

<p><b>Green Beetz Lesson</b></p>	<p><b>Next Generation Science and ELA Standards</b></p>
<p>Lesson 1: Welcome to Green Beetz</p>	<p><b>5.E.SS3.1</b> - Obtain and combine information about ways individual science communities use science ideas to protect the Earth’s resources and environment.</p> <p><b>MS-LS2-1</b>-Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</p> <p>-----</p> <p><b>RI.5.7</b> Draw on information from multiple print or <b>digital sources</b>, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.</p> <p><b>W.5.8</b> Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.</p> <p><b>WHST.6-8.8</b> Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><b>W.5.9</b> Draw evidence from literary or <b>informational</b> texts to support analysis, reflection, and research.</p> <p><b>WHST.6-8.9</b> Draw evidence from informational texts to support analysis, reflection, and research.</p> <hr/> <p><b>5.E.SS3.1</b></p> <p><b>MS-LS2-1</b></p> <p><b>RI.5.7</b></p> <p><b>W.5.8</b></p> <p><b>WHST.6-8.8</b></p> <p><b>W.5.9</b></p> <p><b>WHST.6-8.9</b></p>

Lesson 2: The Natural Food Cycle

**5-LS1-1.** Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

**5-LS2-1.** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.]

**LS2.A:** Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem

**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. [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.]

- 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. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6)
- In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2- 1)
- 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. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.

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**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.

**W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

	<p><b>WHST.6-8.8</b> Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><b>W.5.9</b> Draw evidence from literary or <b>informational</b> texts to support analysis, reflection, and research.</p> <p><b>WHST.6-8.9</b> Draw evidence from informational texts to support analysis, reflection, and research.</p> <p>-----</p> <p><b>5-LS1-1</b>  <b>5-LS2-1</b>  <b>LS2.A</b>  <b>MS-LS1-6</b>  <b>RI.5.7</b>  <b>W.5.8</b>  <b>WHST.6-8.8</b>  <b>W.5.9</b>  <b>WHST.6-8.9</b></p>
<p>Lesson 3: History of Food</p>	<p><b>5-ESS3.C: Human Impacts on Earth Systems</b>  Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.</p> <p><b>MS- LS2.C: Ecosystem Dynamics, Functioning, and Resilience</b>  ▪ Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health.</p> <p><b>MS-ESS3-4: Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World</b>  ▪ All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.</p> <p>-----</p> <p><b>RI.5.7</b> Draw on information from multiple print or <b>digital sources</b>, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.</p>

	<p><b>W.5.8</b> Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.</p> <p><b>WHST.6-8.8</b> Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><b>W.5.9</b> Draw evidence from literary or <b>informational</b> texts to support analysis, reflection, and research.</p> <p><b>WHST.6-8.9</b> Draw evidence from informational texts to support analysis, reflection, and research.</p> <p><b>W.5.1</b> Write opinion pieces on topics or texts, supporting a point of view with reasons and information.</p> <p><b>WHST.6-8.1</b> Write arguments focused on discipline content.</p> <hr/> <p><b>W.5.8</b>  <b>WHST.6-8.8</b>  <b>W.5.9</b>  <b>WHST.6-8.9</b>  <b>W.5.1</b>  <b>WHST.6-8.1</b>  <b>5-ESS3.C:</b>  MS- LS2.C  MS-ESS3-4  <b>RI.5.7</b></p>
<p>Lesson 4: The Modern Food System</p>	<p><b>5-ESS3.C:</b> Human Impacts on Earth Systems  Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.</p> <p>MS- LS2.C: Ecosystem Dynamics, Functioning, and Resilience  ▪ Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (?)</p> <p>MS- LS2.A: Interdependent Relationships in Ecosystems  ▪ Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (?)</p>

MS-ESS3-4: Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World

- All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
- The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.

MSESS3-4: Connections to Nature of Science Science Addresses Questions About the Natural and Material World

- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes

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**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.

**W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

**WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

**W.5.9** Draw evidence from literary or **informational** texts to support analysis, reflection, and research.

**WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research.

**W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

**WHST.6-8.1** Write arguments focused on discipline content.

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**5-ESS3.C**

**MS- LS2.C**

**MS- LS2.A**

	<p>MS-ESS3-4  MSESS3-4  <b>RI.5.7</b>  <b>W.5.8</b>  <b>WHST.6-8.8</b>  <b>W.5.9</b>  <b>WHST.6-8.9</b>  <b>W.5.1</b>  <b>WHST.6-8.1</b></p>
<p>Lesson 5: Nutrition Science Basics</p>	<p><b>5-LS1.C:</b> Organization for Matter and Energy Flow in Organisms  Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.</p> <p><b>MS-LS1-3.</b> Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.]</p> <p>-----</p> <p><b>RI.5.7</b> Draw on information from multiple print or <b>digital sources</b>, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.</p> <p><b>W.5.8</b> Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.</p> <p><b>WHST.6-8.8</b> Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><b>W.5.9</b> Draw evidence from literary or <b>informational</b> texts to support analysis, reflection, and research.</p> <p><b>WHST.6-8.9</b> Draw evidence from informational texts to support analysis, reflection, and research.</p> <p>-----</p> <p><b>5-LS1.C</b>  <b>MS-LS1-3</b>  <b>RI.5.7</b>  <b>W.5.8</b></p>

	<p><b>WHST.6-8.8</b>  <b>W.5.9</b>  <b>WHST.6-8.9</b></p>
<p>Lesson 6: Digestive and Circulatory System</p>	<p><b>5-LS1.C:</b> Organization for Matter and Energy Flow in Organisms  Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.</p> <p><b>MS-LS1-3.</b> Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.]</p> <ul style="list-style-type: none"> <li>▪ All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).</li> <li>▪ Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.</li> <li>▪ In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.</li> </ul> <p>-----</p> <p><b>RI.5.7</b> Draw on information from multiple print or <b>digital sources</b>, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.</p> <p><b>W.5.8</b> Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.</p> <p><b>WHST.6-8.8</b> Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><b>W.5.9</b> Draw evidence from literary or <b>informational</b> texts to support analysis, reflection, and research.</p> <hr/> <p><b>5-LS1.C</b>  <b>MS-LS1-3</b>  <b>RI.5.7</b>  <b>W.5.8</b>  <b>WHST.6-8.8</b>  <b>W.5.9</b></p>
<p>Lesson 7:</p>	<p><b>5-LS1.C:</b> Organization for Matter and Energy Flow in Organisms</p>

<p>Diet-related illness</p>	<p>Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.</p> <p><b>MS-LS1-3.</b> Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.]</p> <p>----</p> <p><b>RI.5.7</b> Draw on information from multiple print or <b>digital sources</b>, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.</p> <p><b>W.5.8</b> Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.</p> <p><b>WHST.6-8.8</b> Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p><b>W.5.9</b> Draw evidence from literary or <b>informational</b> texts to support analysis, reflection, and research.</p> <p><b>WHST.6-8.9</b> Draw evidence from informational texts to support analysis, reflection, and research.</p> <p><b>W.5.1</b> Write opinion pieces on topics or texts, supporting a point of view with reasons and information.</p> <hr/> <p><b>RI.5.7</b>  <b>W.5.8</b>  <b>WHST.6-8.8</b>  <b>W.5.9</b>  <b>WHST.6-8.9</b>  <b>W.5.1</b>  <b>MS-LS1-3</b>  <b>5-LS1.C</b></p>
<p>Lesson 8: Marketing and Advertising</p>	<p><i>This lesson asks students to apply what they have learned about the nutritional information and what our bodies need to function well in a <u>real-world</u> situation. It asks students to evaluate marketing and advertising and support their ideas with evidence. In some ways, this</i></p>



*helps support students' development of the science and engineering practices.*

Science and Engineering Practices:

5-LS-1- Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K– 2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Support an argument with evidence, data, or a model.

MS-ESS 3-4 - Engaging in Argument from Evidence

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

**R.I.1 / RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts.

**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.

**W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

**WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

**W.5.9** Draw evidence from literary or **informational** texts to support analysis, reflection, and research.

**WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research.

**W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

	<p>MS-ESS 3-4  RI.1 / RST.6-8.1  <b>RI.5.7.</b>  <b>W.5.8</b>  <b>WHST.6-8.8</b>  <b>W.5.9</b>  <b>WHST.6-8.9</b>  <b>W.5.1</b></p>
<p>Lesson 9: Cooking Basics</p>	<p><i>This is a fun way to apply what students have learned in previous lessons, especially lessons 5 &amp; 7 to a real-world situation of preparing food for themselves.</i></p> <p><b>RI.5.9</b> Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.</p> <p><b>RST.6-8.9</b> Compare and contrast the information gained from experiments, simulations, <b>video, or multimedia sources with that gained from reading a text</b> on the same topic.</p> <hr/> <p><b>RI.5.9</b>  <b>RST.6-8.9</b></p>
<p>Lesson 10: The Culture of Food</p>	<p><i>Again, this is another opportunity for students to bring in their own experiences and compare it with classmates and those around the world. Students can evaluate food in terms of nutrition because they have been given the foundation to do so in previous lessons.</i></p> <p><b>RI.5.9</b> Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.</p> <p><b>RST.6-8.9</b> Compare and contrast the information gained from experiments, simulations, <b>video, or multimedia sources with that gained from reading a text</b> on the same topic.</p> <hr/> <p><b>RI.5.9</b>  <b>RST.6-8.9</b></p>

### **Grade 5 Disciplinary Core Ideas:**

**5-LS1-1.** Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

**5-LS2-1.** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.]

**PS3.D:** Energy in Chemical Processes and Everyday Life The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

**LS1.C:** Organization for Matter and Energy Flow in Organisms Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1) Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

**LS2.A:** Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

**LS2.B:** Cycles of Matter and Energy Transfer in Ecosystems Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

### **Cross-Cutting Concepts**

#### **Energy and Matter**

Matter is transported into, out of, and within systems. (5-LS1-1)

Energy can be transferred in various ways and between objects. (5-PS3-1)

## **Earth Systems**

### **Core Disciplinary Ideas**

**ESS3.C:** Human Impacts on Earth Systems Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

## **Engineering Designs**

### **Cross-Cutting Concepts**

Influence of Science, Engineering, and Technology on Society and the Natural World  
People's needs and wants change over time, as do their demands for new and improved technologies. (3- 5-ETS1-1)

Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

## **Middle School**

### **Core Disciplinary Ideas -**

**MS-LS1-3.** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.]

### **Matter and Energy in Organisms**

**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. [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.]

**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. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.]

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. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.]

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

### **Core Disciplinary Ideas**

LS1.C: Organization for Matter and Energy Flow in Organisms

- 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. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6)

- 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. (MS-LS1-7) **LS2.A: Interdependent Relationships in Ecosystems**
  - Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)
  - In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1)
  - Growth of organisms and population increases are limited by access to resources. (MS-LS2-1) **LS2.B: Cycle of Matter and Energy Transfer in Ecosystems**
    - 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. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.

(MS-LS2-3) **LS2.C: Ecosystem Dynamics, Functioning, and Resilience**

- Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)

**PS3.D: Energy in Chemical Processes and Everyday Life** ▪ 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. (secondary to MS-LS1-6) ▪ Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (secondary to MS-LS1-7)

**LS1.A: Structure and Function**

- All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (**MS-LS1-1**)
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (**MS-LS1-2**) ▪ In multicellular organisms, the body is a system of multiple interacting

subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3)

### **Cross -Cutting Concepts**

#### Systems and System Models

- Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)

### **Interdependent Relationships in Ecosystems**

#### **LS2.A:** Interdependent Relationships in Ecosystems

- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2)

#### **LS2.C:** Ecosystem Dynamics, Functioning, and Resilience

- Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (MS-LS2-5)

#### **LS4.D:** Biodiversity and Humans

- Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)

### **ELA standards:**

**RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1)

**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. (5-PS1)

**RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)

**W.5.8** Recall relevant information from **experiences** or gather relevant information from print and **digital sources**; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-2),(5-PS1-3),(5-PS1-4)

**W.5.9** Draw evidence from literary or **informational** texts to support analysis, reflection, and research. (5-PS1-2),(5-PS1-3),(5-PS1-4)

Possible Extensions:

**W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)

**SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (MS-ETS1-1),(MS-ETS1-2),(MS-ETS1-3) **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-ETS1-3)

**RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ETS1-2),(MS-ETS1-3)

**WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-ETS1-2)

**WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-ETS1-1) **WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research. (MS-ETS1-2) **SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ETS1-4)