

Carbon TIME Units and NGSS Alignment

Systems & Scale Unit

Middle School

Structures and Properties of Matter. MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.

<http://www.nextgenscience.org/msps-spm-structure-properties-matter>

Chemical Reactions. MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

<http://www.nextgenscience.org/msps-cr-chemical-reactions>

Chemical Reactions. MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

<http://www.nextgenscience.org/msps-cr-chemical-reactions>

High School

Chemical Reactions. HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

<http://www.nextgenscience.org/hsp-cr-chemical-reactions>

Chemical Reactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

<http://www.nextgenscience.org/hsp-cr-chemical-reactions>

Animals Unit

Middle School

MS. Matter and its Interactions. MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.

<http://www.nextgenscience.org/msps1-matter-interactions>

Matter and its Interactions. MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

<http://www.nextgenscience.org/msps1-matter-interactions>

Matter and its Interactions. MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

<http://www.nextgenscience.org/msps1-matter-interactions>

From Molecules to Organisms: Structures and Processes. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

<http://www.nextgenscience.org/msls1-molecules-organisms-structures-processes>

Animals Unit (continued)

High School

Matter and its Interactions. HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

<http://www.nextgenscience.org/hsp1-matter-interactions>

Matter and its Interactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

<http://www.nextgenscience.org/hsp1-matter-interactions>

From Molecules to Organisms: Structures and Processes. HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

<http://www.nextgenscience.org/ms1-molecules-organisms-structures-processes>

From Molecules to Organisms: Structures and Processes. HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

<http://www.nextgenscience.org/ms1-molecules-organisms-structures-processes>

From Molecules to Organisms: Structures and Processes. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

<http://www.nextgenscience.org/ms1-molecules-organisms-structures-processes>

Ecosystems: Interactions, Energy, and Dynamics. HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

<http://www.nextgenscience.org/hsl2-ecosystems-interactions-energy-dynamics>

Plants Unit

Middle School

Structure and Properties of Matter. MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.

<http://www.nextgenscience.org/msps-spm-structure-properties-matter>

Chemical Reactions. MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

<http://www.nextgenscience.org/msps-cr-chemical-reactions>

Chemical Reactions. MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

<http://www.nextgenscience.org/msps-cr-chemical-reactions>

Plants Unit (continued)

Middle School (continued)

Matter and Energy in Organisms and Ecosystems. 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.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Structure, Function, and Information Processing. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

<http://www.nextgenscience.org/msls-sfip-structure-function-information-processing>

Matter and Energy in Organism and Ecosystems. 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.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organism and Ecosystems. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and non-living parts of an ecosystem.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

High School

Chemical Reactions. HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

<http://www.nextgenscience.org/hspc-cr-chemical-reactions>

Chemical Reactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

<http://www.nextgenscience.org/hspc-cr-chemical-reactions>

Energy. HS-PS3-1. Create a computational model to calculate change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

<http://www.nextgenscience.org/hspc-e-energy>

Structure and Function. HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

<http://www.nextgenscience.org/hsls-sfip-structure-function-information-processing>

Matter and Energy in Organisms and Ecosystems. HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Plants Unit (continued)

High School (continued)

Matter and Energy in Organisms and Ecosystems. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Decomposers Unit

Middle School

Structure and Properties of Matter. MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.

<http://www.nextgenscience.org/msps-spm-structure-properties-matter>

Chemical Reactions. MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

<http://www.nextgenscience.org/msps-cr-chemical-reactions>

Chemical Reactions. MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

<http://www.nextgenscience.org/msps-cr-chemical-reactions>

Matter and Energy in Organisms and Ecosystems. 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.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

High School

Chemical Reactions. HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.

<http://www.nextgenscience.org/hspc-cr-chemical-reactions>

Chemical Reactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

<http://www.nextgenscience.org/hspc-cr-chemical-reactions>

Decomposers Unit (continued)

High School (continued)

Matter and Energy in Organisms and Ecosystems. HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Ecosystems Unit

Middle School

Matter and Energy in Organisms and Ecosystems. 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.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Interdependent Relationships in Ecosystems. MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

<http://www.nextgenscience.org/msls-ire-interdependent-relationships-ecosystems>

Matter and Energy in Organisms and Ecosystems. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy in and out of organisms.

<http://www.nextgenscience.org/msls-meoe-matter-energy-organisms-ecosystems>

Earth's Systems. MS-ESS2-1. Develop a model to describe the cycling of earth's materials and the flow of energy that drives this process.

<http://www.nextgenscience.org/msess-es-earth-systems>

Human Impacts. MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

<http://www.nextgenscience.org/msess-hi-human-impacts>

Ecosystems Unit (continued)

High School

Chemical Reactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

<http://www.nextgenscience.org/hsp1-cr-chemical-reactions>

Interdependent Relationships in Ecosystems. HS-LS2-1. Use mathematical and or computational representations to support explanations of factors that affect carrying capacity of ecosystems and different scales.

<http://www.nextgenscience.org/hsls-ire-interdependent-relationships-ecosystems>

Interdependent Relationships in Ecosystems. HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems at different scales.

<http://www.nextgenscience.org/hsls-ire-interdependent-relationships-ecosystems>

Matter and Energy in Organisms and Ecosystems. HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Matter and Energy in Organisms and Ecosystems. HS-LS2-5: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

<http://www.nextgenscience.org/hsls-meoe-matter-energy-organisms-ecosystems>

Earth's Systems. HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

<http://www.nextgenscience.org/hsess-es-earth-systems>

Human Energy Systems Unit

Middle School

Earth and Human Activity. MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

<http://www.nextgenscience.org/mse3-eha-earth-human-activity>

Human Impacts. MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

<http://www.nextgenscience.org/mse3-hi-human-impacts>

Earth and Human Activity. MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

<http://www.nextgenscience.org/mse3-eha-earth-human-activity>

High School

Matter and Its Interactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

<http://www.nextgenscience.org/hsp1-matter-interactions>

Human Energy Systems Unit (continued)

High School (continued)

Ecosystems: Interactions, Energy, and Dynamics. HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

<http://www.nextgenscience.org/hsls2-ecosystems-interactions-energy-dynamics>

Ecosystems: Interactions, Energy, and Dynamics. HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

<http://www.nextgenscience.org/hsls2-ecosystems-interactions-energy-dynamics>

Earth's Systems. HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

<http://www.nextgenscience.org/hsess-es-earth-systems>

Earth and Human Activity. HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

<http://www.nextgenscience.org/hsess3-earth-human-activity>

Earth and Human Activity. HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

<http://www.nextgenscience.org/hsess3-earth-human-activity>

Earth and Human Activity. HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

<http://www.nextgenscience.org/hsess3-earth-human-activity>