



# SAINT LOUIS UNIVERSITY

## 1818 ADVANCED COLLEGE CREDIT PROGRAM

<http://www.slu.edu/1818>

### **NOTES FOR EDITING DOCUMENT:**

1. To edit a copy of this template, please go to **"File -> Download As -> Word."**
2. All **bold headings, black text, and SLU logos should not be removed.** Please input the various required syllabus information under each heading (indicated by red text). You may input your high school logo if you like.
3. The sections **"SLU Grading Information"** and **"Information Essential to Student Success in SLU Course"** should remain. There is nothing you need to edit in those sections.
4. Please delete the "Notes for Editing Document" section and text in red/purple before publishing your syllabus / submitting it for review to the 1818 Program Office.

### **SLU Course Name and Number and credits**

BIOL 1240- General Biology: Information Flow and Evolution, 3 credits

<<High School Name>>

<<High School Course Name and Number>>

### **Course Syllabus**

**Semester:**

<<TERM and YEAR>>

**Instructor:**

<<Instructor Name>>

**Contact Information:**

<<Office Address>>

<<E-mail Address>>

<<Phone>>

<<Availability/Office Hours>>

**Required Text/Resources Information:**

<<insert here>>

### **Course Description:**

#### **BIOL 1240- General Biology: Information Flow and Evolution:**

This course is part of the two-semester Principles of Biology sequence, and is primarily focused on the core concepts of information flow and storage as well as evolution. Students will learn about the chemical and molecular basis of life, cell structure and function, gene structure,



expression and heredity, reproduction, development, and evolution. As they learn concepts in biology, students will practice reasoning scientifically about real-world problems and applications.

3.000 Credit hours

### Additional Description

<<OPTIONAL. Insert HS course description info/additional descriptive info>>

### Course Learning Outcomes:

#### **Upon completion of BIOL 1240, you should be able to:**

1. Define and describe key concepts and principles of biology relating to: ○ the common properties and chemical composition of living organisms; ○ the structure and organization of cells; ○ how cells store, replicate, and use genetic information; ○ how genes and traits are inherited through different modes of reproduction; ○ how populations grow, interact with their environment, and change over time; ○ the definition, mechanisms and outcomes of evolution, and the origins of life's diversity.

Knowledge goals: As a result of this course, you will know (remember and understand) fundamental concepts and principles of biology.

2. Apply your knowledge of biological concepts and principles to: ○ analyze case studies and examples of biological systems; ○ interpret data, models, and representations of biological systems and processes; ○ explain the causes and mechanisms underlying biological phenomena; ○ create scientific representations of biological systems (e.g., models, diagrams); ○ articulate and evaluate claims (conclusions) based on evidence (data, observations).

Higher-order Skills: There is much more to biology than knowing facts and concepts. With practice and feedback, you will learn to apply your knowledge of biology to interpret and explain real-world phenomena.

This course satisfies the Ways of Thinking: Natural and Applied Sciences requirement of SLU's University Core Curriculum. As such, it is designed to advance student achievement of the following University Core Student Learning Outcomes:

### **Ways of Thinking: Natural and Applied Sciences**

This course is part of the Saint Louis University Core, an integrated intellectual experience completed by all baccalaureate students, regardless of major, program, college, school or campus. The Core offers all SLU students the same unified approach to Jesuit education guided by SLU's institutional mission and identity and our nine undergraduate [Core Student Learning Outcomes](#) (SLOs).

**Ways of Thinking: Natural and Applied Sciences** is one of 19 Core Components. The University Core SLO(s) that this component is designed to intentionally advance are listed below:

#### **University Core Student Learning Outcomes**

The Core SLO(s) that this component is intentionally designed to advance are:



SLO 2: Integrate knowledge from multiple disciplines to address complex questions

SLO 3: Assess evidence and draw reasoned conclusions

Additionally, the Core Component-level Student Learning Outcomes are listed below:

**Component-level Student Learning Outcomes**

Students who complete this course will be able to:

- Acquire knowledge of the world through a scientific discipline (natural or applied sciences)
- Express how scientific disciplines approach complex questions
- Use scientific thinking to draw conclusions about multidimensional problems
- Assess data used to make evidence-based decisions

Additional [HIGH SCHOOL NAME HERE] Learning Outcomes:

<<**OPTIONAL:** insert any high school, district, state or instructor developed outcomes here>>

<<**REQUIRED** Attendance Policy; include the following:

- Policy on late/missing work and exams
- Policy on attendance/tardiness

<<**REQUIRED:** Please list the attendance policy for the class and any negative consequences for lack of attendance (ie. automatic failure, grade reduction, etc) and late work. NOTE we recommend when discussing attendance to not delineate between excused or unexcused just define it as absences>>

<<**REQUIRED** Significant Learning Activities on which students will be assessed:

Ex. Exams, projects, papers, participation, presentations, in-class work, individual assignments, etc. The SLU 1818 BIOL 1240 course requires a Common Assessment in the form of multiple choices questions. These questions should be used on the Dec/May final exams and students should NOT have access to these questions in any form before the exam(s). The link to the required common assessment questions is provided on the SLU 1818 Biology Discipline Site.

<<**REQUIRED** Grading policies and practices:

- Include a grading scale
- Include information on what percent of the final grade each type of assessment is worth (ex. Quizzes- 5%, Exams, 40%, In class assignments 15%, etc)
- Grades for Lecture (BIOL 1240) and Lab (BIOL 1245) must be submitted separately for SLU grades as they represent separate courses at SLU. They can be combined for the high school grade, but NOT the SLU grade. In this section, please indicate that each grade will be calculated separately for the SLU grades.

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NOTE: Louis University's undergraduate grading system follows a 0 - 4.000 grade point scale. Grading is at the discretion of the 1818 instructor, who will be guided by the course description, shared learning outcomes, and shared assessment as well as professional experience and collaboration.

The on-campus Biology 1240 grading policies are included below for your reference:

***FYI: Grading policies from on campus SLU BIOL 1240 course:***

*Your grade for the course will be calculated as a weighted average of the scores you earn on the following assessments:*

|     |                                                                          |
|-----|--------------------------------------------------------------------------|
| 20% | Exam 1                                                                   |
| 20% | Exam 2                                                                   |
| 20% | Exam 3                                                                   |
| 20% | Final Exam (cumulative)                                                  |
| 20% | Assignments Total (calculated based on 90% of the total possible points) |

*If you earn a grade lower than you had hoped on exams 1, 2, or 3, do not give up! If your final exam grade is greater than any of the previous three exam grades, the final exam grade will replace that of your lowest exam score. This means that the final exam will count as 40% of your final grade, and your lowest exam score will be dropped. Note, however, that the final exam grade cannot replace a zero.*

*In this course, there are **no opportunities for extra credit**. Midterm and semester averages will be **rounded to the nearest tenth of a point** and translated to letter grades according to the following scale:*

|    |            |    |            |   |            |
|----|------------|----|------------|---|------------|
| A  | 93.0-100%  | B- | 80.0-82.9% | D | 57.0-64.9% |
| A- | 90.0-92.9% | C+ | 75.0-79.9% | F | 0-56.9%    |
| B+ | 87.0-89.9% | C  | 70.0-74.9% |   |            |
| B  | 83.0-86.9% | C- | 65.0-69.9% |   |            |

**SLU Grading Information:**

Saint Saint Louis University's undergraduate grading system follows a 0 - 4.000 grade point scale. Grades are assigned to the SLU transcript as follows:

| Grade | Grade Points | Interpretation                               |
|-------|--------------|----------------------------------------------|
| A     | 4.000        | High achievement and intellectual initiative |
| A-    | 3.700        |                                              |
| B+    | 3.300        | Above average, approaching high achievement  |
| B     | 3.000        | Above average achievement                    |
| B-    | 2.700        |                                              |
| C+    | 2.300        | Midway between B and C                       |
| C     | 2.000        | Average achievement                          |
| C-    | 1.700        |                                              |
| D     | 1.000        | Inferior but passing achievement             |



F

0

Failure

Note on SLU Undergraduate Cumulative GPA:

The grades earned through the 1818 Advanced College Credit Program are Saint Louis University grades, and will be part of each student's permanent undergraduate SLU academic record and transcript.

**<<REQUIRED Approximate Deadlines for Learning Activities and Course Calendar/Schedule:**

- <<Insert here. Please note: Calendars/Schedules for the course may best be added to the end of the syllabus **and this section can be a broad overview of topics that will be studied. If the calendar is at the end of the syllabus, please add a note to refer to the end of the document.** Calendar dates do not need to be specific but may be outlined as week by week or section by section. The topics must include all the topics covered in the on campus BIOL 1240 course (BIOL 1240 course schedule provided at the end of this document). You do not have to cover the topics in the same order. >>

**Information Essential to Student Success in SLU Course:**

**Academic Integrity Syllabus Statement**

Academic integrity is the commitment to and demonstration of honest and moral behavior in an academic setting. Since the mission of the University is "the pursuit of truth for the greater glory of God and for the service of humanity," acts of integrity are essential to its very reason for existence. Thus, the University regards academic integrity as a matter of serious importance. Academic integrity is the foundation of the academic assessment process, which in turn sustains the ability of the University to certify to the outside world the skills and attainments of its graduates. Adhering to the standards of academic integrity allows all members of the University to contribute to a just and equitable learning environment that cultivates moral character and self-respect. The full University-level Academic Integrity Policy can be found on the Provost's Office website at:

<https://www.slu.edu/provost/policies/academic-and-course/academic-integrity-policy.pdf>.

Additionally, each SLU College, School, and Center has its own academic integrity policies, available on their respective websites.

Students participating in the 1818 Advanced College Credit Program are held to and should be familiar with the College of Arts and Sciences Academic Honesty policy available at:

<http://www.slu.edu/college-of-arts-and-sciences-home/undergraduate-students/academic-honesty>

<<OPTIONAL: High School Academic Integrity Policy>>



### **Disability Accommodations**

Students with a documented disability who wish to request academic accommodations must formally register their disability with the University. Once successfully registered, students also must notify their course instructor that they wish to use their approved accommodations in the course.

Please contact the Center for Accessibility and Disability Resources (CADR) to schedule an appointment to discuss accommodation requests and eligibility requirements. Most students on the St. Louis campus will contact CADR, located in the Student Success Center and available by email at [accessibility\\_disability@slu.edu](mailto:accessibility_disability@slu.edu) or by phone at 314.977.3484. Once approved, information about a student's eligibility for academic accommodations will be shared with course instructors by email from CADR and within the instructor's official course roster. Students who do not have a documented disability but who think they may have one also are encouraged to contact to CADR. Confidentiality will be observed in all inquiries.

### **Title IX**

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of discrimination on the basis of sex, including sexual harassment, sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. Discrimination on the basis of sex includes discrimination on the basis of assigned sex at birth, sex characteristics, pregnancy and pregnancy related conditions, sexual orientation and gender identity. If you speak with a faculty member about an incident that involves a Title IX matter, **that faculty member must notify SLU's Title IX Coordinator that you shared an experience relating to Title IX.** This is true even if you ask the faculty member not to disclose the incident. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you are pregnant or experiencing a pregnancy related condition, the Title IX Coordinator can assist you in understanding your rights and options as well as provide supportive measures.

Anna Kratky is the Title IX Coordinator at Saint Louis University (DuBourg Hall, room 36; [anna.kratky@slu.edu](mailto:anna.kratky@slu.edu); 314-977-3886). If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK or make an anonymous report through SLU's Integrity Hotline by calling 1-877-525-5669 or online at [SLU.EDU/INTEGRITYHOTLINE](https://www.slu.edu/about/safety/sexual-assault-resources/index.php). To view SLU's policies, and for resources, please visit the following web addresses:  
<https://www.slu.edu/about/safety/sexual-assault-resources/index.php>

### **Saint Louis University Academic Calendar Link**

#### **1818 Advanced College Credit Program: Academic Calendar**



*Note: Due to the varying academic calendars of the many 1818 Partner High Schools, no “term start” or “term end” dates are listed below. Generally, all 1818 Fall term courses begin in late August and end in mid-December; Spring term courses generally begin in early January and end in late May.*

<<REQUIRED: <https://www.slu.edu/registrar/calendars/1818-calendar.php>>> (We recommend you also post this link to your classroom management site)

### **OPTIONAL SYLLABUS COMPONENTS (Best Practice but not required):**

#### **University Counseling Center Syllabus Statement**

The University Counseling Center (UCC) offers free, short-term, solution-focused counseling to Saint Louis University undergraduate and graduate students. UCC counselors are highly trained clinicians who can assist with a variety of issues, such as adjustment to college life, troubling changes in mood, and chronic psychological conditions. To make an appointment for a wellness consultation, call 314-977-8255 (TALK), or visit the clinic on the second floor of Wuller Hall. For after-hours needs, please press #9 after dialing the clinic number.

#### **Student Success Center**

The Student Success Center (SSC) supports students in reaching their goals in and out of the classroom. Providing a variety of resources, the Student Success Center houses both the Center for Accessibility and Disability Resources (CADR) and Academic Support, which includes Tutoring, Supplemental Instruction, University Writing Services, and Student Success Coaching. The Student Success Center is located in the Busch Student Center, Suite 331, and students can make an appointment with any SSC resource via EAB Navigate. To learn more about the Student Success Center and its resources, please visit:

<https://www.slu.edu/life-at-slu/student-success-center/index.php>.

#### **University Writing Services**

University Writing Services offers one-on-one consultations with trained writing consultants who help with everything from brainstorming, outlining, and proposing research questions to documenting sources, revising, and implementing feedback. These consultations can take place in-person, asynchronously, or via Zoom and can be scheduled through EAB Navigate – Student. Getting feedback benefits writers at all skill levels on different writing projects (including but not limited to class assignments, conference papers, cover letters, dissertations, group projects, multimedia assignments, personal statements, senior capstone projects, short answer questions on applications, speeches, and theses). For additional information, visit

<https://www.slu.edu/life-at-slu/student-success-center/academic-support/university-writing-services/index.php> or send an email to [writing@slu.edu](mailto:writing@slu.edu).

**NOTE: The schedule below is for your information. You do not have to follow it exactly, but you do have to cover ALL of the topics listed below in your course.**

**Please replace the on-campus schedule below with your tentative high school schedule.**

## BIOL 1240 Schedule of Topics and Core Learning Objectives

Note: This schedule is subject to minor modifications, at the instructor's discretion.

Dates are based on the University [2023-2024 Academic Calendar](#).

**Recommended Textbook:** Freeman et al. (2020). *Biological Science*, 7th ed., Pearson Education.

|                                                                                           | Textbook Reference Sections                                                                                                                                                                                                  | Learning Objectives                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wed, 08/23</b><br><i>Welcome to BIOL 1240!</i>                                         | First Day of class - Orientation                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>- Review the syllabus;</li> <li>- Practice using the course tools;</li> <li>- Develop a plan for learning and studying in this course.</li> </ul>                                                                                                                                                                                                        |
| <b>Fri, 08/25</b><br><i>How does science generate and revise knowledge?</i>               | <b>1.6:</b> Doing Biology<br><b>BioSkill 2:</b> Reading and Making Graphs<br><b>BioSkill 3:</b> Interpreting Standard Error Bars and Using Statistical Tests                                                                 | <ul style="list-style-type: none"> <li>- Interpret quantitative evidence (data in graph or table format) and notations of statistical significance.</li> <li>- Evaluate evidence-based claims.</li> <li>- Differentiate between correlation and causation.</li> </ul>                                                                                                                           |
| <b>Mon, 08/28</b><br><i>What do all living things have in common?</i>                     | <b>1.1:</b> What Does It Mean to Say That Something Is Alive?<br><b>1.2:</b> Life Is Cellular and Replicates through Cell Division<br><b>1.3:</b> Life Processes Information and Requires Energy<br><b>1.4:</b> Life Evolves | <ul style="list-style-type: none"> <li>- Distinguish living from nonliving things, based on the presence of defining characteristics of life.</li> </ul>                                                                                                                                                                                                                                        |
| <b>Wed, 08/30</b><br><i>The chemical basis of life</i>                                    | <b>2.1:</b> Atoms, Ions, and Molecules: The Building Blocks of Chemical Evolution<br><b>BioSkill 14:</b> Reading Chemical Structures                                                                                         | <ul style="list-style-type: none"> <li>- Describe and differentiate the properties of covalent, ionic, and hydrogen bonds.</li> <li>- Use the electronegativity scale to determine whether a covalent bond is polar or nonpolar.</li> <li>- Identify the following functional groups in chemical structures: hydroxyl, carbonyl, carboxyl, phosphate, amino, methyl, and sulfhydryl.</li> </ul> |
| <b>Fri, 09/01</b><br><i>The properties of water and how molecules interact with water</i> | <b>2.2:</b> Properties of Water and the Early Oceans                                                                                                                                                                         | <ul style="list-style-type: none"> <li>- In a polar covalent bond, identify which atoms carry partial positive or partial negative charges.</li> <li>- Predict how chemical groups within molecules interact with water.</li> <li>- Predict whether a molecule or chemical group is soluble in water.</li> </ul>                                                                                |
| <b>No Classes Monday 09/04 – Labor Day</b>                                                |                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                 |



|                                                                                                         |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wed, 09/06</b><br><i>Structure and function of biological molecules (proteins and carbohydrates)</i> | <b>2.5:</b> Life Is Carbon Based<br><b>3.1:</b> Amino Acids and Their Polymerization<br><b>3.2:</b> What Do Proteins Look Like<br><b>3.3:</b> Folding and Function<br><b>5.2:</b> The Structure of Polysaccharides | <ul style="list-style-type: none"><li>- Identify the general structure of amino acids.</li><li>- Infer whether amino acids side chains are polar, nonpolar, positively charged, or negatively charged, based on their chemical structures.</li><li>- Given a polypeptide, identify the amino terminus, carboxyl terminus, and peptide bonds, and number the amino acids that compose it.</li><li>- Explain how polypeptide chains fold into 3D shapes in a watery environment.</li></ul> |
| <b>Fri, 09/08</b><br><i>How phospholipids interact with water to form bilayers and cell membranes</i>   | <b>6.1:</b> Lipid Structure and Function<br><b>6.2:</b> Phospholipid Bilayers (pp. 125-127)<br><b>Figure 6.17 - 6.18</b>                                                                                           | <ul style="list-style-type: none"><li>- Describe the structure and properties of phospholipids; - Explain why phospholipids form bilayers in water.</li><li>- Describe how membrane proteins (integral and peripheral) interact with the phospholipid bilayer</li></ul>                                                                                                                                                                                                                  |
| <b>Mon, 09/11</b><br><i>Cell organization in prokaryotes and</i>                                        | <b>7.1:</b> Bacterial and Archaeal Cell Structures and Their Function<br><b>7.2:</b> Eukaryotic Cell Structures and Their Functions                                                                                | <ul style="list-style-type: none"><li>- Describe similarities and differences between prokaryotic and eukaryotic cells;</li><li>- Describe the functional properties of the plasma membrane (semipermeable barrier).</li></ul>                                                                                                                                                                                                                                                           |

|                                                                                                              |                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>eukaryotes (plants, fungi, and animals)</i>                                                               |                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Wed, 09/13</b><br><i>Structure &amp; function of DNA: storage of genetic information. What is a gene?</i> | <b>4.1:</b> What Is a Nucleic Acid?<br><b>4.2:</b> DNA Structure and Function                                                                                                                          | <ul style="list-style-type: none"><li>- Identify key features in the structure of nucleotides and DNA, including the chemical bonds within and between strands.</li><li>- Predict the sequence of one strand of DNA when given the sequence of its complementary strand.</li><li>- Explain how a double-stranded DNA molecule serves as a template for its own replication.</li></ul>                                                                                                                                                                             |
| <b>Fri, 09/15</b><br><i>Gene expression: mRNA synthesis (transcription)</i>                                  | <b>4.3:</b> RNA Structure and Function<br><b>16.2:</b> The Central Dogma of Molecular Biology<br><b>17.1:</b> An Overview of Transcription<br><b>17.2:</b> RNA Processing in Eukaryotes                | <ul style="list-style-type: none"><li>- Identify the key structural hallmarks of a eukaryotic gene, specifically its promoter, transcription start site, exons, introns, and terminator sequence.</li><li>- Contrast the structures of DNA and RNA molecules, and relate these structures to their distinct functions.</li><li>- Explain how information in a gene is used to produce a molecule of RNA during transcription.</li><li>- Use a model of a eukaryotic gene to predict the size and sequence of the corresponding primary and mature mRNA.</li></ul> |
| <b>Mon, 09/18</b><br><i>The genetic code and protein synthesis (translation)</i>                             | <b>16.3:</b> The Genetic Code<br><b>17.3:</b> An Introduction to Translation<br><b>17.4:</b> The Structure and Function of Transfer RNA<br><b>17.5:</b> Ribosome Structure and Function in Translation | <ul style="list-style-type: none"><li>- Identify the locations of the start and stop codons on a model of a eukaryotic gene.</li><li>- Use the nucleotide sequence of a gene segment to predict the sequences of the corresponding mRNA and protein.</li><li>- Describe the roles of tRNAs and ribosomes in translation.</li><li>- Connect the processes of transcription and translation to generate a complete explanation of how information stored in a gene is used in a cell to produce a protein.</li></ul>                                                |



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|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wed, 09/20</b><br><i>Protein sorting in the cell</i>                                                               | <b>7.3:</b> Putting the Parts into a Whole<br><b>7.4:</b> Cell Systems I: Nuclear Transport<br><b>7.5:</b> Cell Systems II: The Endomembrane System Manufactures, Ships, and Recycles Cargo<br><b>Table 7.2:</b> Cytoskeletal Filaments<br><b>Figure 7.27:</b> Motor Proteins Move Vesicles Along Microtubules | <ul style="list-style-type: none"> <li>- Based on the location of a protein in the cell, predict whether that protein is synthesized by free ribosomes or by endoplasmic reticulum-associated ribosomes in the cell.</li> <li>- Explain the function of N-terminal signal sequences in ribosome and protein localization.</li> <li>- Explain how integral membrane proteins and secreted proteins move through the endomembrane system to reach their final destination.</li> <li>- Use information about the functions of specific proteins to explain how they may produce visible traits in an organism (phenotype).</li> </ul> |
| <b>Fri, 09/22</b>                                                                                                     | <b>Catch up and Review</b>                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Mon, 09/25</b>                                                                                                     | <b>Exam 1</b>                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Wed, 09/27</b>                                                                                                     | <b>No classes; University Break</b>                                                                                                                                                                                                                                                                            | <b>Mental Health Day</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Fri, 09/29</b><br><i>Organization of genetic information: Genomes, Chromosomes, Genes and Alleles</i>              | <b>12.1:</b> How Do Cells Replicate?<br><b>Table 13.1:</b> Terms for Describing Chromosomes                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>- Describe the organization of eukaryotic genomes.</li> <li>- Differentiate between haploid and diploid cells (based on how many sets of chromosomes, and how many total chromosomes they contain).</li> <li>- Differentiate between sister chromatids and homologous chromosomes.</li> <li>- Draw chromosomes before and after replication and label gene loci.</li> </ul>                                                                                                                                                                                                                 |
| <b>Mon, 10/02</b><br><i>DNA replication and mutation (how genetic variation arises)</i>                               | <b>15.3:</b> A Model for DNA Synthesis<br><b>15.5:</b> Repairing Mistakes and DNA Damage<br><b>16.4:</b> What are the Types and Consequences of Mutation?                                                                                                                                                      | <ul style="list-style-type: none"> <li>- Describe how DNA is replicated in cells; - Interpret a diagram of a replication fork.</li> <li>- Explain how new alleles originate;</li> <li>- Predict the effects of mutations on gene expression and protein structure.</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Wed, 10/04</b><br><i>How cells divide: Binary fission in prokaryotes; Mitosis and cell division in eukaryotes.</i> | <b>12.2:</b> What Happens during M Phase?<br><b>Table 7.2:</b> Cytoskeletal Filaments<br><b>Figure 7.24:</b> Centrosomes Are a Type of Microtubule-Organizing Center                                                                                                                                           | <ul style="list-style-type: none"> <li>- Describe the stages of mitosis and the eukaryotic cell cycle;</li> <li>- Explain how chromosomes are distributed to daughter cells in mitosis;</li> <li>- Predict how many chromosomes, chromatids, and copies of a given gene are in a somatic cell at different stages of the cell cycle;</li> <li>- Draw chromosomes (and alleles on these chromosomes) at</li> </ul>                                                                                                                                                                                                                  |
|                                                                                                                       |                                                                                                                                                                                                                                                                                                                | different stages of the cell cycle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Fri, 10/06</b><br><i>Meiosis</i>                                                                                   | <b>13.1:</b> How Does Meiosis Occur?<br><b>13.2:</b> Meiosis Promotes Genetic Variation                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>- Predict how many chromosomes, chromatids, and copies of a given gene will be in a cell at different stages of meiosis;</li> <li>- Draw chromosomes and label alleles at different stages of meiosis;</li> <li>- Explain how meiosis produces genetic variation.</li> <li>- Contrast the mechanisms and outcomes of meiosis and mitosis, and of meiosis I and meiosis II.</li> </ul>                                                                                                                                                                                                       |



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|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mon, 10/09</b><br><i>Sexual and asexual reproductive strategies of diverse organisms; generalized life cycles.</i> | <b>47.1:</b> Asexual and Sexual Reproduction<br><b>28.3 (pp 588-589)</b> Alternation of Generations<br><b>Figure 13.5:</b> Ploidy Changes during the Life Cycle of an Animal<br><b>Figure 13.12:</b> Asexual Reproduction Produces More Offspring                | <ul style="list-style-type: none"> <li>- Describe and differentiate between sexual and asexual reproduction.</li> <li>- Identify the mechanisms that increase genetic variation in sexual and asexual reproduction.</li> <li>- Identify the relative advantages and disadvantages of sexual and asexual reproduction.</li> <li>- Interpret the generalized life cycles of eukaryotic organisms (haplontic, diplontic, and alternation of generations cycles).</li> </ul> |
| <b>Wed, 10/11</b><br><i>Animal Reproduction</i>                                                                       | <b>30.1:</b> What Is an Animal?<br><b>30.3 (pp 644-645)</b> Reproduction; Life Cycles<br><b>47.3</b> Fertilization and Egg Development                                                                                                                           | <ul style="list-style-type: none"> <li>- Explain how the gametes of animals with external fertilization locate and recognize each other.</li> <li>- Explain why certain reproductive adaptations (e.g., internal fertilization and internal development) are adaptive.</li> <li>- Explain how sex chromosomes are inherited, based on the events that occur during gametogenesis.</li> </ul>                                                                             |
| <b>Fri, 10/13</b><br><i>Animal Development</i>                                                                        | <b>47.4:</b> Embryonic Development <b>30.2 (pp 634-635)</b> Origin of Embryonic Tissue Layers and Muscle<br><b>30.2 (pp 637-639)</b> Origin of the Gut and Coelom; Origin of Protostomes and Deuterostomes                                                       | <ul style="list-style-type: none"> <li>- Relate animal body plans to the events in early animal development.</li> <li>- Describe the developmental potential and degree of differentiation of animal cells at various stages of development.</li> <li>- Explain how cells in a multicellular organism develop different structures and functions.</li> </ul>                                                                                                             |
| <b>Mon, 10/16</b><br><i>Plant Growth and Development</i>                                                              | <b>34.3:</b> Primary Growth Extends the Plant Body<br><b>34.4:</b> Secondary Growth Widens Shoots and Roots                                                                                                                                                      | <ul style="list-style-type: none"> <li>- Describe the evolutionary adaptations that distinguish the main groups of plants (e.g. vascular vs. nonvascular, angiosperm vs. gymnosperm)</li> <li>- Relate the location and properties of plant meristematic tissues to indeterminate growth.</li> </ul>                                                                                                                                                                     |
| <b>Wed, 10/18</b><br><i>Plant reproductive structures and strategies</i>                                              | <b>38.1:</b> An Introduction to Plant Reproduction<br><b>38.2:</b> Reproductive Structures<br><b>38.3:</b> Pollination and Fertilization<br><b>38.4 (pp 823-825):</b> Seeds and Fruit<br><b>Figures 27.16 and 27.17:</b> Life Cycles; Alternation of Generations | <ul style="list-style-type: none"> <li>- Predict the ploidy and number of chromosomes of different plant cell types at various stages of the life cycle.</li> <li>- Explain why land plants' reproductive structures (e.g. seeds, flowers, and fruit) and strategies (e.g., pollination) are adaptive.</li> </ul>                                                                                                                                                        |
| <b>Fri, 10/20</b>                                                                                                     | <b>Exam 2</b>                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Mon, 10/23</b><br><i>Mendelian inheritance: the principle of segregation</i>                                       | <b>14.1:</b> Mendel's Experimental System<br><b>14.2:</b> Mendel's Experiments with a Single Trait                                                                                                                                                               | <ul style="list-style-type: none"> <li>- Use a Punnett square to predict the genotypes and phenotypes that result from a monohybrid cross (i.e., a cross in which we follow one gene)</li> <li>- Connect Mendel's principle of segregation to the behavior of chromosomes during meiosis.</li> </ul>                                                                                                                                                                     |
| <b>Fall Midterm Grades due by Wednesday Oct 25</b>                                                                    |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Wed, 10/25</b><br><i>Mendelian inheritance: the principle of independent assortment</i>                            | <b>14.3:</b> Mendel's Experiments with Two Traits                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>- Predict the genotypes of the gametes produced by an organism that is heterozygous for two unlinked genes;</li> <li>- Use a Punnett square to predict the outcomes of a dihybrid cross (i.e., a cross in which we follow two unlinked genes);</li> <li>- Predict the phenotypes that result from crosses involving incompletely dominant or codominant alleles.</li> </ul>                                                       |



| No Classes Thursday 10/26 - Friday 10/27 – Fall Break – <i>Enjoy Hulu or Netflix</i>                |                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <b>Mon, 10/30</b><br><i>Sex-linked inheritance</i>                                                  | <b>14.4:</b> The Chromosome Theory of Inheritance<br><b>14.6:</b> Applying Mendel's Rules to Human Inheritance                                                  | <ul style="list-style-type: none"> <li>- Analyze pedigrees showing inheritance of human traits, and make inferences about the mode of inheritance based on the evidence shown in a pedigree.</li> <li>- Explain how traits encoded by genes on the sex chromosomes are inherited.</li> </ul>                                                                                                                                                                 |
| <b>Wed, 11/01</b><br><i>Populations: Demography and life history tables</i>                         | <b>51.1:</b> Distribution and Abundance<br><b>51.2:</b> Demography and Life History                                                                             | <ul style="list-style-type: none"> <li>- Interpret survivorship curves and use them to make inferences about life history traits of a population;</li> <li>- Use net reproductive rate to determine whether a population is growing, stable, or declining.</li> </ul>                                                                                                                                                                                        |
| <b>Fri, 11/03</b><br><i>How populations grow</i><br>ONLINE LECTURE—<br>INSTRUCTOR OUT OF TOWN       | <b>51.3:</b> Population Growth<br><b>51.5:</b> Human Population Growth                                                                                          | <ul style="list-style-type: none"> <li>- Explain how the overall growth rate (<math>dN/dT</math>) of a population differs from its per-capita growth rate (<math>r</math>);</li> <li>- Interpret exponential (density-independent) and logistic (density-dependent) models of population growth;</li> <li>- Use mathematical models (exponential and logistic) to make predictions about population size at a given time.</li> </ul>                         |
| <b>Mon, 11/06</b><br><i>What is evolution and how do we measure it?</i>                             | No associated reading                                                                                                                                           | <ul style="list-style-type: none"> <li>- Calculate allele and genotype frequencies in populations.</li> <li>- Make inferences about whether evolution is occurring in a population, based on changes in allele frequencies.</li> </ul>                                                                                                                                                                                                                       |
| <b>Wed, 11/08</b><br><i>Applying the HardyWeinberg Equilibrium principle</i>                        | <b>23.1:</b> Null Hypothesis: The HardyWeinberg Principle                                                                                                       | <ul style="list-style-type: none"> <li>- Formulate hypotheses about how and why allele frequencies might change in a population over time.</li> <li>- Use data (evidence) to determine whether a population is in HWE for a given locus;</li> <li>- Compare observed genotype frequencies to those expected if a population is in Hardy-Weinberg equilibrium.</li> </ul>                                                                                     |
| <b>Fri, 11/10</b><br><i>Natural selection and sexual selection</i>                                  | <b>22.3:</b> The process of Evolution: How Does Natural Selection Work?<br><b>23.3:</b> Natural Selection                                                       | <ul style="list-style-type: none"> <li>- Identify the role of the environment (e.g., selecting agent) in a complete explanation of evolution by natural selection;</li> <li>- Predict whether given environmental conditions will result in stabilizing, directional, or disruptive natural selection patterns;</li> <li>- Explain why a deleterious allele may be maintained by natural selection in a population (example: sickle-cell anemia).</li> </ul> |
| <b>Mon, 11/13</b><br><i>Non-adaptive evolutionary mechanisms (mutation, genetic drift and flow)</i> | <b>23.4:</b> Genetic Drift<br><b>23.5:</b> Gene Flow                                                                                                            | <ul style="list-style-type: none"> <li>- Use available evidence to infer what evolutionary mechanisms may be acting in a population;</li> <li>- Explain the difference between gene flow and genetic drift (founder effect).</li> </ul>                                                                                                                                                                                                                      |
| <b>Wed, 11/15</b>                                                                                   | Review Day                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Fri, 11/17</b>                                                                                   | <b>Exam 3</b>                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Mon, 11/20</b><br><i>Mechanisms of macroevolution; adaptive radiation</i>                        | <b>24.1:</b> How Are Species Defined and Identified?<br><b>24.2:</b> Isolation and Divergence in Allopatry<br><b>24.3:</b> Isolation and Divergence in Sympatry | <ul style="list-style-type: none"> <li>- Use evidence to make inferences about whether organisms belong to the same or different species;</li> <li>- Evaluate which species concept is appropriate based on the available evidence;</li> <li>- Explain how different mechanisms (vicariance, dispersal, divergence in sympatry, and polyploidization) may result in speciation</li> </ul>                                                                    |
| No classes Wednesday 11/22 - Friday 11/24 – Thanksgiving Break — <i>Enjoy Max or Peacock</i>        |                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



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|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mon, 11/27</b><br><i>How species interactions shape evolution</i>                                                | <b>52.1:</b> Species Interactions (focus on evolutionary outcomes)                                                              | - Predict and explain how interspecific interactions may affect, in the long term, the evolution of coexisting species.                                                                                                                                                                                                                                                                                                  |
| <b>Wed, 11/29</b><br><i>What is a phylogenetic tree and what does it tell us? What types of evidence is used to</i> | <b>25.1:</b> Tools for Studying Life's History: Phylogenetic Trees<br><b>BioSkill 13:</b> Reading and Making Phylogenetic Trees | <ul style="list-style-type: none"><li>- Interpret phylogenies based on different sources of evidence;</li><li>- Identify monophyletic, paraphyletic, and polyphyletic groups in phylogenetic trees;</li><li>- Identify sister groups and outgroups in phylogenetic trees</li><li>- Distinguish between divergent and convergent evolution;</li><li>- Apply the parsimony principle to identify the most likely</li></ul> |
| <i>construct phylogenetic trees?</i>                                                                                |                                                                                                                                 | hypothesis about evolutionary relationships.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Fri, 12/01</b><br><i>Drawing Phylogenetic Trees</i>                                                              | Phylogeny part 2—no additional reading                                                                                          | - Continue previous objectives                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Mon, 12/03</b><br><i>History of Life</i>                                                                         | <b>25.3:</b> Adaptive Radiation<br><b>25.4:</b> Mass Extinction                                                                 | - Will be explained in class                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Wed, 12/05</b><br><i>Evolution of Skin Color</i>                                                                 | Reading TBD                                                                                                                     | - Will be explained in class                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Fri, 12/08</b><br><i>Last Day of class</i>                                                                       | Review Day                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Mon, 12/11</b>                                                                                                   | <b>Final Exam, 10:00 - 11:50 am</b>                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                          |