UNIT OVERVIEW

EARTH'S RESOURCES

Unit Issue: How the use of natural resources by humans can affect the availability of these resources and how these resources vary in their distribution around the world.

Anchoring Phenomenon: Humans affect the availability of natural resources, such as metals, fossil fuels, and freshwater.

Listed below is a summary of the activities in this unit. Note that the total teaching time is listed as 19–28 periods of approximately 45–50 minutes (approximately 4–6 weeks). If you find you are running out of time, you may choose to skip Activities 5 and 8.

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
1. **Investigation: Observing Earth's Resources** Students are introduced to Earth's natural resources. They observe samples of five resources and rank them from the most to least valuable. The class discusses what makes natural resources valuable, and the concept of renewable vs. nonrenewable resources is introduced.	Renewable and nonrenewable resources, properties	Prepare Student Sheet; fill vials with water.		1
2. **Reading: World Resource Consumption** Students read about the consumption and distribution of three commonly used natural resources and how rates of consumption have changed with increases in human population.	Resource use, population, human impact LITERACY SENSEMAKING	Prepare Student Sheets.	ARG A3	1–2
3. **Laboratory: Properties of Natural Resources** Students are provided with an unidentified mineral (either calcite or quartz). Students design an investigation to test and identify the mineral. They first select which property would be the most useful for identifying the mineral. After collecting data, they compare the data on the unknown mineral to the properties of calcite and quartz in order to identify the mineral.	Resources, properties		PCI Proc. AID A1 E&T QUICK CHECK A4	2
4. **Talking it Over: Per Capita Consumption** Students rank the consumption of copper, petroleum, and groundwater by eight different countries. They calculate per capita consumption and compare how countries rank on total consumption vs. per capita consumption. Images and information on the use of natural resources in different countries leads to an analysis of impacts on Earth systems.	Resource use, population, human impact	Prepare Student Sheets.	ARG A4	2–3

EARTH'S RESOURCES (continued)

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
5. **Modeling: Finding Resource Deposits** Students model the use of remote sensing techniques to reveal subsurface features. Based on the data gathered from the model, they create and interpret a false-color map to predict the locations that are more likely to contain accumulations of resources. They then consider why resources are unequally distributed around the globe.	Remote sensing, resource distribution, ancient environments	Set up Remote Sensing Boxes; prepare Student Sheet.		1–2
6. **Laboratory: Extracting Resources** Students model the extraction of copper from the ore malachite. They crush the ore and use acid to dissolve copper from the rock. They discuss how consumption of natural resources impacts Earth's systems, and apply their scientific understanding to a real-world mining question using evidence and trade-offs.	Resource extraction, human impact, ancient environments	Fill water bottles; collect and label 250-mL beaker and cup; prepare Student Sheet.	MOD A1 E&T A3	2
7. **Reading: Geological Processes** Students read about the geological processes that form petroleum, copper, and freshwater. The idea that resources are limited and not replaceable during human lifetimes is reinforced.	Geological processes, resource distribution, ancient environments LITERACY SENSEMAKING	Prepare Student Sheets.	EXP A5 (Assessment of PE MS-ESS3-1)	1–2
8. **Laboratory: Groundwater Formation** Students explore the filtration of water into, and its extraction out of, earth materials. Students examine samples of sandstone, shale, sand, and clay and describe their properties, including how they interact with water.	Groundwater, aquifer, resource distribution, ancient environments	Set up earth materials; prepare Student Sheet.		1–2
9. **Modeling: Modeling Rock Layers** Students model the formation of rock layers of Earth's crust by dropping game chips into a cylinder. The class compares data and develops the idea that some layers are formed by the ongoing deposition of sediments and that lower layers are usually older than upper layers.	Geological processes, geological time		MOD A2 EXP QUICK CHECK A4	1–2

EARTH'S RESOURCES (continued)

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
10. **Investigation: Earth's History** Students develop a personal "geologic" time scale to order important events in their own lives. Students are introduced to Earth's age as they place important events in Earth's history into one of four time periods. They compare their ordering with that of modern geologists.	Geologic time scale, fossils, ancient environments	Prepare Student Sheets.		2
11. **Investigation: Fossils Through Time** Students place events in geological time periods. They then construct a geologic time scale to fit on a 90-cm strip of paper.	Geological time, geological processes, resource distribution, ancient environments	Cut 90-cm strips of adding-machine paper; prepare Student Sheet.	EXP QUICK CHECK A4	1
12. **Investigation: Reading Rock Strata** Students examine four drill cores representing a fictional series of rock layers. They then use the evidence from each drill core to create a stratigraphic column for each location. Based on the fossils contained within the layers, students determine how the layers in each location correlate to the layers from the other locations. They are then challenged to use this fossil evidence to construct a timeline showing the relative time spans of each species represented by the fossils.	Geological time, stratigraphy, ancient environments LITERACY	Prepare Student Sheet.	EXP A5 (Assessment of PE MS-ESS1-4)	1–2
13. **Reading: Impact on Earth Systems** Students read about four resources and the effects of human use of these resources on Earth. Students use an Anticipation Guide before, during, and after the reading to make predictions based on prior knowledge and then examine how their understandings have changed at the end of the activity. Students construct an argument supported by scientific evidence about the negative affects of human consumption of food, water, copper and petroleum.	Resource use, human impact LITERACY SENSEMAKING	Prepare Student Sheet.	E&T A2 ARG A3 (Assessment of PE MS-ESS3-4)	1–2
14. **Talking it Over: The Rockford Range Decision** Students are given a fictional scenario of a community in need of resources for a growing population. They have to choose which resource to mine based on the geology of the land site and the needs of the community. They weight the benefits and trade-offs of mining the land for each of the resources.	Resource use, human impact, trade-offs, geological processes, resource distribution, ancient environments LITERACY SENSEMAKING	Research local mines; prepare Student Sheet.	E&T A1 EXP A3 (Assessment of PE MS-ESS3-1)	2–3