Oct. Grade 7 Unit 4D: Renew and Nonrenewable resources

Content Area: **Science**
Course(s):
Time Period: **October**
Length: **3 Weeks**
Status: **Published**

Unit Overview

Water is a renewable resource; coal is a non-renewable resource. This concept will introduce you to the different types of renewable and non-renewable resources.

Enduring Understandings

Lesson Objectives

By the end of the lesson, students should be able to:

- Distinguish between renewable and nonrenewable energy resources.
- Compare the advantages and disadvantages of renewable and nonrenewable energy resources.
- Explain the interconnection between science and technology in using energy resources.

Essential Questions

- **Overarching Question**
    - How do Earth's surface processes and human activities affect each other?
- **Focus Question**
    - How do humans depend on Earth's resources?
- **Lesson Questions**
    - What are the differences between renewable and nonrenewable energy resources?
    - What are the advantages and disadvantages of renewable and nonrenewable energy resources?
    - How are science, technology, and energy resources interconnected?
- **Can You Explain?**
    - What are the differences between renewable and nonrenewable energy resources, and what are

the advantages and disadvantages of each type of resource?

Instructional Strategies & Learning Activities

DISCOVERY TECHBOOK LESSONS:

- The Five E Instructional Model

  Science Techbook follows the 5E instructional model. As you plan your lesson, the provided Model Lesson includes strategies for each of the 5Es.

- Engage (45–90 minutes)

  Students consider what energy is and how we get it. They investigate both renewable and nonrenewable sources and begin to formulate ideas around the Can You Explain? (CYE) question.

- Explore (180 minutes)

  Students investigate questions about the differences between renewable and nonrenewable energy sources. They consider the benefits of each and how technology is related to these sources.

- Explain (45–90 minutes)

  Students construct scientific explanations to the CYE question by including evidence of the differences between renewable and nonrenewable resources and the advantages and disadvantages of each.

- Elaborate with STEM (45–135 minutes)

  Students apply their understanding of renewable and nonrenewable resources as they learn about planning a wind farm, investigate the price of electricity, and evaluate renewable energy resources.

- Evaluate (45–90 minutes)

  Students are evaluated on the state science standards as well as Standards in ELA/Literacy and Standards in Math standards using Board Builder and the provided concept summative assessments.

Integration of Career Exploration, Life Literacies and Key Skills

	An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
9.4.8.CI.1	Assess data gathered on varying perspectives on causes of climate change (e.g., cross-

	cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4).
9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
	Multiple solutions often exist to solve a problem.
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
9.4.8.CT.2	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
9.4.8.CT.3	Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
	Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
9.4.8.GCA.1	Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
9.4.8.GCA.2	Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.
	Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
	Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
9.4.8.TL.2	Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
9.4.8.TL.4	Synthesize and publish information about a local or global issue or event (e.g., MSLS4-5, 6.1.8.CivicsPI.3).
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technolgy and Design Integration

Technology is fully integrated using Discovery Techbook.

Interdisciplinary Connections

LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.RST.6-8.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
LA.RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
LA.WHST.6-8.1	Write arguments focused on discipline-specific content.
MA.7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.6-8.4	Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.
LA.WHST.6-8.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
LA.WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
LA.WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
LA.WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

LA.WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

Differentiation

Struggling Students	ELL	Accelerated Students
1. Have students use a T-chart to classify the energy resources discussed in this concept as renewable or nonrenewable. Students can include images of each energy resource. 2. Have students work with a partner to complete a graphic organizer listing the advantages and disadvantages of renewable and nonrenewable resources. Students can create a 2 x 2 chart with columns for the types of resources and rows for advantages or disadvantages of each.	1. Allow students to complete the Spanish versions of the Exploration "Power Up" and the Virtual Lab "How Big Is Your Footprint?" 2. Assist students in identifying familiar prefixes and/or words within words for each glossary term (e.g. *habita*t is from the Latin word *habitare*, which means "it dwells")	1. Instruct students to fill out a 3 Way Venn Diagram to compare three different types of renewable energy resources. 2. Have students complete a T-Chart to illustrate the advantages and disadvantages of different renewable energy resources. 3. Instruct students to research different careers in the energy field that use technology to solve problems related to energy use.

Differentiation in science can be accomplished in several ways. Once you have given a pre-test to students, you know what information has already been mastered and what they still need to work on. Next, you design activities, discussions, lectures, and so on to teach information to students. The best way is to have two or three groups of students divided by ability level.

While you are instructing one group, the other groups are working on activities to further their knowledge of the concepts. For example, while you are helping one group learn the planet names in order, another group is researching climate, size, and distance from the moon of each planet. Then the groups switch, and you instruct the second group on another objective from the space unit. The first group practices writing the order of the planets and drawing a diagram of them.

Here are some ideas for the classroom when you are using differentiation in science:

- Create a tic-tac-toe board that lists different activities at different ability levels. When students aren't involved in direct instruction with you, they can work on activities from their tic-tac-toe board. These boards have nine squares, like a tic-tac-toe board; and each square lists an activity that corresponds with the science unit. For example, one solar system activity for advanced science students might be to create a power point presentation about eclipses. For beginning students, an activity might be to make a poster for one of the planets and include important data such as size, order from the sun, whether it has moons, and so on.

- Find websites on the current science unit that students can explore on their own.
- Allow students to work in small groups to create a project throughout the entire unit. For example, one group might create a solar system model to scale. Another group might write a play about the solar system. This is an activity these groups can work on while they are not working directly with you.

Differentiation in science gets students excited to learn because it challenges them to expand their knowledge and skills, instead of teaching the whole group concepts they have already mastered.

Modifications & Accommodations

Refer to QSAC EXCEL SMALL SPED ACCOMMOCATIONS spreadsheet in this discipline.

Modifications and Accommodations used in this unit:

In addition to differentiated instruction, IEP's and 504 accommocations will be utilized.

Benchmark Assessments

Benchmark Assessments are given periodically (e.g., at the end of every quarter or as frequently as once per month) throughout a school year to establish baseline achievement data and measure progress toward a standard or set of academic standards and goals.

Schoolwide Benchmark assessments:

Aimsweb benchmarks 3X a year

Linkit Benchmarks 3X a year

Additional Benchmarks used in this unit:

Science Benchmarks are given in Dec. and June

Formative Assessments

Assessment allows both instructor and student to monitor progress towards achieving learning objectives, and can be approached in a variety of ways. **Formative assessment** refers to tools that identify misconceptions, struggles, and learning gaps along the way and assess how to close those gaps. It includes effective tools for

helping to shape learning, and can even bolster students' abilities to take ownership of their learning when they understand that the goal is to improve learning, not apply final marks (Trumbull and Lash, 2013). It can include students assessing themselves, peers, or even the instructor, through writing, quizzes, conversation, and more. In short, formative assessment occurs throughout a class or course, and seeks to improve student achievement of learning objectives through approaches that can support specific student needs (Theal and Franklin, 2010, p. 151).

Formative Assessments used in this unit:

See assessments located in the unit link above

Summative Assessments

Summative assessments evaluate student learning, knowledge, proficiency, or success at the conclusion of an instructional period, like a unit, course, or program. Summative assessments are almost always formally graded and often heavily weighted (though they do not need to be). Summative assessment can be used to great effect in conjunction and alignment with formative assessment, and instructors can consider a variety of ways to combine these approaches.

Summative assessments for this unit:

See assessments located in the unit link above

Instructional Materials

See materials located in Unit above.

Discovery Techbook

Teacher made materials

Additonal labs available through NJCTL on line curriculum

Standards

MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. Developing and Using Models Modeling in in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena.
ESS2.A	Earth’s Materials and Systems All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. This energy is derived from the sun and Earth’s hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth’s materials and living organisms. Stability and Change Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.