



#4 Energy and the Environment HWO0 (23-24)

Duration: 6 Weeks, 6 hours
Unit dates: 23rd Aug 2023 - 4th Oct 2023
Subjects: Social Studies, Science, English
Grades: 4

Planning



Transdisciplinary theme

How we organize ourselves

Transdisciplinary theme focus

- societal decision-making
- economic activities and their impact on humankind and the environment



Central idea

Economic decisions can have an impact on the environment



Learner profile attributes

Principled, Reflective



Key concepts

Responsibility, Causation, Connection



Related concepts

Concepts

- **Responsibility:** resources
- **Causation:** economics
- **Connection:** energy



Lines of inquiry

- Economic decisions and the factors that influence them (economics, causation)
- The relationship between energy production/use and the impact on the environment (energy, connection)
- How availability of resources can impact decision-making (resources, responsibility)



Approaches to learning

Research Skills

Research Skills

Research Skills (General)

Teaching the ATL skills

SEL Journeys Unit 4 - Social Awareness



Subject standards

Social Studies

Economics

Economic Decision-Making

- ECO 4.1 - Compare the benefits and costs of individual choices (*ECO 4.1*)
- ECO 4.2 - Identify positive and negative incentives that influence the decisions people make. (*ECO 4.2*)

English

Reading: Informational Text

Craft and Structure

- CCSS.ELA-LITERACY.RI.4.6 - Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided. (*CCSS.ELA-LITERACY.RI.4.6*)

Integration of Knowledge and Ideas

- CCSS.ELA-LITERACY.RI.4.9 - Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (*CCSS.ELA-LITERACY.RI.4.9*)

Writing

Production and Distribution of Writing

- CCSS.ELA-LITERACY.W.4.6 - With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting. (*CCSS.ELA-LITERACY.W.4.6*)
- CCSS.ELA-LITERACY.W.4.4 - Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.) (*CCSS.ELA-LITERACY.W.4.4*)

- CCSS.ELA-LITERACY.W.4.5 - With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 4 here.) (*CCSS.ELA-LITERACY.W.4.5*)

Research to Build and Present Knowledge

- CCSS.ELA-LITERACY.W.4.8 - Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (*CCSS.ELA-LITERACY.W.4.8*)

Text Types and Purposes

- CCSS.ELA-LITERACY.W.4.2 - Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (*CCSS.ELA-LITERACY.W.4.2*)
- CCSS.ELA-LITERACY.W.4.2.A - Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. (*CCSS.ELA-LITERACY.W.4.2.A*)
- CCSS.ELA-LITERACY.W.4.2.B - Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. (*CCSS.ELA-LITERACY.W.4.2.B*)
- CCSS.ELA-LITERACY.W.4.2.C - Link ideas within categories of information using words and phrases (e.g., another, for example, also, because). (*CCSS.ELA-LITERACY.W.4.2.C*)
- CCSS.ELA-LITERACY.W.4.2.E - Provide a concluding statement or section related to the information or explanation presented. (*CCSS.ELA-LITERACY.W.4.2.E*)
- CCSS.ELA-LITERACY.W.4.2.D - Use precise language and domain-specific vocabulary to inform about or explain the topic. (*CCSS.ELA-LITERACY.W.4.2.D*)

Science

Engineering Design

Asking Questions and Defining Problems

- 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Constructing Explanations and Designing Solutions

- 3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Earth and Human Activity

Obtaining, Evaluating, and Communicating Information

- 4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.

Energy

Asking Questions and Defining Problems

- 4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Planning and Carrying out Investigations

- 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Constructing Explanations and Designing Solutions

- 4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.



Prior learning

Pre-assessment of knowledge: Circuits – Lights – Hands on
Deconstruct transdisciplinary theme descriptor, central idea and lines of inquiry to determine student content knowledge and vocabulary, what is known and thought to be known.



Teacher questions

- What are the advantages and disadvantages of different types of energy on people and the earth?
- How do people use the resources in an area to create energy?
- What factors influence the type of energy that people use?

Implementing



Learning experience library



Click on link below for reworded virtual field trip

Amy Rios



Sources of electricity reading (general summaries):

Amy Rios



How will the classroom environment, local environment, and/or the community to used to facilitate the inquiry?

Amy Rios

Field Trip: Trash to Energy plant



Immerse - Building background knowledge

Amy Rios



Tech 18-19

Amy Rios



Principled – (make responsible decisions)

Amy Rios



Gather - go deep

Amy Rios

**Identify - Identify inquiry questions**

Amy Rios

**Reflective - (think about your knowledge about yourself and the environment to do what is best)**

Amy Rios

**Research into energy use in different countries, natural resources related to energy in a country, policies about energy usage**

Amy Rios

**Knowledgeable - (informed decisions)**

Amy Rios

**Evaluate**

Amy Rios

**4-PS3-2 Make observation to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents**

Amy Rios

**17-18 Music-Ukulele**

Amy Rios

Student musicians were reflective as they set goals for playing the ukulele and assessed their progress as well as being principled by taking responsibility for their actions during independent practice

**Create -go beyond facts to make meaning**

Amy Rios

**Students needed to apply research skills (read for meaning, take notes, determine importance and then write an informative paragraph reflecting their knowledge.**

Amy Rios

**Explore - Look around and dip in**

Amy Rios

**Share - share your learning**

Amy Rios

**4-ESS3-1 Obtain and combine information to describe the energy and fuels are derived from natural resources and their uses affect the environment**

Amy Rios



Open Provocation - Inquiry into Electric Circuits

Amy Rios



4-ESS3-1 Obtain and combine information to describe the energy and fuels are derived from natural resources and their uses affect the environment

Amy Rios



3. Provocation

Amy Rios

Now that we have a better understanding of different power sources and it is evident that clean power is ideal, why do we still use "dirty" power? What type of power is used in different parts of the world and why do they use that type of power?



[Prior] Summative assessment task

Amy Rios

Your task: Use your knowledge of energy to reflect and make a principled decision about what kind of energy to use.

Your company is designing and building a new community of homes. You must go to the planning and zoning committee of the town, named

Utopia, to get them to approve the type of energy you want to use in your homes.

You know:

The community is within 30 miles of the ocean.

The community has an average rainfall of less than 10 inches a year.

The community has sunshine most of the year and an average temperature of 60 degrees.

There is a forest nearby.

There is a large river close by that empties into the ocean.

The houses will sit up on a hill and will have ocean breezes.

Other Utopia homes in the area already use natural gas and oil.

You need to include:

A name for your development along with a visual model or diagram of the community

A description of the type of energy and how the energy gets to the homes

Economic information about how much your type of energy might cost a homeowner

An example of another country where this type of energy is used

The pros and cons of your chosen type of energy



Art 18-19

Amy Rios



Learning experiences

Ideas from PYP online group:

CI: The use of energy affects our environment in different ways.

LI: Forms of energy; The storage and transformation of energy; Renewable and sustainable energy.

We also have an Energy Unit this year. One of my faves! Here are some Provocations we did in the past.

1) Form teams by getting picture of resources, cut into puzzle pieces, and distribute randomly to find groups. Have a discussion about what your picture is. Record questions and observations about your picture in your IB journal

2) Spill the Beans (page 17-18 of TPT Energy Inquiry). Change term "energy resources" to "beans" when answering discussion questions.

Bean breakdown:

31% black (coal)

27% pinto (oil)

19% white (natural gas)

13% green peas (solar)

10% red beans (nuclear)

Depends on where in the world you are. If possible, turn off electricity /energy source for a time and watch reactions to no heat or light. Remove batteries from torches etc.

I see, I think, I wonder using provocative pictures of energy use and sources.

Use pictures for energy usage affecting the environment in different ways. I see think wonder.

We divided our learners in three groups

First group was asked to run around the field to complete the lap and once they are discussion was taken forward, how they feel? Why so? What happened?

Second group was made to sit in a dark room and solve few problems and then discussion was taken how was the task? Did they face any challenge and so on

Third group was given the devices with minimum battery to complete the research work and when devices charshed in middle of their work the discussion was taken

In the last all three groups shared about their experience and findings and what can they inquire into

I've got an ikea Christmas candle with a spinning fox on top. The heat from the candle moves the [fox.you](#) could make them ponder why it spins...



Ongoing assessment

Pre-assessment of knowledge: Circuits – Lights – Hands on



Resources

- [Energy System Map](#)
- [How Does Your State Make Electricity? \(Published 2018\)](#)
- [Which country is the world leader in renewable energy in 2021?](#)
- [People, Power & Prosperity - Full Video](#)
- [People, Power & Prosperity - Life Without Electricity](#)
- [The World's Largest Lesson](#)
- [Emma Watson introduces The World's Largest Lesson 2016 #2 - The Global Goals](#)
- [11 countries leading the charge on renewable energy - Climate Council](#)
- [Without electricity, 1.3 billion are living in the dark](#)

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- [!\[\]\(9063468a59e93f469b71000ac5796bc3_img.jpg\) Energy Source Comparison](#)
 - [!\[\]\(1db6320223680ab4bd04b0d269ab6c8a_img.jpg\) Energy.](#)
 - [!\[\]\(cd69309a3e813d8c682e56d54a0f4a01_img.jpg\) Renewable and NonRenewable Resources](#)
 - [!\[\]\(10da5836d64f6bfda0e81f64eb06c09d_img.jpg\) Renewable & Non-Renewable Resources: Definition & Differences - Video & Lesson Transcript | Study.com](#)
 - [!\[\]\(64ffe1f7747b0ebf9d3de05413a827ba_img.jpg\) Powering the Planet: Renewable Energy - Nature Works Everywhere](#)
 - [!\[\]\(48ca033094687ae35179967b129920cd_img.jpg\) Can 100% renewable energy power the world? - Federico Rosei and Renzo Rosei](#)
 - [!\[\]\(62aee36f74ae3183ab09e8d3ffe50364_img.jpg\) 300 years of fossil fuels in 300 seconds](#)
 - [!\[\]\(751c9e446f61c8f82144499002de1a38_img.jpg\) Breck Elementary 4th grade debate 2](#)
 - [!\[\]\(eb803b8fdde7500bcf82afed11b47c67_img.jpg\) Energy and kids](#)
 - [!\[\]\(68bdb588ed455981d68a9611d6b4c3a0_img.jpg\) Fossil Fuels 101](#)
 - [!\[\]\(3c943ceda096d8eb5042402eb8fea037_img.jpg\) ReadWorks](#)
 - [!\[\]\(a7ef25a34fc069aa24226716130df97b_img.jpg\) ReadWorks](#)
 - [!\[\]\(0c2fef1252cb93144161962c1e10ae73_img.jpg\) Electric Circuits - BrainPOP](#)
 - [!\[\]\(93e10fc6375608329ec83034525df85e_img.jpg\) How do solar panels work? - Richard Komp](#)
 - [!\[\]\(14d7ba12c2282a47491897a7172cf4c5_img.jpg\) ReadWorks](#)
 - [!\[\]\(7890d3689f99cab62e6ce45ce21117c5_img.jpg\) How do solar panels work? - Richard Komp](#)
 - [!\[\]\(294c0b8fdd6763b24170667df7190f29_img.jpg\) Why aren't we only using solar power? - Alexandros George Charalambides](#)
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 - [!\[\]\(abbfdd98fed26880fac922326f84b4b1_img.jpg\) ReadWorks](#)
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 - [!\[\]\(eb5fa6df0d7f0d779c08a5efd4619565_img.jpg\) ReadWorks](#)
 - [!\[\]\(5533b0d72381070f5e874d2f5991a238_img.jpg\) e-SMARTkids-Video-The Electric Safety World](#)
 - [!\[\]\(7bf334942f9ccfc3ef0025956a5e98c4_img.jpg\) \[https://www.teachengineering.org/content/ncs_/lesson/ncs-2026-nuclear-energy-virtual-field-trip/ncs-2026-nuclear-energy-field-trip-handout.pdf\]\(https://www.teachengineering.org/content/ncs_/lesson/ncs-2026-nuclear-energy-virtual-field-trip/ncs-2026-nuclear-energy-field-trip-handout.pdf\)](#)
 - [!\[\]\(8e47f83f46b6f0b10ad4f7dee82c1395_img.jpg\) Chernobyl then and now: 28 haunting images from nuclear disaster](#)
 - [!\[\]\(747a0ba3888e911beaa01ed089754323_img.jpg\) How do nuclear power plants work? - M. V. Ramana and Sajan Saini](#)
 - [!\[\]\(3c788ddfcfe44828f36ada58f7861ec6_img.jpg\) Database Error](#)
 - [!\[\]\(f3d1cf25b17c586eadbcd986111a53e2_img.jpg\) Energy Explained - U.S. Energy Information Administration \(EIA\)](#)
 - [!\[\]\(ae370a80097893386749f53f6cbc30b4_img.jpg\) BICYCLE GENERATOR .HOW TO MAKE A BICYCLE GENERATOR , PRODUCE ELECTRICITY WITH A BICYCLE ?](#)
 - [!\[\]\(5b3046dfa22bfbeecb9a96506f7775a2_img.jpg\) 12 Countries Leading the Way in Renewable Energy | Click Energy](#)
 - [!\[\]\(db74405203d9dee5bcede769db78afdb_img.jpg\) Supply and Demand - BrainPOP](#)
 - [!\[\]\(6ce65dc6a5a8b8a43a69a208eccc88ca_img.jpg\) Goal 7: Affordable & Clean Energy | The Worlds Largest Lesson](#)
 - [!\[\]\(723aeb603c9945164dd2e33bd526c8af_img.jpg\) Energy and the environment - Energy Kids: U.S. Energy Information Administration \(EIA\)](#)
 - [!\[\]\(75cfbb46456d2b57f791acc215eb7c6b_img.jpg\) Repurpose Schoolbags offer children a brighter future](#)

