7.4 Matter Cycling and Photosynthesis

Content Area: **Science**
Course(s): **Science 7**
Time Period: **Marking Period 3**
Length: **20 days**
Status: **Published**

Established Goals/Standards

SCI.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.
SCI.MS.LS1.C	Organization for Matter and Energy Flow in Organisms
SCI.MS.PS3.D	Energy in Chemical Processes and Everyday Life

Technology Standards

TECH.8.1.8.A.2	Create a document (e.g., newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
TECH.8.1.8.B.1	Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).
TECH.8.1.8.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.8.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

NJ 21st Century Life and Careers/NJ Career Ready Practices

CAEP.9.2.8.B.5	Analyze labor market trends using state and federal labor market information and other resources available online.

Interdisciplinary Connections

ELA/Literacy -

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. ,(MS-LS1-6),(MS-LS2-1),(MS-LS2-4)

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RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS2-1)

RI.8.8 Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS2-4)

WHST.6-8.1 Write arguments focused on discipline content. (MS-LS2-4)

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SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(MS-LS1-7),(MS-LS2-3)*

Mathematics -

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *(MS-LS1-6),(MS-LS2-3)*

Essential Questions

- How do some organisms turn electromagnetic radiation into matter and energy?
- How is food rearranged through chemical reactions to form new molecules that support growth and/or release energy as this matter moves through an organism?
- What is the role of photosynthesis in the cycling of matter and flow of energy into and out of an organism?

Enduring Understanding

- Food is rearranged through chemical reactions, forming new molecules that support growth.
- Matter is cycled through biotic and abiotic environments.
- Photosynthesis is the main process of cycling oxygen and carbon through the environment.

Content

- Photosynthesis has a role in the cycling of matter and flow of energy into and out of organisms.
- The flow of energy and cycling of matter can be traced.
- The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.
- The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon based organic molecules and release oxygen.
- Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen.
- Sugars produced by plants can be used immediately or stored for growth or later use.
- Transfers of matter into and out of the physical environment occur at every level.
- Decomposers recycle nutrients from dead plant and animal matter back to the soil in terrestrial environments or to the water in aquatic environments.

- Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem.
- Within a natural system, the transfer of energy drives the motion and/or cycling of matter.
- Food is rearranged through chemical reactions, forming new molecules that release energy as this matter moves through an organism.
- Molecules are broken apart and put back together to form new substances, and in this process, energy is released.
- Cellular respiration in plants and animals involves chemical reactions with oxygen that release stored energy.
- In cellular respiration, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules to support growth or to release energy.
- Matter is conserved during cellular respiration because atoms are conserved in physical and chemical processes.

Accommodations and Modifications

Accommodations and Modifications according to student IEP, 504, I&RS goals, and/or gifted status.

Assessment

Summative assessment:

- Construct a scientific explanation for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms based on valid and reliable evidence obtained from sources (including the students' own experiments).
- Construct a scientific explanation for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms based on the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
- Develop and use a model to describe how food is rearranged through chemical reactions.

Formative Assessments

- Participation/Observations
- Questioning

- Discussion Circles
- Science Notebook
- Exit Slips
- Peer/Self Assessment
- Rubrics
- Teacher-created project-based assessment
- Turn & Talk

Alternate Assessments

- Teacher-created project-based assessment
- Alternate running records
- Discussion Circles
- Turn and Talks

Benchmark Assessments

- Teacher-created assessment

Resources

Please add your Resources by clicking on the Lists tab above.

- BrainPOP
- Discovery Education
- OpenSciEd