the item. The parent/guardian must pick up the confiscated item from the Office of Student Conduct or the teacher.

**Computer/Internet Usage Policy:** Students may not use computers and/or the GPA network without proper adult supervision. The teacher/staff will choose resources on the Internet that are appropriate for classroom instruction and/or research for the needs, maturity, and ability of their students.



## *Acceptable Use-*

- Access to any site that provides information relevant to current class assignments
- Access to college or university websites
- Use of teacher approved educational software (games, instructional tools, etc.)

Academic Integrity- Honest behavior is an expectation for all students at Gompers Preparatory Academy. Our goal is to create and maintain an ethical academic atmosphere. Acts of academic dishonesty that will not be tolerated at GPA are listed below:

- Cheating on any classroom assignment, test, or quiz
- Plagiarism - copying or representing another's ideas, words, or work as one's own, without properly citing the source. Plagiarism includes the misuse of published material, electronic material, and/or the work of other students. The original writer who intentionally shares his/her work for another to copy, without the permission of the teacher, is also engaged in plagiarism.
- Fabrication (any falsification or invention of date, citation, or other authority in an assignment); theft or alteration of materials
- Unauthorized collaboration
- Unauthorized use of electronic devices

Students found in violation of GPA's Academic Integrity Policy will be disciplined appropriately which may lead to formal suspension. Consequences for offenses may include, but are not limited to, detention, *lowering of academic and citizenship grade and/or suspensions/exclusion from extracurricular activities.*

## Standards/Format for Writing Papers- MLA Format

The standard format for all papers follows the MLA formatting rules:

1. Typed, double-spaced: TIMES NEW ROMAN, 12 font, including title
2. Heading: 4 lines  
Student name: "Sammy Gompers"  
Teacher name: Ms. Teacher  
Course name, period: English I, Period 3  
Date 06 February 2009
3. All pages numbered: upper right corner, last name and page number; no punctuation, no "p." or "pg."
4. Title: centered, upper and lower case
5. Work Cited/ Documentation Format: It is necessary to credit any source that is used in a paper or project. Plagiarism is considered cheating. All sources must be documented. Citing sources in a paper must be thorough and accurate. MLA formatting for in text citations and works cited is mandatory

## Important Dates:

- Q1 Finals: October 19th and 20th





# GOMPERS PREPARATORY ACADEMY *A UCSD Partnership*

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- Parent Conferences: October 23rd - 27th
- Q2 Finals: January 25th and 26th
- Parent Conferences: January 16th - 22nd
- Q3 Finals: April 12th and 13th
- Parent Conferences: April 16th - 20th
- Q4 Finals: May 31st and 1st

Student Signature : \_\_\_\_\_ Parent/Guardian Signature: \_\_\_\_\_

Date: \_\_\_\_\_



