

Next Generation Science Standards

The *Next Generation Science Standards* (NGSS) performance expectations that middle and high school students can achieve through completing the *Human Energy Systems* 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

- 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>
- 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.
- Earth's Systems. HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
- Weather and Climate. HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
<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>

Middle School

- MS-ESS2-1. Develop a model to describe the cycling of the Earth's materials and the flow of energy that drives this process.
- 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/msess3-earth-human-activity>
- Human Impacts. MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capital consumption of natural resources impact Earth's systems.
<http://www.nextgenscience.org/msess-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/muess3-earth-human-activity>