

# The Process of Photosynthesis Level 9-12

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ELC-4047

## Science (NGSS – Life Science & Physical Science)

- **4-LS1-1:** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction (*Science – Life Science*)
- **5-LS1-1:** Support an argument that plants get the materials they need for growth chiefly from air and water (*Science – Life Science*)
- **5-LS2-1:** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment (*Science – Life Science*)
- **5-PS3-1:** Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun (*Science – Physical Science*)
- **MS-LS1-6:** Construct a scientific explanation based on evidence for the role of **photosynthesis** in the cycling of matter and flow of energy into and out of organisms (*Science – Life Science, Grade 6*)
- **MS-LS1-7:** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism (*Science – Life Science, Grade 6*)
- **MS-LS2-1:** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem (*Science – Life Science, Grade 6*)
- **MS-LS2-3:** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem (*Science – Life Science, Grade 6*)

## English Language Arts (CCSS ELA)

- **RI.4.3:** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text (*ELA – Reading Informational*)
- **RI.5.3:** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text (*ELA – Reading Informational*)
- **RI.4.4:** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area (*ELA – Vocabulary/Reading*)
- **RI.5.4:** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area (*ELA – Vocabulary/Reading*)

- **RI.4.7:** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations) and explain how the information contributes to an understanding of the text in which it appears (*ELA – Reading Informational*)
- **RI.5.7:** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently (*ELA – Reading Informational*)
- **W.4.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly (*ELA – Writing*)
- **W.5.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly (*ELA – Writing*)
- **W.4.7:** Conduct short research projects that build knowledge through investigation of different aspects of a topic (*ELA – Writing/Research*)
- **W.5.7:** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic (*ELA – Writing/Research*)
- **SL.5.4:** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace (*ELA – Speaking & Listening*)
- **L.5.6:** Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (*ELA – Language/Vocabulary*)

### Mathematics (CCSS Math)

- **CCSS.Math.Practice.MP.2:** Reason abstractly and quantitatively (*Mathematics – Mathematical Practice*)
- **CCSS.Math.Practice.MP.4:** Model with mathematics (*Mathematics – Mathematical Practice*)
- **CCSS.Math.Practice.MP.5:** Use appropriate tools strategically (*Mathematics – Mathematical Practice*)
- **4.MD.4:** Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ). Solve problems involving addition and subtraction of fractions by using information presented in line plots (*Mathematics – Measurement & Data*)
- **5.MD.2:** Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots (*Mathematics – Measurement & Data*)
- **5.MD.1:** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m) and use these conversions in solving multi-step, real world problems (*Mathematics – Measurement & Data*)

### Social Studies (C3 Framework – Geography & Civics)

- **D2.Geo.8.3-5:** Explain how human settlements and movements relate to the locations and use of various natural resources (*Social Studies – Geography*)
- **D2.Civ.2.3-5:** Explain how all people, not just official leaders, play important roles in a community (e.g. caring for classroom or neighborhood environments) (*Social Studies – Civics*)

- **D4.6.3-5:** Use evidence and criteria to evaluate options for decision-making, describing the possible consequences of each option (e.g. considering solutions to environmental issues related to plants) (*Social Studies – Civic Participation*)

### Arts (National Core Arts Standards – Visual Arts)

- **VA:Cn10.1.5a:** Apply formal and conceptual vocabularies of art and design to view surroundings in new ways through artmaking (*Arts – Visual Arts, Connecting*)
- **VA:Cr1.2.5a:** Combine ideas to generate an innovative visual representation or illustration of a concept (e.g. create a diagram or artwork that explains photosynthesis) (*Arts – Visual Arts, Creating*)
- **VA:Pr5.1.5a:** Develop and refine artistic techniques and tools (e.g. diagrams, models, visual aids) for presenting information effectively (*Arts – Visual Arts, Presenting*)

Each of the above standards is met through the packet's multi-faceted activities. The packet's science content addresses NGSS life science and energy concepts, while its reading passages, research questions, and vocabulary building meet ELA standards for informational texts and academic language. The inclusion of data analysis, measurements, and quantitative reasoning aligns with math standards. Cross-curricular extensions into social studies (environmental implications, community and global connections) and creative art projects (diagrams and visual aids to demonstrate understanding) ensure that the packet also fulfills relevant C3 social studies and National Core Arts standards. All standards are grouped by subject to highlight the interdisciplinary educational value of the photosynthesis packet.