

# Next Generation Science Standards

The *Next Generation Science Standards* (NGSS) performance expectations that middle and high school students can achieve through completing the *Plants* Unit are listed below. To read a discussion of how the *Carbon TIME* project is designed to help students achieve the performances represented in the NGSS, please see [Three-dimensional Learning in Carbon TIME](#).

## 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>
- 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>
- 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>

## 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-LS1-6. 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>