

Grade: 6-8 | Time: 1 hour
ENERGY DETECTIVE
Essential Question: What is energy?



Overview

This is an introductory activity for studying energy. Students will look for energy, collecting “energy evidence,” and then come up with their own definition of energy.

Assessment

Can students

- Define energy in their own words?
- Can students fill out the “My Energetic Day” worksheet?

Vocabulary

- Energy
- Work
- Force
- Heat
- Movement

Alaska Standards

Addressed

Science GLEs

The student demonstrates an understanding of:

- how energy can be transformed, transferred, and conserved by [6] SB2.1 recognizing that energy can exist in many forms

- the processes of science by [6, 7, 8] SA1.1 asking questions, predicting, observing, describing, making generalizations, inferring, and communicating.

Alaska English/Language Arts and Mathematics Standards (2012)

- RSL.6-8.1, RSL.6-8.4, RSL.6-8.9
- WL.6-8.9
- SL.6-8.1

Teacher Information and Procedure

Prior knowledge for students:

None.

Source: From R.E.A.C.T. Teacher’s Activity Guide, National Renewable Energy Laboratory Education Programs Home page: <http://www.nrel.gov> (Graphics from Depositphotos.com)

Materials needed

Copies of Detective Data Sheet, copies of clues.

What to do in advance: Make copies.

Teaching the Lesson

Gear-up

Have students create a “word splash” with energy terms they are already familiar with; make small posters of the word splashes. A “word splash” is basically a collage of terms.

Explore

1. Give each student group a copy of the Detective Data Sheet and a copy of the clues. Point out that their goal is to search for the answer to “What is energy?”
2. Based on the clues given in the hand-out, students go in search of evidence that will help them find the answer.
3. Once they have written each clue onto their Data Sheet, have each

group come up with a definition.

4. Have each group share their definition with the rest of the class.

Generalize

1. Discuss with students: Can you feel energy? (Heat waves or energy in wind can move us around on a windy day or cause a sailboat to skip across a lake.) Can you see energy? (Yes, sunlight.) Can you hear energy?
2. Have students look up the definition of energy in the dictionary (the capacity for vigorous activity; available power) and compare with the physics definition (the ability to do work). Discuss how these definitions compare with the definition students came up with.
3. Have students make up a list of clues that they can find at home that support the definition, “Energy is the ability to do work.” (Examples: electricity causes the light bulbs to glow and get hot, sunlight causes plants to follow it, running water causes left over food to be rinsed from the plate when held under it, etc.)

Assess

As a homework assignment have the students do the “My Energetic Day” activity.

As a warm-up for class, a few days later, ask students to write down a definition of energy.

Extensions, adaptations, and more resources

This activity could be done by individual students rather than small groups. Have the students pick only one type of each energy source (i.e. only one item that runs on electricity).

Discuss Radiant, Chemical, and Solar energy, have the students use those terms for each type.

Handout 2

Name _____

REPORT FROM THE

“ _____ ”

DETECTIVE AGENCY



After you have collected energy evidence, have each person in your group make up a definition for energy. Write definitions in the spaces below. Next, have your whole group agree on one definition and write it at the bottom of the page.

DETECTIVES' NAME	DEFINITION OF ENERGY

GROUP ANSWER: WHAT IS ENERGY?



Handout 3

EXTRA CLUES FOR PUZZLED DETECTIVES

1. Electrical and solar energy give us light.
2. Sun energy grows our food.
3. Lightning is a natural form of electrical energy.
4. Gasoline, made from crude oil, gives us energy to make cars go.
5. Energy heats our homes and school.
6. Energy keeps our refrigerator cold.
7. Sailboats need wind energy.



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What is Energy?

Energy helps us do things. It gives us light. It warms our bodies and homes. It bakes cakes and keeps milk cold. It runs our TVs and our cars. It makes us grow and move and think. **Energy** is the power to change things. It is the ability to do work.

Energy is Light

Light is a form of energy we use all the time. We use it so we can see. We get most of our light from the sun. Working during the day saves money because sunlight is free.

At night, we must make our own light. Usually, we use electricity to make light. Flashlights use electricity, too. This electricity comes from **batteries**.



Energy is Heat

We use energy to make heat. The food we eat keeps our bodies warm. Sometimes, when we run or work hard, we get really hot. In the winter, our jackets and blankets hold in our body heat.

We use the energy stored in plants and other things to make heat. We burn wood and natural gas to cook food and warm our houses. Factories burn fuel to make the products they sell. Power plants burn coal and natural gas to make electricity.



Energy Makes Things Grow

All living things need energy to grow. Plants use light from the sun to grow. Plants change the energy from the sun into sugar and store it in their roots and leaves. This is called **photosynthesis**.

Animals can't change light energy into sugars. Animals, including people, eat plants and use the energy stored in them to grow. Animals can store the energy from plants in their bodies.



Energy Makes Things Move

It takes energy to make things move. Cars and motorcycles run on the energy stored in **gasoline**. Many toys run on the energy stored in batteries. Sail boats are pushed by the energy in the wind.

After a long day, do you ever feel too tired to move? You've run out of energy. You need to eat some food to refuel.



Energy Runs Machines

It takes energy to run our TVs, computers, and video games—energy in the form of **electricity**. We use electricity many times every day. It gives us light and heat, it makes things move, and it runs our toys, electronics, and microwaves. Imagine what your life would be like without electricity.

We make electricity by burning coal, oil, gas, and even trash. We make it from the energy that holds atoms together. We make it with energy from the sun, the wind, and falling water. Sometimes, we use heat from inside the Earth to make electricity.



Energy Doesn't Disappear

There is the same amount of energy today as there was when the world began. When we use energy, we don't use it up completely; we change it into other forms of energy. When we burn wood, we change its energy into heat and light. When we drive a car, we change the energy in the gasoline into heat and motion.

There will always be the same amount of energy in the world, but more and more of it will be changed into heat. Most of that heat will go into the air. It will still be there, but it will be hard to use.



Photo courtesy of BP

