3.4 - Plants Unit, Packet 4

Score
□ Above & Beyond
□ Meets Expectations
□ Near Expectations
□ Incomplete – *fix the following pages:*

First & Last Name: _____ Period/Hour:_____

NOTE: Packets are due after completing Part 5. Check each page to be sure all blanks are completed.

Driving Question: How do plants grow and function? How do plants acquire the matter and energy their cells need to function?

Anchoring Phenomenon: Throughout this unit, we have explored how plant cells differ from animals and how they acquire matter and energy from glucose & soil minerals. We will now put all the pieces together to develop sophisticated explanations for the phenomena we have encountered in this unit.

Deeper Questions

1. How do plants acquire the matter & energy they need to function?
2. How do plant cells differ from animal cells?
3. Why do plants need soil minerals and fertilizers?

Schedule

Part 1: Introduction
- Summative Check-in Questions

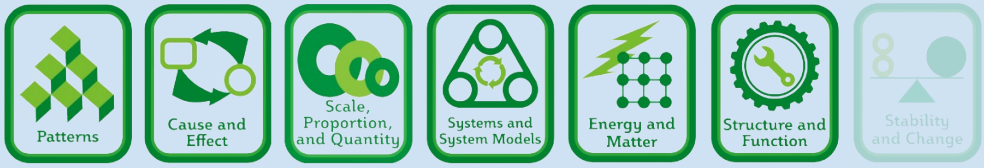
Part 2: Core Ideas
- Evaluating Sample Responses
- Writing a "Level 3" Response

Part 3: Life Connections
- Carnivorous Plants

Part 4: Review Game
- Jeopardy Review Game

Part 5: Final Review
- Final Q&A

NGSS Standards (*PEs* & *CCCs are summarized below. SEPs are noted throughout the packet*).
HS-LS1-2. Organization of interacting systems in multicellular organisms. HS-LS1-6. How carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. HS-LS1-5. How photosynthesis transforms light energy into stored chemical energy. HS-LS1-7. Cellular respiration is a chemical process whereby food molecules and oxygen molecules form new compounds resulting in a net transfer of energy.



Semester Schedule

1. Matter & Energy
1.1: What happens when something burns?
1.2: How does burning change matter & energy?
1.3: Unit Assessment

2. Animals
2.1: How do animal cells use food?
2.2: What happens to food when it is consumed?
2.3: How do cells acquire atoms from food?
2.4: Unit Assessment

3. Plants
3.1: How do plant cells differ from animal cells?
3.2: How do plant cells obtain matter and energy?
3.3: How can we investigate plant growth and function?
3.4: Unit Assessment

4. Ecosystems
4.1: Why do different places have different amounts of species?
4.2: How does human activity affect species?
4.3: Unit Assessment

These materials were partly developed with assistance from artificial intelligence.

Resource Links: Class Website; Part 1 Check-in Form; Jeopardy Review; Unit Summary; Venus Fly Trap Movie; Practice Test;

Part 1: Introduction – Check-in Questions (3.4.1)

Overview: In this activity, you will show your readiness for an assessment and demonstrate your understanding of key concepts from this unit by completing this form.

Part 2: Critiquing Responses (3.4.2)

Directions: For each of the following, provide a brief written justification for why you think they earned a 1 (*still learning*), 2 (*acceptable*), or 3 (*sophisticated*). See below for a summary of each criteria for grading.
3 2 1 Complete: Do they fully address the entire question and explain all changes to matter & energy?
3 2 1 Accurate: Is every aspect of the written response factually correct?
3 2 1 Precise: Are they effectively using terms from the course in a clear and specific manner?

Question: Where does the mass of a tree come from?

Oscar: *The tree absorbs heavy minerals from the soil, which make up most of the mass of the tree.*

Overall Score: _____/3 Comments: _____

Nina: *Plants use the glucose from cell respiration to form cellulose which makes the skeleton of the tree.*

Overall Score: _____/3 Comments: _____

Bristol: *The tree's leaves convert sunlight into glucose, which can be made into cellulose.*

Overall Score: _____/3 Comments: _____

Chandra: *Plant cells absorb water and CO_2 and rearrange these to form glucose and oxygen during photosynthesis. Some glucose is used to make cellulose, which makes up most of the mass of the tree. Atoms in glucose can also be rearranged with soil minerals to make other molecules like amino acids, ATP, etc.*

Overall Score: _____/3 Comments: _____

Part 3: Life Connections (3.4.3)

Directions: Using your prior knowledge, you'll consider how and why carnivorous plants exist.

Background: Most carnivorous plants live in soil with low nitrogen (such as wetlands). They've adapted to trap and digest insects to acquire nitrogen needed to make molecules such as amino acids. The most famous carnivorous plant is the Venus flytrap. It has two leaves that close around insects when the plant senses movement on its trigger hairs. Another carnivorous plant is the pitcher plant. Its leaves are coated with slippery mucus. When an insect lands, it slips into their liquid-filled pits to be digested by enzymes. [*Movie URL:* The Venus Flytrap]

Questions:
1. T/F: carnivorous plants consume insects instead of photosynthesizing. Explain.
2. Why are carnivorous plants typically found in soil with low levels of nitrogen?
3. For which of these processes do carnivorous plants primarily need insects? *Photosynthesis, cell respiration, biosynthesis.* Explain.
4. Many animals also consume insects. How does this differ from carnivorous plants?

Part 4: Jeopardy Review (3.4.4)

Directions: In this activity, you'll play a Jeopardy-style game to review course concepts. Rules are in the presentation. You can also use this for test preparation. Your instructor may use an alternative option like Gimkit or Kahoot.

Game URL: Plants Jeopardy

Part 5: Final Q&A (3.4.5)

Directions: For each objective, rank it as a 1 (*cannot understand or explain*), 2 (*understand but can't explain*), or 3 (*can understand & fully explain*). Review any content that is still unfamiliar and ask questions as needed. Pay special attention to items that are **bold**.

1. True/false: animal & plant cells function similarly and are made from the same macromolecules. Explain.
2. Do plant cells have mitochondria? What process occurs here? Why is this needed?
3. **What are three organelles found in plant cells that are not found in animal cells?**
4. **What is a cell wall? What is cellulose? How do these affect plant function & plant cells?**
5. What is a vacuole? What is its purpose and function in a plant cell?
6. **What is a chloroplast? What process occurs here? Why is this needed for cell function?**
7. **Most of the glucose produced during photosynthesis is used for what purposes?**
8. True or false: like animal cells, plant cells are organized into tissues, organs, and systems.
9. **How do plants transport molecules like glucose and water without a heart to circulate fluids? Include: *xylem, phloem, evaporation.***
10. Plant cells in roots and stems lack access to light; how do they obtain glucose needed for cell respiration and other functions?
11. **How do plants acquire carbs, fats, & proteins if they cannot consume other organisms?**
12. How do plant cells produce carbohydrates?
13. How do plant cells produce fatty acids?
14. How do plant cells produce amino acids?
15. **How do the atoms in glucose and soil minerals relate to all the molecules found within a plant cell?**
16. True or false: an enzyme has a completely different molecular structure after a reaction is completed. Explain.
17. **How do enzymes assemble & disassemble macromolecules from molecules?**
18. How do enzymes enable species to interact with each other?
19. What are decomposers? Why are decomposers important for species interactions?