# Energy Resources for Our Future

## Earth Science Activity Calendar, 2025–2026 School Year


EARTH SCIENCE WEEK

AGI american geosciences institute
connecting earth, science, and people

Earth Science Week 2025
American Geosciences Institute
www.americangeosciences.org

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# Energy Resources for Our Future



Earth science is at the core of our understanding of energy resources that shape every aspect of our lives — from the energy that powers our homes to the fuels that drive our industries. Whether it's exploring geothermal energy beneath Earth's crust, understanding how oil and natural gas are formed and extracted, or assessing an area's potential to use wind or solar energy, earth science plays a critical role in ensuring that we can meet our energy needs in sustainable ways.

In classrooms, laboratories, and field sites around the globe, the study of earth science helps us better understand how to find, use, and preserve vital energy resources. Earth Science Week 2025 focuses on the theme "Energy Resources for Our Future". This year's Earth Science Week theme encourages students, educators, and communities to engage in activities that explore the pivotal roles played by the geosciences in energy production, conservation, and sustainability throughout the year. The activities in this calendar are organized to first introduce Earth's energy sources and resources, then explore methods for harnessing and transmitting energy, and conclude with an assessment of energy consumption and its potential environmental impacts.

This year's celebration continues to relate earth science to sustainability and the United Nations 17 Sustainable Development Goals (SDGs, **https://sdgs.un.org/**). Each SDG outlines a global issue and how it would be addressed in a sustainable world. Given this year's theme, there is special focus on SDG 7: Clean and affordable energy, and how work toward this goal affects the achievement of other SDGs. Aligning educational activities to the SDGs connects student learning to real-world problems and potential solutions. Each activity in this calendar is tagged with the SDGs to which it most closely relates to promote understanding of the vital role that earth science plays in informing, maintaining, and strengthening sustainability.

Each month, in addition to the highlighted earth science activity, you will find a callout box with an online resource — datasets, maps, activity guides, and more — that can help students and the public understand how progress toward the SDGs are monitored. These resources were curated by Earth Observations for the Sustainable Development Goals (EO4SDG) to highlight the range of quantitative and qualitative data collected by geoscientists that can be used in classrooms to help students understand earth science concepts in the context of real-world issues faced by communities and ecosystems around the globe.

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# Earth Science Week Is for You

Laila Martinez*

This year, you're invited to join the millions of participants in all 50 states and many nations worldwide who are celebrating Earth Science Week. This exciting event has grown steadily in momentum and participation since the American Geosciences Institute facilitated the first Earth Science Week in 1998.

Every year, people in schools, workplaces, civic centers, and elsewhere celebrate Earth Science Week to help build public understanding and appreciation of the earth sciences. Earth Science Week serves the geoscience community by:

- giving students new opportunities to discover the earth sciences,
- highlighting the contributions made by the geosciences to society,
- publicizing the message that earth science is all around us,
- encouraging responsible stewardship of the planet through an understanding of Earth processes,
- providing a forum where geoscientists can share their knowledge and enthusiasm about the Earth and how it works, and
- making learning about earth science fun!

Formal and informal educators, students, parents, geoscientists, and interested citizens can all play a leading role in Earth Science Week. Start with a visit to the Earth Science Week website (**www.earthsciweek.org**). Let us know how you are planning to celebrate! Send us an email at **info@earthsciweek.org**. Celebrate Earth Science Week: October 12–18, 2025!

EARTH SCIENCE WEEK

How can you get involved? Explore the Earth Science Week website to find a host of tools designed to make planning and attending events easy, fun, and rewarding! We have many resources to help you work with local geoscience professionals to engage young people and others in events that help them consider their role in earth science, innovation, and sustainability.

You'll also find links to educational materials and activities, many of which are also available in the 2025 Earth Science Week Toolkit.

The website also includes a link to subscribe to our electronic newsletter so you can stay up-to-date on the latest developments and upcoming activities!

**www.earthsciweek.org**

Siena Heid* (portion of original shown)

Ashley Resurreccion* (portion of original shown)

Adeline Kong*

*Earth Science Week 2024 Photography and Visual Arts Contest entries by listed artists

LEARNING ACTIVITY:

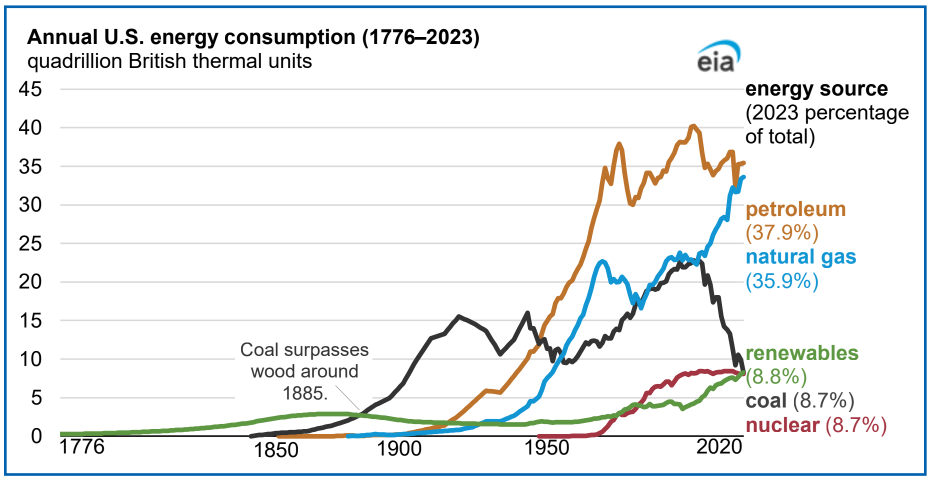
# The Potential of Energy Reservoirs and Deposits

## GRADES 6–12

## MATERIALS

- Computer with internet access

All countries rely on multiple energy sources to power industries, homes, and transportation. The combination of energy sources used by a nation is called their *energy mix*. Energy comes in many forms, and some of the most important sources are stored beneath the Earth's surface (known as reservoirs). Each of these sources plays a critical role in generating electricity around the world. In this activity, you'll explore six key energy reservoirs/resources: geothermal, helium, hydrogen, lithium, oil and gas, and uranium.




Credit: U.S. Energy Information Administration

## PROCEDURE

1. Make observations of graphs showing energy consumption in the United States at: **https://bit.ly/US-energy-1776-2023**.
   a. Use the first graph to describe the trend for each energy source, being sure to note both times of increases and decreases in their use.
   b. The second graph is a breakdown of renewable energy sources (included in the "renewables" line on the first graph). Why do you think the use of each of these energy resources started at different times in U.S. history?
   c. Some of the energy sources on these graphs co-exist with each other, and some are derived from each other. Which energy sources on the graph do you think fall in each category?

2. Many energy sources are stored in underground reservoirs or deposits. Use the following resources to learn about how different energy reservoirs form:
   - Geothermal: **https://bit.ly/geothermal-reservoirs**.
   - Helium: **https://bit.ly/helium-energy**.
   - Hydrogen: **https://on.doi.gov/4ih8uOt**.
   - Lithium* from brines and mineralization: **https://bit.ly/lithium-deposits**.
   - Oil and Gas: **https://bit.ly/oil-gas-reservoirs**.
   - Uranium from mineral deposits: **https://bit.ly/uranium-deposits**.

## ANALYSIS

1. Describe a benefit and drawback of the use of each energy reservoir/deposit you learned about.

2. Which of the energy reservoirs and deposits you learned about in Step 2 are **not** represented on the U.S. consumption graphs you analyzed in Step 1? Why do you think this is?
   a. Which of these energy reservoirs do you think will have a significant increase in use in the future? Why do you think this?
   b. Do you think any of these reservoirs will have a significant decrease in use in the future? Why or why not?
   c. Conduct research to learn what energy experts think about the use of each type of energy reservoir.

## FURTHER STEPS

Read about the potential growth of geoscience careers in geothermal energy, energy storage, subsurface exploration, and oilfield monitoring: **https://bit.ly/AAPG-geoscience-careers**.

*Lithium is not an energy source, but is a raw material for energy storage technologies, like batteries.

## NGSS CONNECTIONS

**SEP:** Analyzing and Interpreting Data
**DCI:** ESS3.A: Natural Resources
**CCC:** Energy and Matter

## SDG CONNECTIONS

**7:** Affordable and clean energy
**12:** Responsible consumption and production

**Source: American Association of Petroleum Geologists.**
Developed by Lindsay Mossa, AGI.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | 1<br>National Water Quality Month | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16<br>International Geocaching Day |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 Vesuvius Day<br>31 | 25 National Park Service Founders Day<br>**Aug. 25–28, 2025: Geoscience Event:** IMAGE 2025, American Association of Petroleum Geologists and Society of Exploration Geophysicists, Houston, Texas | 26 | 27<br>National Petroleum Day | 28 | 29 | 30<br>National Beach Day |

## ▶ GEOBluePlanet Eutrophication Information Hub

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This resource offers interactive chlorophyll data to help students understand the impacts of pollution and climate dynamics on ocean conditions. This tool is part of a larger "GIS for Ocean" platform hosted by Esri, supporting education on the health of oceans and projects being conducted to track ocean chemistry, biodiversity, and interactions with the atmosphere: **https://chlorophyll-esrioceans.hub.arcgis.com/**.

▶ **SDG Connections:**

6 CLEAN WATER AND SANITATION

14 LIFE BELOW WATER

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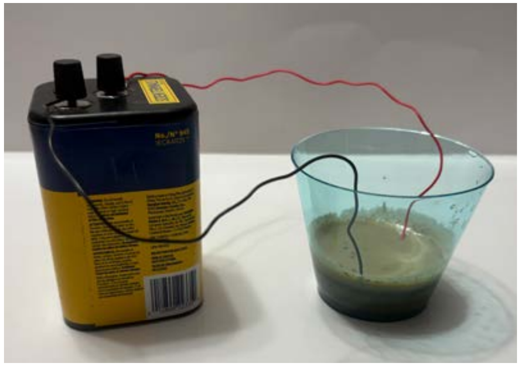
**August 2025**

LEARNING ACTIVITY:

# Soil has a Charge!



**Activity setup.**
Credit: E. Robeck, AGI

## GRADES 7–10

### MATERIALS

- Copper wire
- Lantern battery (6V)
- Clay: Pottery clay, bentonite or native soil with clay texture*
- Hammer or mortar and pestle (optional, to break up aggregates [clumps] in dry soil)
- Water
- Plastic cup (3 oz)
- Spoon or craft stick
- Timer
- Wire cutter, if needed

* What is clay texture? **https://bit.ly/soil-texture-by-feel** (by Dr. Dirt)

How does texture-by-feel work? **https://bit.ly/soil-texture-video** (by UC Davis)

Soils transport water and provide homes for trillions of bacteria and other organisms. Soils also contain solids (sand, silt, clay, organic matter) with pores between them filled with air and water. The soil solids affect the ability of soil to hold and release plant nutrients.

Plant nutrients are ions (see Analysis question #2 for examples) which are atoms or molecules with a net electrical charge. Clay particles and organic matter have charged surfaces that either attract cations (positive ions) or anions (negative ions). Different kinds of clay minerals vary in their amount of negative surface charges which allow the soil to attract and hold different amounts of cations. The cation exchange capacity of soil is determined by the amount and type of clay minerals and the amount of organic matter within the soil.

Why is this important? These charged surfaces have a role in retaining soil nutrients for plant use by a process called *ion exchange*. Water in soil is a solution — it always contains ions. Ion exchange involves the movement of cations or anions between the soil solution and another cation or anion that is stuck (adsorbed) to the clay surface. The following activity shows how ions are attracted to soil surfaces.

## PROCEDURE

1. Cut two 8 inch lengths of copper wire. Strip about 1 inch of the insulation off both ends of the wires.
2. Add 30 mL (2 Tbsp) water to a plastic cup.
   a. Stir the water while slowly adding 5 g (1 tsp) clay at a time, breaking up aggregates that form.
   b. Continue stirring and adding clay until it is a slurry with the consistency of thick glue.
3. Attach one copper wire to the positive pole of a 6-Volt battery. Attach the second wire to the negative pole.
4. Submerge the ends of both wires in the clay slurry ½ inch apart (see photo).
5. After 10 minutes, carefully pull the wires upward out of the slurry to observe both ends. Is the clay sticking to one of the wires? If so, which battery pole wire attracts the soil?

## ANALYSIS

1. Discuss your observations with your classmates. Explain what occurred using the terms *cation* and *anion*.
2. These are some of the ions commonly added to soils from fertilizers and the atmosphere:

| | | | |
|---|---|---|---|
| $H^+$ | Hydrogen | $Cl^-$ | Chloride |
| $NH_4^+$ | Ammonium | $Ca^{2+}$ | Calcium |
| $NO_3^-$ | Nitrate | $SO_4^{-2}$ | Sulfate |
| $K^+$ | Potassium | | |

   a. Based on your understanding, identify the ions in the list that will attach to a clay-rich soil's exchange sites.
   b. Describe how you determined this using evidence from this activity.
   c. Research why these ions are needed by plants.

## FURTHER STEPS

Try this activity with soil from your yard. The amount of interaction between the wires and the soil can be an indicator of how much clay (and organic matter) is in the soil.

Check out more information on this activity from Dr. Dirt: **https://cdrdirt.com/soil-is-charged/**.

## NGSS CONNECTIONS

**SEP:** Planning and Carrying Out Investigations
**DCI:** ESS2.A: Earth's Materials and Systems
**CCC:** Energy and Matter

## SDG CONNECTIONS

**2:** Zero hunger
**15:** Life on land

Soil Science Society of America

**Source: Soil Science Society of America.**
Developed by Clay Robinson, a.k.a. Dr. Dirt, for SSSA.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | **1**<br>**Federal Holiday:**<br>**Labor Day** | **2** | **3**<br>**Sept 3–6, 2025:**<br>**Geoscience Event:**<br>44th Annual NABG Technical Conference, National Association of Black Geoscientists,<br>Golden, Colorado | **4**<br>**Protect Your Groundwater Day** | **5** | **6** |
| **7**<br>**Sept 7–8, 2025:**<br>**Total Lunar Eclipse**<br>(Europe, Africa, Asia, Australia)<br>**Grandparents' Day** | **8** | **9** | **10** | **11**<br>**Patriot Day**<br>**Sept 11–12, 2025:**<br>**Geoscience Event:**<br>6th International Conference on Biofuels and Bioenergy,<br>Rome, Italy | **12** | **13** |
| **14** | **15** | **16**<br>**International Day for the Preservation of the Ozone Layer** | **17** | **18**<br>**World Water Monitoring Day** | **19**<br>**Sept. 19–28, 2025:**<br>**Geoscience Event:**<br>36th Flagstaff Festival of Science, "Harvesting Knowledge,"<br>Flagstaff, Arizona | **20**<br>**World Cleanup Day**<br>**International Coastal Cleanup Day** |
| **21**<br>**Zero Emissions Day**<br>**Partial Solar Eclipse**<br>(Australia, Antarctica, Pacific Ocean, Atlantic Ocean) | **22**<br>**World Car-Free Day**<br>**Autumnal Equinox**<br>**Sept. 22–24, 2025:**<br>**Rosh Hashanah**<br>(Sundown to Sundown) | **23** | **24** | **25** | **26**<br>**World Environmental Health Day** | **27**<br>**International Sky Day** |
| **28**<br>**World Rivers Day**<br>**International Day for the Universal Access to Information** | **29** | **30** | | | | |

## ▶ Esri's Sentinel-2 Land Cover Explorer

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This interactive mapping tool allows students to explore high-resolution land cover data derived from imagery from the Sentinel-2 satellites launched by the European Space Agency (2017 to 2024). Students can visualize changes in forests, urban areas, agriculture, and other land types over time, helping them understand the dynamics of land use and its impact on biodiversity and sustainable urban development: https://bit.ly/land-cover-explorer.

**▶ SDG Connections:**

11 SUSTAINABLE CITIES AND COMMUNITIES

15 LIFE ON LAND

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**September 2025**

LEARNING ACTIVITY:

# Geothermal Features in National Parks

GRADES 4–9

## MATERIALS

- Squeeze bottle with narrow spout (see Figure 2)
- Water (cold and warm)
- Antacid tablets
- Thermometer (optional)
- Materials to modify your geyser design

Geothermal features are formed by heat from beneath the Earth's surface, creating amazing sights like geysers (see Figure 1), hot springs, volcanoes, and tar pits. Many of these features are now in protected areas designated as National Parks, allowing people to experience them in their natural state. These areas also help scientists study Earth's processes, while conserving habitats for the unique ecosystems supported by geothermal features and promoting environmental education. In this activity, you will model how geysers work.

**Figure 1. Sawmill Geyser.**
Credit: Jacob W. Frank, Yellowstone National Park

## PROCEDURE

1. Optionally, record the temperature of the cold and warm water you will be using.
2. Fill a squeeze bottle to the top with cold water.
3. Drop 3–4 antacid tablets into the bottle and quickly close the lid and observe what happens.
4. Empty and rinse out the bottle.
5. Predict what will happen if you use warm water.
6. Repeat steps 2 and 3 with warm water.
7. Consider what other factors might affect the geyser (make it erupt higher or lower).
8. The antacid tablets carbonate the water and cause the model to erupt, but only some geysers in volcanic settings have carbonated water.
   a. Learn more how geysers erupt: **https://bit.ly/Yellowstone-how-geysers-work**.
   b. Think about modifications you could make to your model so it is more like a real geyser.
   c. If possible, test out your modifications.

## ANALYSIS

1. Discuss your results with your classmates — how did the temperature of the water affect the geyser's eruption?
2. Discuss your modifications with your classmates.
   a. Which do you think is most accurate based on what you learned about how geysers erupt.
   b. If you tested the modifications, how effective were they?

## FURTHER STEPS

Use the interactive map of Geothermal Processes & Features to explore National Parks that contain them: **https://bit.ly/NPS-Geothermal**.

Read more about Yellowstone National Park, which contains an extraordinary collection of over 10,000 hydrothermal features, including hot springs, mudpots, fumaroles, and over 500 geysers: **https://bit.ly/Yellowstone-hydrothermal**.

**Figure 2. Activity setup.**
Credit: L. Mossa, AGI

## NGSS CONNECTIONS

**SEP:** Developing and Using Models
**DCI:** ESS2.A: Earth's Materials and Systems
**CCC:** Cause and Effect

## SDG CONNECTIONS

**15:** Life on land

NATIONAL PARK SERVICE

**Source: National Park Service.**
Developed by Lindsay Mossa, AGI.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | **1**<br>**National Clean Energy Action Month**<br>**National Go on a Field Trip Month**<br>**Oct. 1–2, 2025: Yom Kippur** (Sundown to Sundown) | **2**<br>**Oct. 2–4, 2025: Geoscience Event:** AISES National Conference, American Indian Science and Engineering Society, Minneapolis, Minnesota | **3**<br>**Oct. 3–5, 2025: Geoscience Event:** AISES National Conference, American Indian Science and Engineering Society, San Antonio, Texas | **4**<br>**Oct. 4–10, 2025: World Space Week**<br>**International Observe the Moon Night** |
| **5**<br>**World Teachers' Day**<br>**Oct. 5–11, 2025:** National Metric Week | **6**<br>**International Geodiversity Day** | **7** | **8** | **9**<br>**Fire Prevention Day** | **10** | **11** |
| **12**<br>**Oct. 12–18, 2025: Earth Science Week**<br>**International EarthCache Day** | **13**<br>**Minerals Day**<br>**Federal Holiday: Indigenous Peoples' Day** | **14**<br>**No Child Left Inside Day**<br>**Earth Observation Day** | **15**<br>**National Fossil Day** | **16**<br>**Geoscience for Everyone Day**<br>**Great ShakeOut Earthquake Drill 10:**17 AM local time. Learn more at **ShakeOut.org** | **17**<br>**Geologic Map Day**<br>**Earth Science Week Contest Due Date** | **18**<br>**International Archaeology Day**<br>**Oct. 18–22, 2025: Diwali** |
| **19**<br>**Oct. 19–22, 2025: Geoscience Event:** GSA Connects 2025, The Geological Society of America, San Antonio, Texas<br>Oct. 19–25, 2025: National Chemistry Week | **20**<br>**Oct. 20–24, 2025: Nuclear Science Week** | **21** | **22**<br>**Sustainability Day** | **23** | **24**<br>**International Day of Climate Action** | **25** |
| **26**<br>**Oct. 26–29, 2025: Geoscience Event:** GRC Annual Meeting & Expo, Geothermal Rising, Reno, Nevada | **27** | **28** | **29** | **30**<br>**Oct. 30–Nov. 1, 2025: Geoscience Event:** SACNAS National Diversity in STEM Conference, Society for Advancement of Chicanos/ Hispanics and Native Americans in Science, Columbus, Ohio | **31**<br>**Halloween** | |

## ▶ World Resources Institute Energy Access Explorer

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This open data platform is designed to address energy scarcity by helping countries assess their energy supply needs on both local and national scales. It provides interactive maps that students can use to explore the types of fuels used for lighting, cooking, mining, and infrastructure across different countries. This resource can show how energy challenges impact essential services like healthcare, education, and agriculture: **www.energyaccessexplorer.org/**.

**▶ SDG Connections:**

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

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**October 2025**

LEARNING ACTIVITY:

# Solar Desalination

GRADES 3–10

## MATERIALS

**Part 1:**

- Large bowl or bucket*
- Water*
- Salt (17 g per 500 mL of water)
- Small glass cup or jar
- Small paper weight or rock
- Cling wrap or plastic wrap
- Tape
- Beaker or graduated cylinder

**Part 2:**

- Computer with internet access
- Calculator

* The time required for Part 1 is dependent on the volume of water the container can hold.

Source: NASA.

Desalination is the process of removing salt from water. The process of desalination can serve as a vital tool to bring fresh water to people and communities that may not have reliable access to safe drinking water. Solar stills have been used since ancient times to treat saltwater. In this activity, you will create a simple solar still, and can do calculations of the energy required for the process.

## PROCEDURE

1 **Part 1**: Solar Desalination

a. Tape the bottom of the glass jar to the center of a bowl.

b. Measure enough water to fill the bowl (record the volume in milliliters, mL). Mix in salt until no more can dissolve.

c. Fill the bowl with the saltwater without getting any in the glass jar.

d. Cover the bowl with plastic wrap and tape it to the side of the bowl to seal it as best you can. Leave it slightly loose so the center sags.

e. Place a small weight in the center of the plastic wrap.

f. Place the bowl in a sunny location and observe what happens.

2 **Part 2**: Calculations (for grades 7 and up)

a. Multiply the volume of water used in Step 1b by the density of water (0.001 kg/mL) to convert to kilograms.

b. Multiply the mass of water you used by the latent heat of water vaporization (2,260,000 J/kg) to calculate the solar energy needed to evaporate it.

c. To calculate solar irradiance, visit the POWER Data Access Viewer (DAV): **https://power.larc.nasa.gov/data-access-viewer/**. A tutorial for this site can be found on the lefthand menu.

d. Select the following from the menu:

- "Single Point"
- User Community: Sustainable Buildings
- Temporal Level: Climatology
- Location: Find your city on the map and click on it
- Parameter: Midday Insolation Incident (MIDDAY_INSOL)

**Salt deposit left behind when water evaporates.**
Credit: Zoshua Colah on Unsplash

e. Click submit and a graph will show the hourly irradiance values. Hover over the line and record the highest and lowest values on the graph.

f. To calculate evaporation time:

Time = Energy / (Solar irradiance * Surface area of water in the large bowl)

Use 0.1 meters squared ($m^2$) if the surface area was not measured.

## ANALYSIS

1 Where did the salt and water end up at the end of the experiment? Explain this by relating to solar energy and the water cycle.

2 How might the time it took for the water to evaporate differ if you did this activity at a different time of year?

3 What could a larger solar still do for those that have limited access to drinking water? Where else could it be useful?

## FURTHER STEPS

Learn more about the data used in Part 2 of this activity from NASA's Prediction of Worldwide Energy Resources (POWER) project (**https://power.larc.nasa.gov/**) that provides free global solar and atmospheric data collected from satellite missions:

- Clouds and the Earth's Radiant Energy System (CERES) mission: **https://ceres.larc.nasa.gov/** and
- Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2): **https://gmao.gsfc.nasa.gov/reanalysis/merra-2/**.

## NGSS CONNECTIONS

**SEP:** Planning and Carrying Out Investigations; Analyzing and Interpreting Data

**DCI:** ESS2.A: Earth's Materials and Systems

**CCC:** Energy and Matter

## SDG CONNECTIONS

**6:** Clean water and sanitation

# November 2025

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2<br>**Daylight Saving Time Ends** | 3 | 4 | 5 | 6 | 7<br>**International Day Against Violence and Bullying at School, Including Cyberbullying** | 8<br>**National STEM/STEAM Day** |
| 9<br>**Nov. 9–12, 2025:**<br>**Geoscience Event:**<br>ASA-CSSA-SSSA International Annual Meeting,<br>Salt Lake City, Utah and Limited Virtual | 10<br>**World Science Day for Peace and Development** | 11<br>**Federal Holiday: Veterans Day** | 12<br>**Nov. 12–15, 2025:**<br>**Education Event:**<br>NSTA National Conference on Science Education, National Science Teaching Association, Minneapolis, Minnesota | 13 | 14 | 15<br>**America Recycles Day** |
| 16 | 17<br>**National Hiking Day** | 18<br>**International Day of LGBTQIA+ People in STEM**<br>**Nov. 18–22, 2025:**<br>Geography Awareness Week | 19<br>**National Camp Day**<br>**GIS Day**<br>(Geographic Information Systems) Day | 20 | 21 | 22 |
| 23 / 30 | 24 | 25 | 26 | 27<br>**Federal Holiday: Thanksgiving** | 28 | 29 |

## ▶ The World Resources Institute's Global Forest Watch Online Platform

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This interactive map is intended to help visualize forest and landscape changes over time. Students can analyze how deforestation and land use changes impact biodiversity, climate, and ecosystems. The tool allows for comparisons across ecoregions, countries, and river basins, offering a valuable way for students to understand the dynamic relationship between land use and environmental sustainability, directly supporting SDG 15 on life on land: **www.globalforestwatch.org/**.

**▶ SDG Connections:**

13 CLIMATE ACTION

15 LIFE ON LAND

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November 2025

LEARNING ACTIVITY:

# Minerals' Role in Sustainable Energy Sources

GRADES 6–12

MATERIALS

- Computer with internet access

**Offshore wind farm.**
Credit: Alamy

**Source: The Mineralogical Society of America.**
Developed by Ann Benbow, MSA.

Certain minerals are called "Critical Materials for Energy" because they play essential roles in sustainable energy sources such as solar and wind, and in energy-storage devices, like batteries. But, how exactly do minerals help convert and store energy from the Sun and wind? Where do these minerals come from, and what is their path from the source to the final product? In this activity, you and the other members of your team will specialize in finding answers to these questions for a specific mineral used in energy-related technologies.

**Solar panels.**
Credit: Alamy

## PROCEDURE

1. Read through this infographic from the U. S. Geological Survey (USGS) to find out what minerals make some forms of renewable energy possible: **https://on.doi.gov/423CfNV.**
2. Your job, and the job of the rest of your team, is to choose one of those minerals in which to specialize. (Coordinate with other teams in your class, so that you aren't all working on the same mineral!)
3. Using reliable print or online resources, (such as those from scientific agencies, colleges and universities, state geological surveys, or science museums), find out the following information about your mineral:
   - Its properties
   - Where it comes from
   - How it is extracted
   - How it is processed
   - Its role in energy technologies (solar, wind, or batteries)
   - Why it is or is not considered a "critical mineral"
4. Create a poster or presentation with what you have discovered. Be sure to include images (drawings or open-source images) showing as much about the mineral as you can.
5. Coordinate with the other teams in your class to present a comprehensive picture of the role of your minerals in sustainable energy sources.


**Electric vehicle (EV) at a charging station.**
Credit: Alamy

## ANALYSIS

1. Look over each team's poster or watch them present on their mineral. Discuss all of the minerals researched with your team to write an argument for which mineral you think is most important for energy-related technologies.
2. Learn more about how minerals are categorized as critical by the Secretary of the Interior and the USGS: **https://bit.ly/USGS-critical**.
   a. Summarize how materials and minerals are identified as "critical".
   b. How do the short-term and medium-term graphs of critical minerals differ? Why do you think this is?

## NGSS CONNECTIONS

**SEP:** Asking Questions and Defining Problems
**DCI:** ESS2.A: Earth's Materials and Systems
**CCC:** Energy and Matter

## SDG CONNECTIONS

**7:** Clean and affordable energy
**12:** Responsible consumption and production

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | 1 Universal Human Rights Month | 2 World Nuclear Energy Day | 3 International Day of Persons with Disabilities | 4 | 5 World Soil Day | 6 National Miners' Day |
| 7 Pearl Harbor Remembrance Day | 8 | 9 **Dec. 9–11, 2025: Groundwater Week,** Las Vegas, Nevada | 10 International Human Rights Day<br>International Animal Rights Day | 11 International Mountain Day | 12 | 13 |
| 14 **Dec. 14–22, 2026: Hanukkah** (Sundown to Sundown) | 15 **Dec. 15–19, 2025: Geoscience Event:** AGU Fall Meeting, American Geophysical Union, New Orleans, Louisiana | 16 | 17 | 18 | 19 | 20 |
| 21 Winter Solstice | 22 | 23 | 24 | 25 Federal Holiday: Christmas | 26 Dec. 26-Jan. 1, 2026: Kwanzaa | 27 |
| 28 | 29 | 30 | 31 New Year's Eve | | | |

## ▶ Earth Information Center's Data Stories: "Nine themes, one Earth"

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This collection of curated datasets provides a dynamic way to teach about Earth and environmental sciences through engaging videos and visualizations on global energy supply and demand, biodiversity monitoring, and wildfire impacts. Students can use these stories to learn how human activity is affecting Earth's systems, and how we monitor those effects, including impacts on human and environmental health: **https://earth.gov/stories**.

▶ **SDG Connections:**

7 AFFORDABLE AND CLEAN ENERGY

13 CLIMATE ACTION

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**December 2025**

JANUARY 2026

LEARNING ACTIVITY:

# Geothermal Exchange

**Figure 1. A geothermal power station in Iceland.**
Credit: Shutterstock/Valery Kraynov

## GRADES 6–10

### MATERIALS

- Small cups
- Thin, flexible tubing
- Scissors
- Baking pan or similar (~3" depth)
- Tape and/or modeling clay
- Digital thermometer
- Containers of warm and cold water
- Goggles
- Tongs
- Towel or rags

If you were to dig a few feet into the ground, you would find that the temperature remains relatively constant, even on the hottest and coldest days of the year. People have learned how to harness the heat underground — called geothermal energy — to heat and cool homes. In this activity, you will model a geothermal exchange system to show how heat can be transferred to help control the temperature in buildings and homes.

## PROCEDURE

1. Make a "drip cup" by cutting a hole in the bottom of a cup just large enough to insert the flexible tubing (upper left of Figure 2).
2. Make a "drain cup" with a hole in the side large enough to fit the tubing (bottom right of Figure 2).
3. Place a towel under the pan.
4. Hold the drip cup a few inches above one end of the shallow pan and place the drain cup just outside the other end of the pan.
5. Cut a piece of tubing long enough to connect the cups. The tubing should hang from the drip cup into the pan, running along the bottom, and into the drain cup (see image).
6. Use tape or modeling clay as needed to secure the tubing to the cups or pan.
7. Measure and record the temperature of the cold water. Pour warm water into the pan that is at least 20 degrees warmer than the cold water. Wait a few minutes.
8. Fill the drip cup ¾ full with cold water.
9. Once the water has reached the drain cup, measure and record the temperature.
10. Repeat the procedure three more times.

## ANALYSIS

1. Take the average of each of the following, then describe your results:
   - the initial water temperatures
   - drain cup temperatures
   - temperature differences
2. What material do you think would be best for constructing the pipes used in geothermal exchange? Explain your answer.

**Figure 2. Geothermal model setup.**
Credit: L. Mossa, AGI

## FURTHER STEPS

What changes might you make to the model that you think would improve the heat exchange? If possible, test them out.

Read GSA's Position Statement on Geosciences and Energy Policy, which discusses the important role of geoscientists in developing and maintaining a range of energy sources that can meet the energy demands of a growing global population: **https://bit.ly/Geosciences-and-Energy**.

## NGSS CONNECTIONS

**SEP:** Developing and Using Models
**DCI:** ESS2.A: Earth's Materials and Systems
**CCC:** Systems and System Models

## SDG CONNECTIONS

**7:** Clean and affordable energy

THE GEOLOGICAL SOCIETY OF AMERICA®

**Source: The Geological Society of America.**
Developed by Lindsay Mossa, AGI.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | **1**<br>**International Creativity Month**<br>**Hawai'i Volcano Awareness Month**<br>**Federal Holiday: New Year's Day** | **2** | **3** |
| **4** | **5** | **6** | **7**<br>**Old Rock Day**<br>**Kid Inventors' Day** | **8**<br>**Earth's Rotation Day** | **9** | **10**<br>**Cut Your Energy Costs Day** |
| **11** | **12**<br>**Jan. 12–16, 2026:**<br>**Geoscience Event:**<br>AMS Annual Meeting, American Meteorological Society, New Orleans, Louisiana | **13** | **14**<br>**Jan. 14–17, 2026:**<br>**Education Event:**<br>Association for Science Teacher Education International Conference, Science for All, Chicago, Illinois | **15** | **16**<br>**Ed Roy Award for Excellence in K–8 Earth Science Teaching**<br>Applications Due | **17** |
| **18**<br>**Jan. 18–24, 2026:**<br>Hawai'i Cave Week | **19**<br>**Federal Holiday: Martin Luther King Jr. Day** | **20** | **21** | **22** | **23** | **24**<br>**International Day of Education** |
| **25** | **26**<br>**International Day of Clean Energy** | **27** | **28**<br>**International Reducing $CO_2$ Emissions Day** | **29** | **30** | **31** |

## ▶ SDGs Today Data Products: UN Sustainable Development Solutions Network

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This resource was designed to be used by K–12 teachers looking to engage students with data that shows progress toward all 17 of the UN Sustainable Development Goals (SDGs). This site houses real-world datasets and visualizations that educators can use to illustrate global challenges and progress towards achieving these goals: https://sdgstoday.org/datasets.

▶ **SDG Connections:**

4 QUALITY EDUCATION

17 PARTNERSHIPS FOR THE GOALS

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**January 2026**

FEBRUARY 2026

LEARNING ACTIVITY:

# Toasty Wind

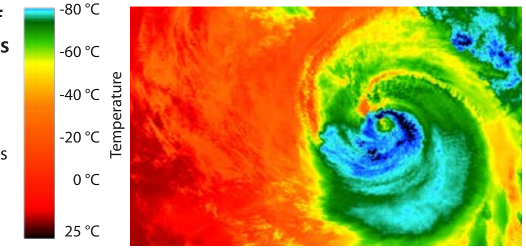



**Figure 1. This colorized image of Hurricane Matthew (2016) shows how the temperature of storms is monitored, as warmer waters lead to faster wind speeds.**
Credit: European Space Agency/ contains modified Copernicus Sentinel data (2016), processed by ESA

## GRADES 5–8

### MATERIALS

- Paper plate or card stock
- Marker
- Scissors
- String (~3 inches)
- Hot plate or toaster

**SAFETY NOTE:** This activity uses a heat source and should be conducted with adult supervision.

Energy transfers are happening everywhere around us. Some we can feel or see, such as a gust of wind blowing through a tree. But where does the energy come from that drives that wind? With this activity, finding out will be a breeze!

## PROCEDURE

1. As needed, turn on the hot plate or toaster to give it time to warm up.
2. Cut off and discard the raised outer rim of a thin paper plate.
3. Poke a small hole in the center of the plate and draw a circle around it.
4. Starting at the circle, draw a spiral toward the outside of the plate. The spiral lines should be about 1 inch apart.
5. Cut the plate along the spiral, then pick up the plate by the circle in the center of the spiral.
6. Trim the end of the lower spiral as needed so it hangs down about 1–2 feet.
7. Tie a knot at one end of a piece of string and pull the string up through the hole in the spiral so the knot supports the weight of the spiral.
8. Hold the spiral by the string to position it over the hot plate or toaster (see Figure 2). **SAFETY:** Be sure the spiral stays at least 4 inches above the heat source at all times.
9. Observe what happens to the spiral as it is held over the hot plate or toaster.

## ANALYSIS

1. Describe the energy transfer that occurred in this activity.
   a. Explain how temperature changes influence air movement and connect this to real-world wind patterns.
2. Predict what would happen if the heat source was set to a lower temperature. What about a higher temperature? Explain your answer.
   a. If possible, test these variables.
   b. Use your predictions and/or results to describe how changes in climate can affect wind.
3. In what way is the spinning different for the model than for the hurricane?

## FURTHER STEPS

Read about innovations that help keep offshore wind energy sustainable: **https://bit.ly/NOAA-offshore-wind**. Research the claim in the first sentence of this article to learn why winds over the ocean "tend to be stronger and more consistent than on land."


**Figure 2. Activity setup.**
Credit: L. Mossa, AGI

Visit **www.noaa.gov/jetstream** to learn more about our atmosphere and to find other fun learning activities.

## NGSS CONNECTIONS

**SEP:** Developing and Using Models
**DCI:** ESS2.A: Earth Materials and Systems
**CCC:** Systems and System Models

## SDG CONNECTIONS

**7:** Clean and affordable energy
**13:** Climate action

**Source: NOAA.**
Adapted by Lindsay Mossa, AGI.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1<br>Black History Month | 2<br>Groundhog Day<br>World Wetlands Day | 3 | 4 | 5 | 6 | 7<br>National Periodic Table Day |
| 8 | 9 | 10 | 11<br>International Day of Women and Girls in Science | 12 | 13 | 14<br>Valentine's Day |
| 15 | 16<br>National Innovation Day<br>**Federal Holiday:** Presidents' Day | 17<br>National Public Science Day<br>Annular Solar Eclipse (Antarctica)<br>**Feb. 17–Mar. 21, 2026:** Ramadan (Sundown to Sundown) | 18<br>National Battery Day | 19 | 20 | 21 |
| 22<br>**Feb. 22–28, 2026:** National Engineers Week | 23<br>**Feb. 23–27, 2026:** National Invasive Species Awareness Week | 24 | 25 | 26 | 27 | 28<br>National Science Day |

EARTH SCIENCE WEEK

**Share how you celebrate Earth Science Week (ESW) and provide feedback on the ESW Toolkit by completing the survey linked in the QR code. Fifty respondents will be selected to receive a free 2026 ESW Toolkit!**

## ▶ Small Island Developing States Global Data Hub

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This resource provides data on sustainable development of small island developing states (SIDS), specifically focused on environmental, economic, and social challenges. Students can explore country-specific and thematic data to understand the unique struggles that island nations face in maintaining environmental health, economic stability, and human well-being. This resource is an excellent tool for teaching about the vulnerabilities of island nations and their strategies for sustainable development: https://sids.sdg.org/.

▶ **SDG Connections:**

14 LIFE BELOW WATER

15 LIFE ON LAND

LEARNING ACTIVITY:

# Solution Mining for Uranium

## GRADES 7–12

### MATERIALS

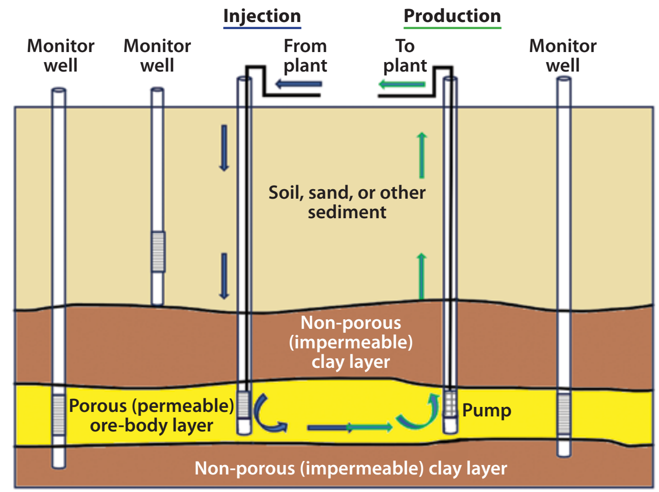
- Large container like a plastic tub or aquarium
- Washed sand (moistened)
- Clay (very fine sediment, moistened)
- Light-colored soil, sand, or other sediment
- Salt (NaCl) with coarse crystals (deicing salt)
- Water
- Pipettes or small syringes
- Large and small diameter straws
- Heat-safe petri dishes
- Heat source (e.g., hot plate)

**SAFETY NOTE:** This activity uses a heat source and should be conducted with adult supervision.

SME FOUNDATION
MEC
MINERALS EDUCATION COALITION

Source: Minerals Education Coalition.

Nuclear energy is used around the world to generate electrical power in a way that does not produce greenhouse gases. Its use is predicted to grow in the coming years. This will increase the demand for uranium, which is mined for medical, industrial, and defense purposes, in addition to producing nuclear energy. Although it is mined in several ways, most uranium in the U.S. is mined by solution mining. This activity models the primary steps of solution mining for uranium.




**A diagram showing injection wells for solution mining. Access the full-size image at: https://bit.ly/solution-mining-diagram.**

Credit: Modified from Heathgate Resources and world-nuclear.org

## PROCEDURE

1. Mix 1 part salt crystals into 5 parts of sand.
2. In a large bin, make 3 2-inch thick layers: clay (brown layers in diagram), sand/salt (yellow layer). The salt/sand layer represents an "orebody" containing soluble uranium minerals.
3. Fill the rest of the bin with a light-colored sand or other sediments.
4. Insert large diameter straws on a 2-inch-square grid pattern through the top layers and into the orebody, simulating drilling wells into a uranium deposit.
   a. Leave the large straws in place to hold the holes open.
   b. Use a smaller straw to remove most of the sediment from each drill hole.
5. Label alternate rows of wells "injection" and "production."
   a. Using a pipette, slowly add water to the injection holes, allowing the salt to dissolve. In uranium mining, a carbonated or mildly acidic solvent is used to dissolve uranium minerals.
   b. After allowing time for the solution to migrate, use the pipette to carefully extract brine from the production holes. This simulates uranium-bearing solution being pumped to the surface.
6. Transfer the brine to shallow dishes on a heat source to evaporate the water and leave the dried salt behind. Likewise, uranium-bearing solution must be processed to extract the uranium.

## ANALYSIS

1. Discuss the pros and cons of solution mining versus surface or underground mining (e.g., ecosystem impacts, water quality).
2. Study where uranium is mined in the U.S. at **https://on.doi.gov/4cn4bzD**.

## FURTHER STEPS

Go to **https://MineralsEducationCoalition.org/esw** for the additional activities in MEC's "Rockin' Energy: Uncovering the Power of Minerals and Rocks" unit.

Use the teacher search tool at **https://MineralsEducationCoalition.org/standards** for correlations to national and state standards.

## NGSS CONNECTIONS

**SEP:** Developing and Using Models

**DCI:** ESS2.A: Earth's Materials; ESS3.B: Natural Resources

**CCC:** Influence of Science, Engineering, and Technology on Society and the Natural World

## SDG CONNECTIONS

**8:** Decent work and economic growth

**9:** Industry, innovation, and infrastructure

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1<br>**Mar. 1–7, 2026:**<br>**Weights and Measures Week** | 2 | 3<br>**World Wildlife Day** | 4<br>**World Engineering Day for Sustainable Development** | 5 | 6<br>**World Energy Efficiency Day**<br>**Total Lunar Eclipse**<br>(Asia, Australia, Pacific Islands, Americas) | 7 |
| 8<br>**International Women's Day**<br>**Daylight Saving Time Begins** | 9<br>**Mar. 9–15, 2026:**<br>**National Groundwater Awareness Week** | 10 | 11<br>**Solar Appreciation Day** | 12<br>**National Plant a Flower Day** | 13 | 14 |
| 15 | 16 | 17<br>**National Ag (Agriculture) Day**<br>**St. Patrick's Day**<br>**Mar. 17–21, 2026:**<br>**Geoscience Event:**<br>AAG Annual Meeting, American Association of Geographers, San Francisco, California | 18<br>**Global Recycling Day**<br>**National Biodiesel Day** | 19<br>**Mar. 19–20, 2026:**<br>**Eid-al-Fitr**<br>(Sundown to Sundown) | 20<br>**Vernal Equinox** | 21<br>**International Day of Forests** |
| 22<br>**World Water Day** | 23<br>**World Meteorological Day** | 24 | 25 | 26 | 27 | 28<br>**Earth Hour Day, Switch Off Lights for One Hour,**<br>8:30 PM Local Time<br>**Mar. 28–Apr. 5, 2026:**<br>**STEM Week** |
| 29 | 30 | 31<br>**International Transgender Day of Visibility** | | | | |

## ▶ World Resources Institute's Aqueduct Tools and Water Risk Atlas

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This platform provides comprehensive data on water-related risks, such as flood, drought, and freshwater supply. Through interactive maps, students can explore global, national, and sub-national data on water availability and quality, helping them understand regional challenges related to water access, food security, and sanitation: **www.wri.org/aqueduct**.

▶ **SDG Connections:**

3 GOOD HEALTH AND WELL-BEING

6 CLEAN WATER AND SANITATION

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**March 2026**

LEARNING ACTIVITY:

# More Power to You!

GRADES 7–10

MATERIALS
- Computer with internet access

**Coal.**
©Shutterstock/Nordroden

**Uranium.**
©Getty Images/iStockphoto/RHJ

Energy and access to it is the bedrock of the modern world, powering everything from industries and cities to your school and home. Have you ever wondered where the energy that powers your school comes from? Or where Earth's natural energy materials, such as coal and uranium, originate? In this activity, you will explore an interactive map to identify energy resources, energy infrastructure, and the connections between them.

## PROCEDURE

1. Go to the U.S. Energy Atlas Energy Infrastructure and Resources: **https://bit.ly/energy-atlas**.
   a. To the right of the map, click the second button down to explore the map's legend.
   b. Click on the button below the legend icon to display map layers. To the right of each item is an "eye" icon that turns layers on and off. Turn off all layers.
2. Coal is a readily combustible, carbon-based sedimentary rock that can be used to generate electricity and release heat.
   a. Turn on layers: "All Coal Mines" and "Fossil Resources". In "Fossil Resources," turn off the "Tight Oil and Shale Gas Plays" and "Sedimentary Basin" sublayers.
   b. Read the legend to see what each color and symbol represents. Write 2–3 observations of the distribution of coal and mine locations in the U.S.
   c. Turn off all layers.
3. Uranium is a radioactive element found in igneous and sedimentary rocks and is a common fuel source for nuclear power plants.
   a. Turn on layers: "Uranium Production" and "Uranium Resources".
   b. Read the legend then write 2–3 observations on the distribution and use of uranium in the U.S.
   c. Turn off all layers.
4. Power plants can convert Earth's natural energy materials, such as coal and uranium, to electricity and energy for our modern world.
   a. Click on the magnifying glass on the upper left of the map and type your school's address.
   b. In the layer list, turn on "All Power Plants".
   c. Zoom out until you see power plants near your school. Double-click each icon to identify the "primary source" of energy at each power plant. Write 2–3 observations about the power plants that may provide energy to your school.

**Thermoelectric plant.**
Credit: USGS, Public Domain

## ANALYSIS

1. Just because a power plant is nearby doesn't mean it necessarily provides energy to your school. Do you know what type of energy powers your school? If not, reach out to your building facilities team to learn more.
2. Zoom out to explore the types of energy used by the U.S. by looking at the "All Power Plants" layer. You may want to look at each sublayer one at a time.
   a. Where do you find different types of energy in our country?
   b. What factors do you think influence the distribution of each energy source?
   c. What infrastructure exists to transport energy?

## FURTHER STEPS

Explore other energy resources such as natural gas or solar energy. Consider how energy needs for the U.S. might change over the next 10 years. If you were to decide, which types of energy would you want to see used and why?

## NGSS CONNECTIONS

**SEP:** Analyzing and Interpreting Data
**DCI:** ESS3.A: Natural Resources
**CCC:** Patterns

## SDG CONNECTIONS

**4:** Quality education
**7:** Affordable and clean energy

USGS science for a changing world

**Source: U.S. Geological Survey.**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 National Garden Month<br>National Walking Day<br>Apr. 1–9, 2026: Passover (Sundown to Sundown) | 2 | 3 National Find a Rainbow Day | 4 |
| 5 National Read a Road Map Day | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 Big Wind Day | 13 | 14 | 15 April 15–18, 2026: **Education Event:** NSTA National Conference on Science Education, National Science Teaching Association, Anaheim, California | 16 | 17 | 18 International Day for Monuments and Sites<br>Apr. 18–26, 2026: National Park Week |
| 19 | 20 | 21 World Creativity and Innovation Day | 22 Earth Day | 23 | 24 Arbor Day | 25 |
| 26 National Richter Scale Day | 27 | 28 | 29 | 30 Apr. 30-May 4, 2026: **Geoscience Event:** National Science Bowl, U.S. Department of Energy Office of Science, Washington D.C. | | |

## ▶ U.S. Energy Information Administration's Energy Atlas

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This mapping tool allows students to view energy infrastructure throughout the U.S. Students can use the maps to examine the distribution of energy resources across communities and industries, which helps explain the complexity of energy access and sustainability in the U.S. This resource supports learning about sustainable energy systems and how energy is produced and used: https://atlas.eia.gov/pages/energy-maps.

▶ **SDG Connections:**

7 AFFORDABLE AND CLEAN ENERGY

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

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LEARNING ACTIVITY:

# Your School's Energy Use

GRADES 3–6

## MATERIALS

- Construction paper (darker colors recommended)
- Scissors
- Windows that are easily accessible
- Painter's tape
- Scotch tape
- Window tint film
- Plastic sandwich bags (optional)
- Sunscreen (optional)

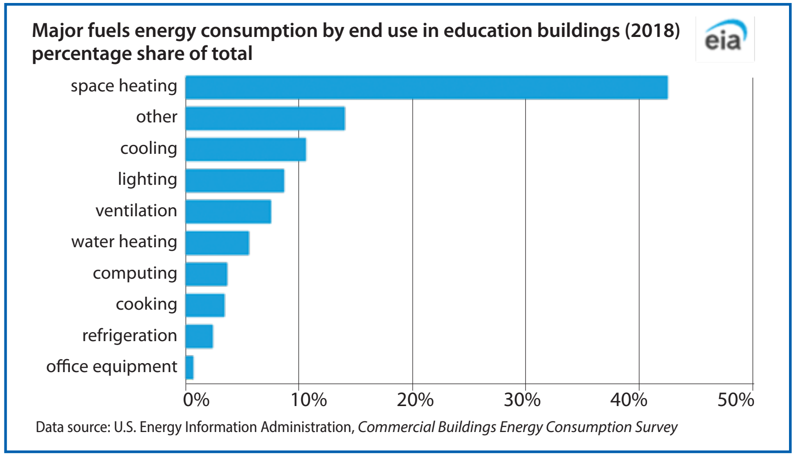
Did you ever think about how much energy (electricity) your school uses? Make a list of all the things you can think of in your school that use energy. Look at the graph of energy use in schools to help you add to your list. Why do you think space heating requires so much energy compared to the other "end uses" shown on the graph? What about your school building might affect how much energy is used to heat it? Where might heat be lost from the building? This activity will allow you to explore one factor that can affect energy consumption related to heating and cooling buildings.

## PROCEDURE

1 Cut a piece of construction paper into various shapes. Use scotch tape to secure these shapes to another whole piece of construction paper.
  a. Tape the construction paper to a window with the shapes facing the window.
  b. Optionally, use windows that get different amounts of direct sunlight.
2 Wait two days and remove the construction paper from the windows. Then, carefully remove the shapes. What do you notice?
3 With permission, cover a portion of the window(s) you used in step 1 with window tint film.
4 Tape a piece of construction paper onto the window(s) so that half of it overlaps with the window tinting.
5 Wait two days, then remove the construction paper. What do you notice?

## ANALYSIS

1 Describe how tinting windows affects the energy transfer between the environment and your school.
  a. What evidence do you have that energy from the sun affects things through the window?
  b. How do you think tinting the windows in your school would affect energy use for heating and cooling? Explain your answer.
2 Watch a video about energy-efficient building modifications: **https://bit.ly/energy-efficient-mods**. Describe two changes that could be made in your school to reduce energy use in the building.




Credit: **www.eia.gov/consumption/commercial/pba/education.php**

## FURTHER STEPS

Watch a webinar on how AGU has made changes to its building (including triple-pane, auto-tinting windows!) in Washington, D.C. to improve energy efficiency and become Net Zero: **https://bit.ly/AGU-NetZero**.

## NGSS CONNECTIONS

**SEP:** Planning and Carrying Out Investigations
**DCI:** PS3.B: Conservation of Energy and Energy Transfer
**CCC:** Energy and Matter

## SDG CONNECTIONS

**4:** Quality education
**7:** Affordable and clean energy

AGU
ADVANCING EARTH AND SPACE SCIENCES

**Source: American Geophysical Union.**
Developed by Lindsay Mossa, AGI.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | 1<br>National Inventors Month<br>American Wetlands Month<br>National Space Day | 2 |
| 3<br>May 3–9, 2026:<br>Teacher Appreciation Week | 4<br>May 4–10, 2026:<br>Air Quality Awareness Week<br>May 4–10, 2026:<br>International Compost Awareness Week | 5<br>National Teachers' Day<br>Cinco De Mayo | 6 | 7 | 8<br>National Public Gardens Day | 9 |
| 10<br>Mother's Day | 11 | 12 | 13 | 14 | 15 | 16<br>Endangered Species Day<br>Armed Forces Day |
| 17 | 18<br>International Astronomy Day<br>International Museum Day | 19 | 20 | 21 | 22<br>International Day for Biological Diversity | 23 |
| 24 / 31 | 25<br>Federal Holiday:<br>Memorial Day | 26 | 27 | 28 | 29<br>Learn About Composting Day | 30 |

## ▶ Worldview, NASA Earthdata

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This interactive map allows students to explore over 1,200 global, full-resolution satellite imagery layers that relate to all of Earth's systems. Students can visualize natural events such as wildfires, hurricanes, and floods, and observe changes in near-real-time. Worldview also offers the ability to create and share visualizations, making it a powerful resource for supporting lessons related to climate, ecosystems, and sustainable cities: **www.earthdata.nasa.gov/data/tools/worldview**.

**▶ SDG Connections:**

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

LEARNING ACTIVITY:

# Locating Subsurface Energy Resources

## GRADES 6–12

### MATERIALS

- Computer with internet access
- Tracing paper and pencils or acetate sheets and dry-erase markers
- Printer access (color ink optional)

**Outcrop in Brazil.**
Credit: Fabin et al., 2018, CC BY 4.0, via Wikimedia Commons

Geophysical techniques are used to identify subsurface formations related to valuable energy resources, such as fossil fuels or geothermal sources, as well as rock layers that could be used for carbon sequestration. Each geophysical technique transmits a specific type of energy into the ground (e.g., electrical, magnetic, or mechanical) to create images of subsurface rock formations. For example, seismic surveys send sound waves through the ground, and the reflection of these waves helps detect differences in the Earth's subsurface (see video at: **https://on.doi.gov/44FMR7a**). Images created from seismic surveys are called seismic profiles, which can be interpreted to identify subsurface formations, such as saline aquifers where carbon dioxide could be injected and stored. This activity will introduce you to the interpretation of seismic profiles to consider how they could be used during exploration to locate saline aquifers.

## PROCEDURE

1. Print an image of an outcrop at: **https://bit.ly/outcrop**.
   a. Place tracing paper or acetate over it.
   b. Trace over the areas where you notice differences in the layers.
2. The image you created on the tracing paper is like a seismic profile, showing the boundaries between subsurface features like rock type, angle, and density.
3. Go to the image source to see where scientists have noted changes in the shown outcrop (image b): **https://bit.ly/outcrop**.
4. Open a video tutorial on seismic profile interpretation: **https://bit.ly/Seismic-Interpretation-Butler**.
   a. Make the video full screen and pause it to take a screenshot of the seismic profile. Print the image, if possible.
   b. Repeat steps 1a-b with this image to indicate subsurface features. Alternatively, use an image editing program to annotate the profile.
   c. Skip to time 12:30 in the video to see the features noted on the seismic profile. How do your annotations compare?
   d. Optionally, watch the video to see an explanation of the features, or repeat these steps with another video to look at a variety of subsurface features.

## ANALYSIS

1. Imagine you are a geologist tasked with interpreting the seismic profile you traced in Step 1. What conclusions can you draw about the geological history of the area based on the changes in subsurface features you identified?
2. Learn more about carbon capture and storage at: **https://bit.ly/CCS_British-Geological-Survey**. Go to the section titled "Carbon dioxide storage" and read "Saline aquifers".
   a. How do you think the properties of rocks that hold saline aquifers affect the speed at which seismic waves travel through them? How would this help in the identification of saline aquifers? Explain your answer.
   b. The water in many saline aquifers is confined, meaning that it is surrounded by rock that helps hold the saltwater in place. How do you think the properties of these rocks differ from the rock layers that hold the saline aquifer.

## FURTHER STEPS

Annotate seismic profiles that show saline aquifers: **https://bit.ly/SEG-EVOLVE** (scroll down to "Learn More" to find a K–12 education pdf).

Watch a short video on advancements in seismic surveys used to find energy resources: **https://exxonmobil.co/433crle**.

## NGSS CONNECTIONS

**SEP:** Analyzing and Interpreting Data
**DCI:** PS4.C: Information Technologies and Instrumentation; ESS2.B: Plate Tectonics and Large-Scale System Interactions
**CCC:** Patterns

## SDG CONNECTIONS

**7:** Clean and affordable energy
**9:** Industry, innovation, and infrastructure

SEG EVOLVE

**Source: Society for Exploration Geophysicists.**
Developed by Lindsay Mossa, AGI.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | 1<br>National Great Outdoors Month<br>National Rivers Month<br>World Reef Awareness Day | 2 | 3 | 4 | 5<br>World Environment Day | 6<br>World Green Roof Day<br>National Caves and Karst Day<br>National Trails Day |
| 7<br>**June 7–8, 2026:**<br>**Geoscience Event:**<br>International Conference on Environmental Sciences (ICES), San Francisco, California | 8<br>World Oceans Day | 9 | 10 | 11 | 12 | 13 |
| 14<br>Flag Day | 15<br>Global Wind Day | 16 | 17<br>World Day to Combat Desertification and Drought | 18<br>Sustainable Gastronomy Day<br>National Dump the Pump Day | 19<br>Federal Holiday: Juneteenth | 20 |
| 21<br>Summer Solstice<br>World Hydrography Day<br>Father's Day | 22<br>World Rainforest Day | 23 | 24<br>National Upcycling Day | 25 | 26<br>June 26–27, 2026:<br>Eid al-Adha<br>(Sundown to Sundown) | 27 |
| 28 | 29 | 30<br>International Asteroid Day<br>National Meteor Watch Day | | | | |

## ▶ National Energy Technology Laboratory's Carbon Capture and Storage (CCS) Database

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This interactive platform can be used by students to explore global efforts in capturing and storing carbon dioxide. This resource provides detailed information on over 300 CCS projects across more than 30 countries, including active, proposed, and terminated initiatives. Students can use the interactive map to examine the technologies employed the and geographical distribution of these projects. This tool supports discussions on climate change mitigation strategies and the role of technology in achieving sustainable energy goals: **https://bit.ly/CCS-database.**

▶ **SDG Connections:**

7 AFFORDABLE AND CLEAN ENERGY

13 CLIMATE ACTION

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www.americangeosciences.org

**June 2026**

LEARNING ACTIVITY:

# Energy Consumption and $CO_2$: Analyzing Trends

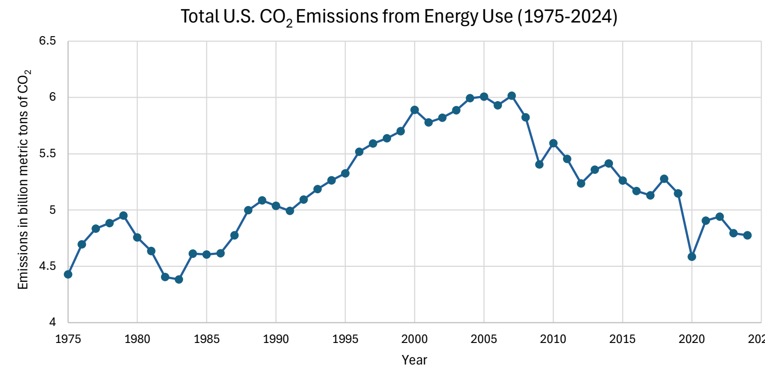
## GRADES 6–12

### MATERIALS

- Computer with internet access

Credit: Photo by Koushik Pal on Unsplash

Human beings rely on energy. We heat and cool our homes, move ourselves from place to place, transport supplies overseas, land, and through air, and produce the things we need to live and work around the world. The sources of energy we use (e.g. fossil fuels, renewables, nuclear) play a key role in how $CO_2$ emissions change over time. Decreasing $CO_2$ emissions is a goal of the United Nations Net-Zero Coalition. Many countries are striving for a 45% reduction in global carbon emissions by 2030. In this activity, you will make a claim supported by energy data as evidence to argue for one strategy for reducing $CO_2$ emissions to consider how we might accomplish this goal in the U.S.




Data Source: U.S. Energy Information Administration

## PROCEDURE

1. Use an interactive graph to explore U.S. energy consumption: **https://bit.ly/US-energy-consumption.**
2. During the last 50 years, $CO_2$ emissions have changed in the U.S.
   a. Describe the trend of $CO_2$ data in the U.S. from 1975–2024 using the graph on this page.
   b. Consider three major world events and describe how $CO_2$ emissions changed during and after each event:
      - Oil Crisis, 1979–1980
      - Global Financial Crisis, 2008–2009
      - COVID-19 Outbreak, 2019–2023
   c. Compare the graphs of energy consumption and $CO_2$ emissions.
3. Describe trends of $CO_2$ emissions by energy source in the U.S.: **https://bit.ly/CO2-by-energy-source**.
4. The U.S. is the largest per capita $CO_2$ emitter in the world.
   a. Explore this chart: **https://bit.ly/US-energy-chart**.
   b. What sources and sectors contribute to $CO_2$ emissions?

## ANALYSIS

1. **Background:** Write something you learned about energy consumption in the U.S.
2. **Claim:** Make a claim about how you might reduce $CO_2$emissions based on the data you analyzed.
3. **Evidence:** Share energy data that provides evidence for your claim.
4. **Societal Implications:** Consider the sectors that would be impacted by your plan to reduce $CO_2$ emissions. Are there other methods for carbon mitigation that you might consider?

## FURTHER STEPS

This activity was developed by the ESIP Education Committee which promotes the use of Earth science data with students (**https://bit.ly/ESIP-edu-committee**) and is based on material from the Evaluating Sources and Claims project, an IGES project. Learn more at **https://serc.carleton.edu/mel/index.html**.

## NGSS CONNECTIONS

**SEP:** Analyzing and Interpreting Data, Engaging in Argument from Evidence
**DCI:** ESS3.D: Global Climate Change
**CCC:** Patterns; Cause and Effect; Energy and Matter

## SDG CONNECTIONS

**7:** Affordable and clean energy
**13:** Climate action

ESIP

INSTITUTE for GLOBAL ENVIRONMENTAL STRATEGIES

**Source: Earth Science Information Partners.**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 Plastic Free July | 2 | 3 | 4 Federal Holiday: Independence Day<br>America's 250th Anniversary |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 International Rock Day | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 Parents' Day | 27 | 28 World Nature Conservation Day | 29 Rain Day | 30 | 31 | |

## ▶ U.S. Climate Resilience Toolkit

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

This toolkit offers national data and resources to help identify climate-related risks and enhance resilience. With open data from both federal and non-federal sources, students can use this tool to explore hazards like wildfires, droughts, and extreme weather conditions. The platform's searchable dashboard provides localized information, making it a great resource for teaching about how different regions in the U.S. are adapting to current and projected climate conditions: **https://resilience.climate.gov/**.

▶ **SDG Connections:**

13 CLIMATE ACTION

15 LIFE ON LAND

# WHAT IS EARTH SCIENCE WEEK?


The American Geosciences Institute has organized this annual international event since 1998 to help people better understand and appreciate the earth sciences and to encourage responsible stewardship of the planet. Earth Science Week takes place October 12–18, 2025, celebrating the theme "Energy Resources for Our Future".

Visit the Earth Science Week website — **www.earthsciweek.org** — to learn more about how you can become involved, events and opportunities in your community, the Earth Science Week newsletter, highlights of past Earth Science Weeks, and how you can order an Earth Science Week Toolkit.

You are invited to help keep the spirit of Earth Science Week alive all year long by posting this calendar in your classroom, office, or home. Whoever you are and wherever you go, you can celebrate earth science!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**www.americangeosciences.org**


AGI american geosciences institute
connecting earth, science, and people

## AGI MEMBER SOCIETIES

AASP - The Palynological Society
American Association of Geographers
American Association of Petroleum Geologists
American Geophysical Union
American Institute of Hydrology
American Institute of Professional Geologists
American Meteorological Society
American Rock Mechanics Association
Association for the Sciences of Limnology and Oceanography
Association for Women Geoscientists
Association of American State Geologists
Association of Earth Science Editors
Association of Environmental & Engineering Geologists
Clay Minerals Society
Council on Undergraduate Research
Environmental and Engineering Geophysical Society
Geo-Institute of ASCE (American Society of Civil Engineers)
Geochemical Society
Geological Association of Canada
The Geological Society of America
The Geological Society of London
Geoscience Information Society
History of Earth Sciences Society
International Association for Geoscience Diversity
International Association of Hydrogeologists/ U.S. National Chapter
International Medical Geology Association
Karst Waters Institute
Mineralogical Society of America
Mineralogical Society of the UK and Ireland
National Association of Black Geoscientists
National Association of Geoscience Teachers
National Association of State Boards of Geology
National Cave and Karst Research Institute
National Earth Science Teachers Association
National Speleological Society
North American Commission on Stratigraphic Nomenclature
Paleontological Research Institution
Paleontological Society
Petroleum History Institute
Seismological Society of America
SEPM, Society for Sedimentary Geology
Society for Mining, Metallurgy & Exploration
Society of Economic Geologists
Society of Exploration Geophysicists
Society of Mineral Museum Professionals
Society of Vertebrate Paleontology
Soil Science Society of America
United States Permafrost Association

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## EARTH SCIENCE WEEK

October 12–18, 2025

## FUTURE DATES

October 11–17, 2026
October 10–16, 2027
October 8–14, 2028



Earth Science Week Staff: Edward Robeck, Lauren Brase, Sequoyah McGee, Lindsay Mossa
Design: Brenna Tobler/AGI



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