

CP BIOLOGY MIDTERM STUDY GUIDE

EXAM EXPECTATIONS	TIME OF EXAM
Your Midterm exam will be a cumulative assessment of all of the Competencies learned in CP Biology up until this point in the year. Your summative score will impact both your Competency 1 and 2 grades. Review for your Midterm is important to your success.	Monday, January 13, 2025 will be a Green Day schedule for reviewing for Midterm Exams. An unexcused absence during your allotted exam period will result in a 0 N (with no reschedule) for your exam. If you arrive late, you will not be able to take the exam. Any make-ups on Friday will need to be planned in advance and OK'd by an administrator. *P3's exam will run Wed. 1/15/25 <i>*Y1s exam will run _____ Thu. 1/18/23</i> <i>*Y3's exam will run _____ Thu. 1/18/23</i>

***Here is a breakdown of what we've covered for both Competency One and Competency Two.
This exam will not be open-note and you will not be able to use your textbook.
However, you may use one 5x7 notecard, prepared ahead of time, to support you on your exam.***

CP1. STRUCTURE AND FUNCTION OF LIVING SYSTEMS-

The student can investigate, model and evaluate the flow of energy and connections between the structure and function of living systems from the atomic to biosphere levels.

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LEARNING TARGET 1: CHARACTERISTICS OF LIFE

I can evaluate the interactions between the characteristics that allow organisms to be alive and reproduce.

Vocab:

- Biology, Organism, Characteristics of Life, Cell, Unicellular, Multicellular, Autotroph, Heterotroph, Growth, Development, Asexual Reproduction, Sexual Reproduction, React versus Adapt, Homeostasis, Negative versus Positive Feedback Loop
- Levels of Organization ({atom → molecule → macromolecule → organelle → cell} → tissue → organ → organ system → organism)

Level 3:

- I can create a visual model to show the relationship between key levels of organization in an organism.
- I can evaluate the interactions between the characteristics that allow organisms to be alive and reproduce.
- I can utilize key vocab words to describe high level concepts from the unit.

Level 4:

- I can justify whether something is alive, dead, or non-living based on how they demonstrate the characteristics of life.
- I can create a visual model to show the way in which key life processes impact all levels of organization within an organism.
- I can utilize a deep understanding of the levels of organization in the biosphere in the context of other units throughout the course.
- I can synthesize concepts from the unit in order to think deeply about new ideas or create something new.

LEARNING TARGET 2: LEVELS OF ORGANIZATION

I can model the organization of interacting systems that provide specific functions within multicellular organisms.

Vocab:

- Cell, Bacteria Cell, Animal Cell, Plant Cell, Specialized Cell, Organelle, Nucleus, Mitochondria, Chloroplast, Nucleus, Protein-Making Organelles, Cell Membrane, Cell Wall, Cytoplasm
- Tissues, Organs, Organ Systems, Leaf, Flower, Stem, Roots, Root System, Shoot System, Vascular System, Dermal Tissue, Ground Tissue, Vascular Tissue, Root Hairs, Cuticle, Stomata, Photosynthetic Cells, Loosely-Packed Ground Cells
- Photosynthesis, CO_2 , H_2O , Sunlight, O_2 , $\text{C}_6\text{H}_{12}\text{O}_6$.

Level 3:

- I can compare and contrast bacteria, animal, and plant cells using the cell parts and organelles contained in them.
- I can analyze how key nutrients and energy are distributed around the plant at multiple levels of organization.
- I can identify key tissues within the leaf, stem, and root utilizing a microscope or microscope image.
- I can utilize key vocab words to describe high level concepts from the unit.

Level 4:

- I can analyze how the process of photosynthesis supports and is supported by all levels of organization in a multicellular plant.
- I can synthesize concepts from the unit in order to think deeply about new ideas or create something new.

C2. MATTER AND ENERGY IN LIVING SYSTEMS– The student can conduct investigations and utilize modeling to support claims that matter and energy flow through the cellular processes and ecosystems of organisms.

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LEARNING TARGET 1: CELLULAR ENERGY

I can use a model to describe and illustrate how matter and energy are transformed through the processes of photosynthesis, aerobic and anaerobic respiration.

Vocab:

- Photosynthesis, Chloroplast, Stroma, Thylakoid, Chlorophyll, $6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Light Energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$, Glucose, Energy, ADP, ATP, NADP^+ , NADPH, Light-Dependent Reactions, Light-Independent Reactions, Calvin Cycle, Chemosynthesis)
- Cellular Respiration, Glycolysis, Lactic Acid Fermentation, Ethyl Alcohol Fermentation, Aerobic, Anaerobic, Mitochondria, $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{ATP Energy} + \text{Heat}$, NAD^+ , Pyruvate, Krebs Cycle, Electron Transport Chain)

Level 3:

- I can relate key photosynthesis processes to their impact at all levels of organization within a photosynthetic organism.
- I can relate the ATP-ADP Cycle and NADP^+ -NADPH Cycle to the processes of Light-Dependent and Light-Independent Reactions of Photosynthesis.
- I can relate key Cellular Respiration and Fermentation processes to their impact at all levels of organization within an organism.
- I can describe how cellular processes differ in the presence or absence of Oxygen.
- I can utilize key vocab words to describe high level concepts from the unit.

Level 4:

- I can synthesize information from the unit to provide a detailed explanation of why the simple equation used to describe photosynthesis is both correct and incorrect.
- I can utilize a deep understanding of photosynthesis to explain how the chemical processes would be impacted by changes in external stimuli or environment and ultimately impact the plant.
- I can synthesize how the processes of photosynthesis and cellular respiration work together to keep an organism alive, with in-depth explanations of how these processes impact the organism at all levels of organization.
- I can utilize a deep understanding of cellular respiration to explain how the chemical processes would be impacted by changes in external stimuli or environment and ultimately impact the plant.
- I can relate these cellular processes to large scale changes in Earth's atmosphere.
- I can synthesize concepts from the unit in order to think deeply about new ideas or create something new.

LEARNING TARGET 2: FOOD WEBS AND TROPHIC PYRAMIDS

I can evaluate how matter and energy are distributed within an ecosystem and how they flow through an ecosystem's food web.

Vocab:

- Ecology, Ecologist, Biotic, Abiotic, Organism, Population, Community, Ecosystem, Biome, Biosphere,
- Food Chain, Food Web, Producer, Consumer (Primary, Secondary, Tertiary, Quaternary), Decomposer, Detritivore, Carnivore, Herbivore, Omnivore, Keystone Species, Biodiversity
- Biomass, Energy/Biomass Pyramid, Open System, Closed System, Productivity, Nutrients, Initial Energy Input
- Rule of 10%, Ecological Efficiency, $\text{Ecological Efficiency} = \frac{\text{Energy for Growth}}{\text{Total Energy Supplied}} \times 100$, $\text{Net Primary Productivity} = \text{Gross Primary Productivity} - \text{Respiration}$
- Levels of Organization- (organism → population → community → ecosystem → biome → biosphere)

Level 3:

- I can relate the processes of photosynthesis and cellular respiration to the movement of matter and energy through trophic levels.
- I can relate the process of decomposition to the recycling of matter within an ecosystem.
- I can support the concept of lost energy through mathematical computations at various trophic levels.
- I can infer how humans make use of net productivity for food and other resources.
- I can infer how net productivity may differ in biomes around the world.
- I can utilize key vocab words to describe high level concepts from the unit.

Level 4:

- I can discuss the varied trophic levels of internal symbionts.
- I can infer how the net productivity in a given biome may be a limiting factor in supporting organisms of higher trophic levels.
- I can utilize mathematical representations to demonstrate how net productivity varies within a given ecosystem and between varying ecosystems around the world.
- I can synthesize concepts from the unit in order to think deeply about new ideas or create something new.

LEARNING TARGET 3:

Biogeochemical Cycles. I can model the cycling of key nutrients among the biosphere, atmosphere, hydrosphere, and geosphere.

Vocab:

- Biogeochemical Cycle, Nutrients, Carbon Cycle, Nitrogen Cycle, Phosphorus Cycle, Hydrologic Cycle, Biosphere, Hydrosphere, Geosphere, Atmosphere, Fossil Fuels, Photosynthesis, Cellular Respiration, Carbon, Carbon Dioxide, Biomass, Decomposition, Natural Changes, Anthropogenic Changes

Level 3:

- I can discuss the role of photosynthesis and cellular respiration in the movement of Carbon through Earth's systems.
- I can create a model that shows a set pathway Carbon can take through Earth's systems.
- I can create a model that demonstrates how another key nutrient can follow multiple pathways through Earth's systems in order to support life.
- I can utilize key vocab words to describe high level concepts from the unit.

Level 4:

- I can analyze numerical values that describe the amount of a given nutrient in each reservoir and process in order to explain how humans are impacting Biogeochemical Cycles.
- I can create an interactive model that shows the variety of pathways a given nutrient can take through Earth's systems.
- I can synthesize concepts from the unit in order to think deeply about new ideas or create something new.

WHAT TO EXPECT ON YOUR MIDTERM EXAM

- Each Learning Target will have L2 and L3 questions, and one L4 question.
- Lower level questions will be multiple choice, some L3's and all L4's will be short answer responses.
- You will get a score for each Learning Target Section. A mean of the Learning Target scores will be input for each Competency.
- This exam will be scored on a 4-point scale, but will impact both Competency 1 and 2, giving it double the impact of your standard CP Biology quiz.
- You will have 90 minutes total to complete your Midterm Exam.

HOW TO PREPARE FOR A CUMULATIVE MIDTERM EXAM

- Go through the vocab lists for each Learning Target and make a list of any terms you don't know or need to review. Create a study guide, notecards, or some other study tool for reviewing— then use what you make 😊
- Review the notes you have on each topic and make sure you can draw / label each model used.
- Go through past formative and summative assignments. Review the types of questions asked. If you were low on any areas, review and practice those questions again.
- Show up to Flex with questions!
- Close to the date of the Exam create a 5x7 notecard with any key information you may want to have access to during your exam. You may write on both sides.