

4-ESS3-1 Earth and Human Activity

California Science Test—Item Content Specifications

# 4-ESS3-1 Earth and Human Activity

Students who demonstrate understanding can:

Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

[Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

Continue to the next page for the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Obtaining, Evaluating, and Communicating Information  Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods.  Obtain and combine information from books and other reliable media to explain phenomena. | ESS3.A: Natural Resources   1. Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. | Cause and Effect  Cause and effect relationships are routinely identified and used to explain change.  Connections to Engineering, Technology, and Applications of Science  Interdependence of Science, Engineering, and Technology  Knowledge of relevant scientific concepts and research findings is important in engineering.  Influence of Engineering, Technology, and Science on Society and the Natural World  Over time, people’s needs and wants change, as do their demands for new and improved technologies. |

## Assessment Targets

Assessment targets describe the focal knowledge, skills, and abilities for a given three-dimensional Performance Expectation. Please refer to the Introduction for a complete description of assessment targets.

### Science and Engineering Subpractice(s)

Please refer to appendix A for a complete list of Science and Engineering Practices (SEP) subpractices. Note that the list in this section is not exhaustive.

8.1 Ability to comprehend and evaluate text in terms of its validity, reliability, and sources

### Science and Engineering Subpractice Assessment Targets

Please refer to appendix A for a complete list of SEP subpractice assessment targets. Note that the list in this section is not exhaustive.

8.1.1 Ability to obtain relevant information through conducting searches in print and online sources and evaluate the reliability of the obtained information

8.1.2 Ability to recognize, interpret, and critique key ideas in scientific and engineering text, including a mix of words, symbols, tables, diagrams, and graphs

8.1.3 Ability to summarize information from a single source and/or combine and synthesize information from multiple sources to address a question or solve a problem

### Disciplinary Core Idea Assessment Targets

#### ESS3.A.2

* Describe how energy is obtained from natural sources
* Describe how energy resources are used to address human energy needs
* Identify whether an energy resource is renewable or nonrenewable
* Identify positive and negative environmental effects of using an energy resource
* Describe the role of technology in mediating the negative environmental effects of using an energy resource
* Describe the role of technology in extracting or using an energy resource

### Crosscutting Concept Assessment Target(s)

CCC2 Identify cause and effect relationships, using them to explain change

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides scientific texts, including a mix of words, tables, diagrams, and graphs, to describe how energy is obtained from nonrenewable natural sources:

* Interprets the information to correctly describe how the use of the energy resource affects the environment (8.1.1, ESS3.A.2, and CCC2)

Task provides information from different sources, such as scientific journals, news reports, and fiction books, about different renewable energy resources:

* Evaluates the reliability of the obtained information (8.1.2, ESS3.A.2, and CCC2)

Task provides a single source of information about how the use of energy resources by humans has changed over time:

* Summarizes the information in order to address a question (8.1.3, ESS3.A.2, and CCC2)
* Summarizes the information in order to solve (or predict a solution to) a problem (8.1.3, ESS3.A.2, and CCC2)

Task provides multiple sources of information about the positive and negative aspects of fossil fuels in an area:

* Combines and synthesizes the information in order to address a question (8.1.3, ESS3.A.2, and CCC2)
* Combines and synthesizes the information in order to solve (or predict a solution to) a problem (8.1.3, ESS3.A.2, and CCC2)

## California Environmental Principles and Concepts

* EP1: The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Wind energy
* Water behind dams
* Sunlight
* Fossil fuels
* Air pollution

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Renewable energy sources (e.g., solar, wind, hydroelectric) do not affect the environment negatively.
* Using nonrenewable energy sources is always irresponsible.
* Using nonrenewable energy sources always affects the environment negatively.
* Energy needs have remained constant over time.
* Building hydroelectric dams is always good for the environment.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

[4-ESS3-1 Evidence Statement](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/4-ESS3-1%20Evidence%20Statements%20June%202015%20asterisks.pdf) <https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/4-ESS3-1%20Evidence%20Statements%20June%202015%20asterisks.pdf>

[Environmental Principles and Concepts](http://californiaeei.org/abouteei/epc/) <http://californiaeei.org/abouteei/epc/>

[California Education and the Environment Initiative](http://californiaeei.org/) <http://californiaeei.org/>

The *2016 Science Framework for California Public Schools Kindergarten through Grade 12*

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade 12 <https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix1.pdf>

Appendix 2: Connections to Environmental Principles and Concepts <https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix2.pdf>

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