

MS Science, Math and Language Arts Standards that Can Apply to this Guide

Disciplinary Core Ideas

3-LS4-3 Biological Evolution: Unity and Diversity

Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-LS4-4 Biological Evolution: Unity and Diversity

Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*

4-ESS2-1 Earth's Systems

Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

4-ESS2-2 Earth's Systems

Analyze and interpret data from maps to describe patterns of Earth's features.

5-ESS3-1 Earth and Human Activity

Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics

Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*

[Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics

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.]*

MS-ESS3 Earth and Human Activity 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.]*

MS-LS2-1 Matter and Energy in Organisms and Ecosystems

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-LS2-4 Matter and Energy in Organisms and Ecosystems 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.]*

Science & Engineering Practices

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.

ESS3.B: Natural Hazards

- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)

ESS3.C: Human Impacts on Earth Systems

- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)

- 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. (MS-ESS3-3),(MS-ESS3-4)

Science & Engineering Practices

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. (MS-ESS3-4)

Crosscutting Concepts

Stability and Change

- Small changes in one part of a system might cause large changes in another part. (MS-LS2-4)
- Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (MS-ESS3-5)

Patterns

- Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2)

Cause and Effect

- Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3)
- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS3-4)

Connections to Engineering, Technology and the 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. (MS-ESS3-4)
- 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. (MS-ESS3-2),(MS-ESS3-3)

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. (MS-ESS3-4)

MATHEMATICS STANDARDS 6-8

[6.RP.A.1 \(MS-ESS3-2\)](#)

Reason abstractly and quantitatively.

[7.RP.A.2 \(MS-ESS3-3\),\(MS-ESS3-4\)](#)

Recognize and represent proportional relationships between quantities.

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ENGLISH LANGUAGE ARTS STANDARDS 6-8

<http://www.corestandards.org/ELA-Literacy/RST/6-8/>

SPEAKING & LISTENING

Comprehension and Collaboration:

[CCSS.ELA-Literacy.SL.8.1](#)

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

[CCSS.ELA-Literacy.SL.8.1.a](#)

Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

[CCSS.ELA-Literacy.SL.8.1.b](#)

Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

[CCSS.ELA-Literacy.SL.8.1.c](#)

Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

[CCSS.ELA-Literacy.SL.8.1.d](#)

Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

Presentation of Knowledge and Ideas:

[CCSS.ELA-Literacy.SL.8.4](#)

Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

[CCSS.ELA-Literacy.SL.8.5](#)

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

WRITING

[WHST.6-8.1](#)

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

[WHST.6-8.2](#)

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS3-1)

[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-ESS3-3)

[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-ESS3-3)

[WHST.6-8.9](#)

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

SCIENCE & TECHNICAL SUBJECTS:

Key Ideas and Details:

[CCSS.ELA-Literacy.RST.6-8.1](#)

Cite specific textual evidence to support analysis of science and technical texts.

[CCSS.ELA-Literacy.RST.6-8.2](#)

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

Integration of Knowledge and Ideas:

[CCSS.ELA-Literacy.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).

[CCSS.ELA-Literacy.RST.6-8.8](#)

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

[CCSS.ELA-Literacy.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.