

# AP Biology Summer Assignment

2026–2027

**Due: First Day of Class**

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Welcome to AP Biology! This is a college-level course, and that means we hit the ground running on Day 1. This summer assignment will help you build the foundation you need to succeed.

You do NOT need to have taken biology or chemistry before. Everything in this packet either reviews ideas you already know from physical science or introduces new concepts in a way that is fully accessible to you.

Completing this assignment carefully will:

- Prepare you for the AP Biology Exam and the Biology EOC (End-of-Course) exam
- Build foundational knowledge tested on the AP Biology Exam in May
- Give you a head start on the most important concepts of the course

## **General Instructions**

- ALL written responses must be HANDWRITTEN in the spaces provided.
- Use books, notes, or trusted websites (Khan Academy, Bozeman Science, etc.) to help you.
- Do not leave questions blank. If you are unsure, make your best attempt and note your question.
- Late work is NOT accepted. Assignments can be turned in early.

**There are THREE assignments in this packet plus a vocabulary list.**

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## **Assignment 1: Introduction Email**

Your very first task is simple. Send me an email so I can get to know you before school starts. There are no wrong answers here. You can only lose points by not following the instructions.

**Due: Friday, July 31, 2026 | Email: [waldeju@boe.richmond.k12.ga.us](mailto:waldeju@boe.richmond.k12.ga.us)**

### **Include ALL of the following in your email:**

**Subject Line:**

AP Biology Intro Letter 2026-27

**Email Body — answer each item below:**

1. Your full name (and the name you prefer to go by)
2. What are your hobbies, sports, interests, or activities outside of school?
3. What is your biggest personal strength when it comes to learning new material?
4. What makes a course feel difficult for you?
5. What is the most effective way YOU study for a test?
6. Why did you choose to take AP Biology? What do you hope to get out of it?
7. What are you most excited about? What are you most nervous about?
8. Is there anything else you would like me to know? (All responses are CONFIDENTIAL.)

Be honest — this helps me be a better teacher for you. Remember, you can only lose points by not following directions.

## Assignment 2: What Is Life? The Big Ideas of Biology

This assignment introduces the foundational concepts of biology. You have seen some of these ideas in Physical Science (energy, matter, systems). Now we will see how they show up in living things.

Use reliable resources, books, Khan Academy ([khanacademy.org/science/ap-biology](https://khanacademy.org/science/ap-biology)), or Bozeman Science ([bozemanscience.com](https://bozemanscience.com)) to help answer the following. ALL RESPONSES MUST BE HANDWRITTEN.

### Characteristics of Life

Answer the following questions in the spaces provided.

1. List the 8 characteristics that ALL living things share.

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2. In Physical Science you studied matter and energy. How does a living organism use energy differently from a rock or a car engine? Explain in 2–3 sentences.

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3. What is homeostasis? Give one example from your own body of how it works.

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4. All living things are made of cells. What is the difference between a unicellular organism and a multicellular organism? Give one example of each.

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5. Living things respond to their environment. Describe TWO examples of a living organism responding to a stimulus (a change in its environment).
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### Levels of Organization

Biology organizes life from the smallest to the largest level. Put the following levels in order from SMALLEST to LARGEST, and write a brief definition of each.

Levels to order: Organ System, Cell, Organism, Tissue, Organ, Molecule, Atom, Population, Ecosystem

1. \_\_\_\_\_ — Definition:
2. \_\_\_\_\_ — Definition:
3. \_\_\_\_\_ — Definition:
4. \_\_\_\_\_ — Definition:
5. \_\_\_\_\_ — Definition:

6. \_\_\_\_\_ — Definition:
7. \_\_\_\_\_ — Definition:
8. \_\_\_\_\_ — Definition:
9. \_\_\_\_\_ — Definition:
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### **The Chemistry of Life: A Gentle Introduction**

Don't worry — you do NOT need chemistry background for this section. We are just building basic vocabulary you will use all year.

1. Everything in biology is made of MATTER. From Physical Science, you know matter is made of atoms. The most important atoms in biology are Carbon (C), Hydrogen (H), Oxygen (O), and Nitrogen (N). Look up and write the symbol AND one sentence describing the role of each element in living things:

**Carbon (C):**

**Hydrogen (H):**

**Oxygen (O):**

**Nitrogen (N):**

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2. Water is one of the most important molecules for life. List THREE properties of water and explain WHY each property is important to living things. (Hint: think about what you know about water from Physical Science — it's a liquid at room temperature, it dissolves things, etc.)

**Property 1:**

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**Property 2:**

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**Property 3:**

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Living things are made of four major types of large molecules called macromolecules. Fill in the table below — use any resource to help you.

| Macromolecule           | Building Block (monomer) | Main Function(s) in the Body | Example |
|-------------------------|--------------------------|------------------------------|---------|
| Carbohydrates           |                          |                              |         |
| Proteins                |                          |                              |         |
| Lipids (Fats)           |                          |                              |         |
| Nucleic Acids (DNA/RNA) |                          |                              |         |

## **Cells: The Basic Unit of Life**

1. What is the Cell Theory? List its three main principles.

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1. What is the difference between a prokaryotic cell and a eukaryotic cell? Give one example of each type of organism.

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1. Label and define the following cell structures. Use a diagram from a reliable resource or Khan Academy if helpful.

**Cell membrane:**

**Nucleus:**

**Mitochondria:**

**Ribosome:**

**Cell wall (in plants):**

**Chloroplast (in plants):**

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## **Energy in Living Things**

In Physical Science, you learned that energy cannot be created or destroyed, only converted. Biology is all about energy conversion.

1. What is photosynthesis? Write the overall equation using words (not chemical symbols). What organisms perform photosynthesis?

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2. What is cellular respiration? Write the overall equation using words. How is it different from photosynthesis?

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3. What is ATP? Why is it often called the 'energy currency' of the cell?

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4. Describe the flow of energy through a food chain using a specific example (e.g., grass → rabbit → fox). Where does the energy originally come from? Where does it go when organisms die?
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## Assignment 3: Introduction to Scientific Thinking

AP Biology is not just about memorizing facts. You will analyze real data, design experiments, and interpret graphs ALL year. This assignment builds those skills. Don't worry if this feels new; we will practice together throughout the course.

Watch the following free videos, take notes in your notebook, and answer the questions below. ALL RESPONSES MUST BE HANDWRITTEN.

**Helpful resource: Bozeman Science — Statistics for Science: [bozemanscience.com/statistics-for-science](https://www.bozemanscience.com/statistics-for-science)**

### The Scientific Method

1. What are the steps of the scientific method? List them in order.

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1. What is a hypothesis? How is it different from a guess or an opinion? What makes a good hypothesis? (Hint: look up 'If... then... because...' format)

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1. Define the following terms used in experiments:

**Independent variable:**

**Dependent variable:**

**Control group:**

**Experimental group:**

**Constants (controlled variables):**

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2. A student wants to test whether plants grow taller with more sunlight. Identify the independent variable, the dependent variable, and TWO things that should be kept constant (controlled).

**Independent variable:**

**Dependent variable:**

**Constant 1:**

**Constant 2:**

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## Final Note: Biology Vocabulary Preview

The following are key biology vocabulary words you will encounter throughout the year. You do NOT have to turn in definitions, but you should look them up and become familiar with them before school starts. The more of these you recognize on Day 1, the easier the year will be.

**Tip: Use index cards or a free app like Quizlet to study these terms over the summer.**

| Term 1            | Term 2               | Term 3       | Term 4        | Term 5       |
|-------------------|----------------------|--------------|---------------|--------------|
| Cell              | Organism             | Tissue       | Organ         | Organ system |
| Unicellular       | Multicellular        | Prokaryote   | Eukaryote     | Nucleus      |
| DNA               | Gene                 | Chromosome   | Protein       | Enzyme       |
| Photosynthesis    | Cellular respiration | ATP          | Glucose       | Oxygen       |
| Mitosis           | Meiosis              | Reproduction | Heredity      | Mutation     |
| Natural selection | Adaptation           | Evolution    | Species       | Population   |
| Ecosystem         | Habitat              | Predator     | Prey          | Food web     |
| Homeostasis       | Stimulus             | Response     | Feedback loop | Metabolism   |

**AP & EOC Exam Tip:** Both the AP Biology exam and the EOC require you to READ and ANALYZE data, not just recall facts.

Have a great summer. See you in August!