

4-ESS3-1 Earth and Human Activity

Students who demonstrate understanding can:

- 4-ESS3-1. 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.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

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.

Disciplinary Core Ideas

ESS3.A: Natural Resources

- 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.

Crosscutting Concepts

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.

Observable features of the student performance by the end of the grade:

1	Obtaining information	
	a	Students gather information from books and other reliable media about energy resources and fossil fuels (e.g., fossil fuels, solar, wind, water, nuclear), including:
	i.	How they are derived from natural sources (e.g., which natural resource they are derived from) [note: mechanisms should be limited to grade appropriate descriptions*, such as comparing the different ways energy resources are each derived from a natural resource).
	ii.	How they address human energy needs.
	iii.	The positive and negative environmental effects of using each energy resource.
2	Evaluating information	
	a	Students combine the obtained information to provide evidence about:
	i.	The effects on the environment of using a given energy resource.
	ii.	Whether the energy resource is renewable.
	iii.	The role of technology, including new and improved technology, in improving or mediating the environmental effects of using a given resource.
3	Communicating information	
	a	Students use the information they obtained and combined to describe* the causal relationships between:
	i.	Energy resources and the environmental effects of using that energy source.
	ii.	The role of technology in extracting and using an energy resource.