

Lesson Five: Powering Up the Country

Grade Level: 4th Grade

Time: 45-60 minutes

Essential Question: How can we be stewards of Wyoming's minerals and energy to benefit current and future generations?

Objective: Students will identify renewable and nonrenewable resources.

Purpose: Students learn the difference between renewable and nonrenewable resources and how they both relate to stewardship.

Required Materials/Resources:

- Introductory options:
 - Non-renewable energy slideshow. (Source 1) - This is a slideshow that you can go through at your own pace.
<http://www.nationalgeographic.org/encyclopedia/non-renewable-energy/>
 - Video:
<https://www.youtube.com/watch?v=pBTnVoElb98>
Stop Motion Film: Renewable vs NonRenewable Energy Sources (Source 2) *Video length: 4 minutes 17 seconds*
- Energy Consumption in the U.S. worksheet (one per student) (Source 3)

TEACHER NOTE:
The U.S. mix of energy production changes from year to year. The most current statistics can be found at the U.S. Energy Information Administration website
https://www.eia.gov/energyexplained/?page=us_energy_home (Source 3).
An optional additional activity is that students can use the data in the chart to create their own graphs rather than looking at those provided.

- Energy Consumption/Production graphs (optional) - (one set to display) (Source 3)
- Mineral and Natural Resource cards from Lesson 3 (one card from each of the six energy resources per small group)
- Energy Sort page (one per small group)
- Renewable or Nonrenewable? graphic organizer (one per student)
- Exit ticket (one per student)

Suggested Teacher Preparation:

- View introductory options and select one.
- Prepare card sets for small groups. Each group will receive a total of six cards.
- Assign students to groups.

Standards:

Science: 4-ESS3-1 (Explicit)

ELA: 4.SL.1.d (Practiced/Encountered)



Vocabulary:

- **Conservation** - the careful utilization of a resource in order to prevent waste and leave some for future generations
- **Nonrenewable resources** - resources that cannot be replenished (made again) in a short period of time
- **Renewable resources** - resources that are capable of being replenished

Instructional Procedure/Steps:

1. Display chosen introductory option as a warm up.
2. Review vocabulary and key concepts from previous lessons. Students can reference the posters that they created. Assign students to small groups.
3. Pass out sets of the Mineral & Natural Resources cards from Lesson 3 and one copy of the Energy Sort page to each group. Groups sort their cards. When groups are finished, discuss as a whole group the placement of each

resource and why it belongs in the category that it does.

4.  Pass out the Energy Consumption in the U.S. worksheets. Have students analyze the data and discuss their takeaways. The teacher can then opt to display the Energy Consumption/Production graphs as an additional tool for building student understanding of what portion of our energy comes from each source.
5.  Reconvene the whole class, and have students discuss/share their observations of the data. Ask: **“What are the implications of having such a large portion of our energy coming from nonrenewable sources?”** If necessary, review meanings of the vocabulary terms conservation and stewardship.
6. Pass out the Renewable or Nonrenewable? graphic organizers and draw students’ attention to the conservation. Remind students of their presentations from a previous lesson and to include any stewardship efforts that they learned about when they did their research. (e.g., part of the process for mining coal is reclaiming the land after the mine is no longer in use.)
7. After students have completed their graphic organizers, have students pick a nonrenewable resource and conservation idea from their sheet. Have students turn and talk to a partner or visit with a small group explaining why it is important.
8. Pass out and have students complete an exit ticket to demonstrate their understanding of renewable and nonrenewable resources.

Assessment: Collect completed Renewable or Nonrenewable? graphic organizers, and check for student understanding of conservation. Collect exit tickets, and check for student understanding of renewable and nonrenewable resources.



In this task, students will be engaged in the higher order thinking skills of analysis.



In this task, students will be engaged in the higher order thinking skills of synthesis.

Credits/Sources:

1. Morse, E. National Geographic. (2013, February 14). *Non-renewable energy*. Retrieved June 26, 2017, from <https://www.nationalgeographic.org/encyclopedia/non-renewable-energy/>
2. Crabtree, R. (2012, February 6). *Stop Motion Film: Renewable vs NonRenewable Energy Sources*. Retrieved June 26, 2017, from <https://www.youtube.com/watch?v=pBTnVoElb98>
3. U.S. Energy Information Administration-EIA. (2017, May 19). *Americans use many types of energy*. Retrieved October 2, 2018, from https://www.eia.gov/energyexplained/?page=us_energy_home