Lesson Summary

Students will be able to use precise language and scientific vocabulary related to energy to inform others about energy use and conservation. They will complete a RAFT task to demonstrate their understanding of the concepts, using facts and details to support their claims. We use a task often used in Differentiated Instruction called a RAFT, an acronym that corresponds to the choices that students make about their Role, Audience, Format, Topic in doing the assignment.

Approx. total time: two 45-minute blocks (this lesson can be completed during ELA/writing time)

Standards

NGSS Disciplinary Core Ideas

ESS3.A: Natural Resources

Energy and fuels that humans use are derived from natural sources. Some resources are renewable over time, and others are not.

PS3.B: Conservation of Energy and Energy Transfer

Energy is present whenever there are moving objects, sound, light, or heat. Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2), (4-PS3-4)

PS3.D: Energy and Chemical Processes and Everyday Life

The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use.

NGSS Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts.
NGSS Crosscutting Concepts

Energy and Matter
Tracking energy and matter flows into, out of, and within systems helps one understand their system’s behavior.

Common Core State Standards

ELA-Literacy.W.4.1.b
Provide reasons that are supported by facts and details.

ELA-Literacy.W.4.2.d
Use precise language and domain-specific vocabulary to inform about or explain the topic.

Objectives

By the end of the lesson, students will

Know (facts/information):
- Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2)

Understand (concepts, big ideas):
- Limited amounts of natural resources are available on earth. Each decision we make about our use of natural resources can have positive or negative impacts on the environment, the economy and other people.
- Kids can use their skills and knowledge to improve our world (or their community) by engaging in a service-learning project.

Be able to do (skills/behaviors/ scientific and engineering practices):
- Use precise language and scientific vocabulary related to energy in context to inform or explain about the topic
- Clearly communicate scientific concepts to an audience in a creative way

Vocabulary

- energy source: a material such as coal, gas, oil, or wood used to produce electricity
- fossil fuels: energy sources that can come from dead plants and animals that have been buried for millions of years. They can be found in solid (coal), liquid (petroleum) and gas (natural gas) states.
- non-renewable resource: a resource that cannot be easily made or replaced naturally in our lifetime
- renewable resource: a resource that can be replaced or restored naturally in a lifetime
3.6 ENERGY & RESOURCES RAFT

Materials

- Teacher Materials:
  - Key Vocabulary Charts (student definitions from throughout the unit)
  - Active Listening, Respectful Communication and Giving/Receiving Feedback anchor charts for reference
- Student Materials:
  - Energy and Resources RAFT handout (2-sided printing for quick reference)
  - Energy in the Future handout
  - Laptop computers (optional)
  - Paper, pencils

Instructional Strategies

Link to Prior Knowledge (10 minutes)

Review and discuss prior energy lessons and vocabulary using anchor chart. Introduce the idea of a RAFT.

As a whole group, ask students to reflect on what they have learned about in previous lessons. Guide their thinking by referencing the What We Have Learned about Energy anchor chart from Lesson 3.4. Ask students if they have anything else to add.

Instruction (40 minutes)

In this lesson, we use a task often used for differentiated instruction called a RAFT. The acronym that corresponds to the choices that students make about their Role, Audience, Format, Topic in doing the assignment (Tomlinson, 2003).

Review directions for the RAFT activity.

Let’s read over the RAFT handout together. Remember that Role means your point of view for the activity, Audience is who you pretend you are writing to, Format is what genre or type of writing you will do (presentation, poem, etc.) and Topic refers to what you will write about.
Read RAFT directions as a class. The goal of the RAFT is to express a more detailed concept about energy in a new, creative way that helps others think about the big picture—responsible energy use. Next, hand out and review the rubric with students. Talk with students about how they will consider the perspective of their chosen audience. How can they communicate their information to that audience so that they understand it?

I would like you to include four or more vocabulary words in your final product. You can use your vocabulary cards and charts you see around the room if you need help to remember meanings of key words. You can also do a little extra research to extend your learning and add new details. Be prepared to share your RAFT with a few classmates. Let’s take a look at the rubric together so that you know how you’ll be assessed on your final product.

Guide students in choosing a RAFT activity.

Some of the choices may be easier to complete successfully than others. Students with limited writing skills may enjoy working on a poster about conserving electricity, or a cartoon that teaches about energy resources. Modify the RAFT task if needed to simplify or add challenge for the students you work with.

Support students as they complete a RAFT activity of their choice.

Give students time to work on their RAFT. Decide if you want them to use laptops for a final draft, or just do written work in their notebooks.

Students may need more than one class to finish their RAFT activity. Some students may need additional scaffolding for their writing. Use strategies they are familiar with for planning writing such as a bubble map, sentence frames or an outline to plan what they will say.

Refer to any routines your class has for drafting, revising and editing writing. If time permits, allow students to edit each other’s RAFTS and revise before finalizing them. Decide whether you’d rather have them share in rough draft form with each other, or after they are finalized.

Allow students to share their work with others.

If your students would enjoy sharing their work with each other, and you have time for this during ELA or science, allow them to share with partners, in a small group, or a few at a time with the whole group. Encourage them to use active listening skills, communicate respectfully, and give each other positive feedback and constructive criticism. Refer to anchor charts as needed.

Closing (5 minutes)

Provide feedback to the group on what you noticed about their RAFTs, and give them a preview of tomorrow’s lesson.

Take a few minutes to give your students feedback on their RAFTS, using the rubric to guide you. Let students know that they have identified many important energy problems, and add any new ones that emerged from the RAFT task. Tomorrow, students will begin work tomorrow on choosing one that they’d like to solve with the class.
3.6 ENERGY & RESOURCES RAFT

Assessment

See rubric for assessing RAFT products.

References


Planning Page

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**Instruction (40 minutes)**

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ENERGY AND RESOURCES
RAFT

RAFT Science Assessment

Directions: Show what you’ve learned about energy and natural resources! You can pick a way to show what you know to a pretend audience (and your teacher and classmates). Follow the steps below to create a RAFT. Your final product should show that you understand a problem with energy or resource use.

1) Read the choices for a:
   - ROLE (who you will be as you write)
   - AUDIENCE (who you would like to share your knowledge with)
   - FORMAT (what style of writing you will use)
   - TOPIC (what you want to tell about)

   Choose one row for your project.

2) Brainstorm ideas for your RAFT using a strategy you like – an outline, graphic organizer, etc.

3) As you write, include four or more vocabulary words we have learned in this unit on energy and resources. See the list below. Be sure to use your own words (paraphrase) as you write – don’t copy words that have been written by others on websites or in books. You are becoming an expert on energy and resources, and we want to hear YOUR ideas.
   - energy source
   - system
   - non-renewable resource
   - renewable resource
   - fossil fuel
   - transportation
   - energy conservation
   - solar energy
   - wind energy
   - biomass energy
   - hydropower
   - coal
   - natural gas (burned to make heat and electricity)
   - gasoline (used in cars)

4) Before your draft is final, look over the rubric and check to make sure you have met the targets for this assignment!
### 3.6 ENERGY AND RESOURCES RAFT

<table>
<thead>
<tr>
<th>ROLE</th>
<th>AUDIENCE</th>
<th>FORMAT</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartoonist</td>
<td>Everyday citizens</td>
<td>Cartoon</td>
<td>Plan out a message you would like to share about renewable and nonrenewable resources. Make a cartoon with characters that share your message.</td>
</tr>
<tr>
<td>Student</td>
<td>Principal or Business Owner</td>
<td>Letter</td>
<td>Think about one thing a school or a business could do that would help save money on their monthly electricity bill. Write a letter to a principal or business owner telling him or her what needs to be done, and how it will reduce electricity use in the building. Also, tell him/her why it’s important to use less electricity.</td>
</tr>
<tr>
<td>Energy conservation specialist</td>
<td>Everyday citizens</td>
<td>Radio ad or poster</td>
<td>Think about different ways that people use electricity in their daily lives. Choose one activity that uses a lot of electricity to focus on. Write an ad (for a radio or on a poster) that tells people about something they can do to reduce their use of electricity. Make sure to explain WHY they should use less electricity. Help them understand how using less electricity helps the environment and saves money.</td>
</tr>
<tr>
<td>Writer</td>
<td>Television or internet audience</td>
<td>Commercial</td>
<td>You have been asked by an energy company to convince others about why their energy source is best for your community. Choose an energy source that you’d like to “sell,” and write a television commercial that excites others about your energy source. Make sure to be honest and admit to any problems or challenges related to your source. Write a script, and plan to videotape or present your commercial to the class.</td>
</tr>
</tbody>
</table>
# 3.6 ENERGY AND RESOURCES RAFT

## RAFT Rubric

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy of Facts (Are the facts true?)</td>
<td>All facts about energy and resource use are accurate.</td>
<td>Almost all facts about energy and resource use are accurate.</td>
<td>A few facts about energy and resource use are accurate, but some inaccurate information is included.</td>
<td>NO facts about energy are reported OR most are inaccurately reported.</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>Used 4 or more vocabulary words and paraphrased them correctly in your own words.</td>
<td>Used 3 or 4 words, and mostly paraphrased them correctly in your own words.</td>
<td>Used 2 or 3 vocabulary words. Some words are correct, but others are incorrect or seem to be teacher or dictionary definitions.</td>
<td>Used 2 or less words. Did not use many of your own words or use words correctly.</td>
</tr>
<tr>
<td>Voice</td>
<td>You have taken the ideas and made them your own. The RAFT sounds like a smart kid, not a boring grownup!</td>
<td>You have taken the ideas and tried to make them your own. The RAFT mostly sounds like you!</td>
<td>You have made a few of the ideas your own, but some parts sound like they came from grown-ups or websites.</td>
<td>The writing does not sound like you. It sounds like it was copied from other places.</td>
</tr>
<tr>
<td>Writing for your Audience</td>
<td>You make it clear why the issue you write about matters to your audience.</td>
<td>You make it mostly clear why the issue you write about matters to your audience.</td>
<td>You try to make it clear why the issue you write about matters to your audience.</td>
<td>You do not make it clear why the issue you write about matters to your audience.</td>
</tr>
</tbody>
</table>