

Strand 8.4: Interactions with natural systems and resources	Interactions of matter and energy through geologic processes have led to the uneven distribution of natural resources. Many of these resources are nonrenewable and per-capita use can cause positive or negative consequences. As energy flows through the physical world, natural disasters can occur which affect human life. Humans can study patterns in natural systems to anticipate and forecast future disasters and work to mitigate the outcomes.	
Standard: 8.4.1 (MS-ESS3-1.)	Construct a scientific explanation based on evidence that shows that the uneven distribution of Earth's mineral, energy, and groundwater resources is <u>caused</u> by geological processes. Examples of uneven distribution of resources could include Utah's unique geologic history that led to the formation and irregular distribution of natural resources like copper, gold, natural gas, oil shale, silver and uranium.	
SEP/CCC	Constructing Explanations and Designing Solutions Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.	<u>Cause and Effect</u> Cause and effect relationships may be used to predict Anchor Phenomena in natural or designed systems.
DCI	ESS3.A: Natural Resources Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.	
Student Friendly Objective	I can construct a scientific explanation based on evidence that explains why earth's resources are unevenly distributed.	
Anchor Phenomena	Geological processes affect the uneven distribution of resources.	
Vertical Learning Progression	Previous Science Content (Discussed in K-7 Standards)	Future Science Content (Discussed in 9-12 Standards)
	- Water is found in many types of places and in different forms on Earth. - Most of Earth's water is in the ocean and much of Earth's freshwater is in glaciers or underground. - Geological forces that shape the Earth's surface. (7th grade) - Rock Cycle (7th grade)	- Details about specific geological processes such as plate tectonics, stratigraphy, rock formation processes, - Specific terms such as aquifer, intrusions, fault types, - Specifics of Utah's geologic history - Specific processes on the formation of fossil fuels
What students will be doing this year:	Articulating the explanation of phenomena "Students articulate a statement relating a given phenomenon to scientific ideas, including that past and current geoscience processes have caused the uneven distribution of the Earth's resources, including": - That the uneven distributions of the Earth's mineral, energy, and groundwater	

	resources are the results of past and current geologic processes. ii. That resources are typically limited and nonrenewable due to factors such as the long amounts of time required for some resources to form or the environment in which resources were created forming once or only rarely in the Earth's history. b. Students use evidence and reasoning to construct a scientific explanation of the phenomenon. Identifying the scientific evidence to construct the explanation a. Students identify and describe the evidence necessary for constructing the explanation, including: i. Type and distribution of an example of each type of Earth resource: mineral, energy, and groundwater. ii. Evidence for the past and current geologic processes (e.g., volcanic activity, sedimentary processes) that have resulted in the formation of each of the given resources. iii. The ways in which the extraction of each type of resource by humans changes how much and where more of that resource can be found. b. Students use multiple valid and reliable sources of evidence. Reasoning a. Students use reasoning to connect the evidence and support an explanation. Students describe a chain of reasoning that includes: i. The Earth's resources are formed as a result of past and current geologic processes. ii. The environment or conditions that formed the resources are specific to certain areas and/or times on Earth, thus identifying why those resources are found only in those specific places/periods. iii. As resources are used, they are depleted from the sources until they can be replenished, mainly through geologic processes. iv. Because many resources continue to be formed in the same ways that they were in the past, and because the amount of time required to form most of these resources (e.g., minerals, fossil fuels) is much longer than timescales of human lifetimes, these resources are limited to current and near-future generations. Some resources (e.g., groundwater) can be replenished on human timescales and are limited based on distribution. v. The extraction and use of resources by humans decreases the amounts of these resources available in some locations and changes the overall distribution of these resources on Earth.
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