

3.4 ENERGY USE IN OUR DAILY LIVES

This lesson is part of a Connect Science unit. For information about other Connect Science lessons and professional development opportunities, visit connectscience.org

Lesson Summary

Students will be able to reflect on what they have learned and review key vocabulary. They will consider ways they use energy each day and identify systems or behaviors they could change in order to conserve energy.

(Approx. total time: 1 hour)



Standards

NGSS Disciplinary Core Ideas

4-ESS3-1

Obtain information to describe that energy and fuels humans use are derived from natural resources and that some energy and fuel sources are renewable and some are not.

NGSS Science and Engineering Practices

Asking Questions and Defining Problems

Identify scientific (testable) and non-scientific (non-testable) questions.

Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.

Use prior knowledge to describe problems that can be solved.

Crosscutting Concept: Energy and Matter

Flows, cycles and conservation

Objectives

By the end of the lesson, students will

Know (facts/information):

- People use resources in their daily lives for transportation, heat and electricity.
- Humans can positively impact the environment by monitoring and conserving when we use energy.
- Heat, sound, light and motion are evidence of energy in a system.

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.
- Systems thinking can be useful in understanding interactions in the world and designing solutions to challenging problems.
- Scientists, engineers and local citizens (including kids) have a responsibility to collaborate to find creative solutions to problems they notice in the world around them.

Be able to do (skills/behaviors/scientific and engineering practices):

- Reflect on their energy use in their daily lives.
- Brainstorm and research ways that they and others could use less energy.

Vocabulary

- **energy conservation:** taking action to use less energy resources

Materials

- Teacher Materials:
 - Problems Anchor Chart
 - What Have We Learned Anchor Chart
 - Word Wall Card for Energy Conservation
 - Projector and computer if you decide to use this video clip to provide ideas for students:
 - <https://www.youtube.com/watch?v=ycdke8MTSCI>
- Student Materials:
 - Notebook paper or science journals
 - Evidence of Energy Being Used Chart
 - Student Vocabulary Cards
 - Laptops or iPads (optional for research)
 - <http://www.alliantenergykids.com/EnergyandTheEnvironment/SavingEnergy/022391>
 - <http://quiethut.com/energy-conservation-for-kids/>

Instructional Strategies

Link to prior knowledge (10-15 minutes)

Have students share what they have learned so far about energy and natural resources.

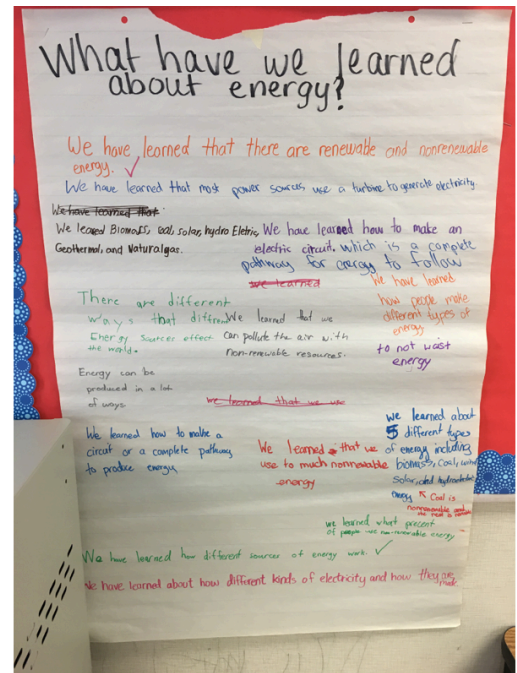
We have spent a lot of time the past couple of weeks learning about energy and natural resources. Let's take a few minutes to review what you've learned (take notes or have students come up and write on the anchor chart). Feel free to look back at your science notebook and your vocabulary cards to remind you of some of the important ideas. Tell me, what are the important ideas you've learned about energy and resources?

To scaffold big ideas, ask:

- What evidence do we look for to see that energy is in an object or system? (light, heat, sound or motion)
- Where do we get energy for electricity from?
- Are there different types of energy sources?
- Are some better than others?

Take a few minutes to read over ideas. Ask students if there are ideas that are similar that go together, or ideas that need more detail. Compare this list to the list of words they generated at the beginning of the unit on energy. Ask them to reflect on whether they have changed any of their ideas about energy since the beginning of the unit.

Tell students that tomorrow they will start a writing task that allows them to show what they've learned in more detail.



Instruction (40 minutes)

Introduce the concept of energy conservation and brainstorm examples of ways to conserve energy.

We've made a list of energy problems, but haven't talked much about solutions yet. Most problems have solutions that people can work on together.

Have any of you seen the words energy conservation before? Do you know what that means?

Display the energy conservation word on the word wall and ask a student to read it to the group.

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Here's a new word for the word wall. Can someone read me the definition? At the end of class, I'll ask you to write your own definition and draw an example.

Let's brainstorm a few examples of ways we could conserve energy.

Select a good example that a student shares and ask that student to draw their example on the word wall under energy conservation.

Scaffolding, if needed:

- When you walk somewhere instead of driving, does that conserve energy?
- What type of energy are you conserving? (Cars are fueled by gasoline which is a fossil fuel, and by walking or biking you are using less gas.)
- When you turn the thermostat up in your house so that you are using less air conditioning, does that save energy? How? (Electricity comes from a power plant, which requires an input of an energy source.)

Explain to students how to find evidence of energy use in their day, and to brainstorm possibilities for energy conservation.

Today we will think about evidence of energy use in our day, and begin to think about which of these places we might be able to save energy, so that we are using less energy resources.

We've learned that we use energy when we use electricity in buildings, when we use transportation that needs gas, or when we buy things that have to be transported to us. Let's make a list of how we use these types of energy in our day, and highlight any places where we think energy could be conserved. Yesterday, we focused on our classroom. Now, think about ANY PLACES in your day where you see evidence of energy being used – at school, home, stores or businesses you visit, or on your way home from school. Your goal is to think of places where a lot of energy is being used, and then reflect on whether energy could be conserved (used less) at any of those places.

Review directions of Evidence of Energy Being Used Handout and allow time for students to complete. Decide if you want students to explore outside of the classroom.

Students will be given a chart like this to complete. Review directions together, and see the examples below to help get them started.

Object and evidence of energy (light, sound, motion, heat)	Where?	Could less energy be used?	How?
Car - light, sound, motion and heat	To and from school	Yes	Ride the bus to school more often
Television- lights and sound	Home	Yes	Watch less TV!

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Teacher's Choice: Consider taking students for a walk around the school and school yard to spark ideas. They may notice appliances in the building that use a lot of electricity, and lots of cars in the school parking lot, etc. Also consider having students work in pairs rather than individually.

After students have worked for a while, have them work (with a partner if you'd like) on the following task:

Have students add ideas to the problem list.

Now, look over your list. Have you found any new problems to add to our list? Are there places where you've noticed a lot of energy being wasted?

Example: We waste energy when we drive to school instead of taking the school bus.

Energy conservation is one solution we can consider to some of the problems we've identified.

Closing (10 minutes)

Ask students to draw and write their own definition for energy conservation.

Review ideas with a video clip if more scaffolding is needed before they write and draw.

Take a few minutes to write a definition for energy conservation on your vocabulary card. Write what the word means to you, and draw a picture that shows people taking action to conserve energy.

(If needed) Here's a short video that has some nice examples of ways that people can conserve energy: <https://www.youtube.com/watch?v=ycdke8MTSCI>

Assessment

Review students' drawings and definitions of energy conservation. Also circulate to see if students are using correct examples of evidence of energy, to reinforce the idea that evidence can be found in the forms of heat, light, motion and sound.

Optional Extensions

Explore websites about energy conservation. Students can add ideas to their list after conducting a little research on energy conservation:

- <http://www.alliantenergykids.com/EnergyandTheEnvironment/SavingEnergy/022391>
- <http://quiethut.com/energy-conservation-for-kids/>

Consider inviting an electrician, custodian, or energy efficient expert from a school district or county to come to class this week to share their work and explain how they work on energy conservation where they work.

References

[the25sda]. (2013, Oct. 3). *How to save energy for school teaching*. [Video Link]. Retrieved from <https://www.youtube.com/watch?v=ycdke8MTSCI>

Alliant Energy Kids (n.d.). *Top 10 rules for saving energy*. Retrieved from <http://www.alliantenergykids.com/EnergyandTheEnvironment/SavingEnergy/022391>

Quiet Hut. (2018, May 27). *Energy Conservation for Kids*. Retrieved from <https://quiethut.com/energy-conservation-for-kids/>

Planning Page

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Link to prior knowledge (10-15 minutes)

Have students share what they have learned so far about energy and natural resources.

Instruction (40 minutes)

Introduce the concept of energy conservation and brainstorm examples of ways to conserve energy.

Explain to students how to find evidence of energy use in their day, and to brainstorm possibilities for energy conservation.

Review directions of Evidence of Energy Being Used Handout and allow time for students to complete. Decide if you want students to explore outside of the classroom.

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Have students add ideas to the problem list.

Closing (10 minutes)

Ask students to draw and write their own definition for energy conservation.

EVIDENCE OF ENERGY BEING USED

Think about all of the things you use in your day that require energy inputs such as electricity or gasoline. Fill in the chart below to show the objects that use energy, and how you could conserve energy.

Object and evidence of energy (light, sound, motion, heat)	Where?	Could less energy be used? (Yes, No, Maybe)	How?
Car (light, sound, motion and heat)	To and from school	Yes	I could ride the bus to school more often.

3.4 EVIDENCE OF ENERGY BEING USED

Object and evidence of energy (light, sound, motion, heat)	Where?	Is energy being wasted, or could less energy be used? (Yes, No, Maybe)	How?