

MS-ESS3 Earth and Human Activity

<https://www.nextgenscience.org/sites/default/files/MS-ESS3%2004.09.14.pdf>

The chart below makes one set of connections between the instruction outlined in this article and the NGSS. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The materials, lessons, and activities outlined in the article are just one step toward reaching the performance expectations listed below.

Dimensions	Classroom Connections
Science and Engineering Practices	
Planning and Carrying Out Investigations - Conduct an investigation and/or evaluate and/or revise the experimental design to produce data to serve as the basis for evidence that meet the goals of the investigation. Analyzing and Interpreting Data - Analyze and interpret data to determine similarities and differences in findings. Constructing Explanations - Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real-world phenomena, examples, or events.	- Students conduct an investigation using air quality monitors to gather data for evidence of air pollution - Students analyze online databases of air quality to identify patterns and sources - Students use particulate matter data from investigations and online to explain changes in air quality
Disciplinary Core Ideas	
ESS3.C: Human Impacts on Earth Systems. Typically, as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.	Students use and analyze patterns of air quality data and relate this to evidence of human activities such as traffic and industry
Crosscutting Concepts	
Patterns - Graphs, charts, and images can be used to identify patterns in data (MS-ESS3-2) Cause and Effect - Cause and effect relationships may be used to predict phenomena in natural or designed systems.	- Students identify local and global patterns in air quality measurements and connect to local activities and geography - Students identify how changes in environment or human behavior results in changes in air quality
Building Towards Performance Expectations	
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human	

impact on the environment. [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

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. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

Connections to the *Common Core State Standards* (NGAC and CCSSO 2010)

ELA

WHST.6-8.1 Write arguments focused on discipline content. (MS-ESS3-4)

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research. (MS-ESS3-4)