

NATURAL RESOURCES LESSON PLAN

Learning Objectives

- Describe sources and uses of energy.
- Define renewable and non-renewable energy.
- Provide examples of common types of renewable and non-renewable resources.
- Understand and explain general ways to save energy at a personal, community and global level.
- Understand and explain, in general terms, how passive solar heating, hydropower and wind power work.
- Describe some general characteristics of solar power, hydropower and wind power.
- Understand the benefits and disadvantages to using renewable resources.

Outline of *Renewable Resources* Lesson:

1. Introduction (Teachers)
2. Introduction to content
3. Pre-lesson Assessment ¹
4. (OPTIONAL) *Guess the Amount!*
5. Explain sorting activity
6. Sorting Activity
7. Classroom engagement. Which category should ” ” go into?
8. **INITIAL VOCABULARY:**
 - (a) *Renewable* energy comes from a source that is not depleted when used
 - (b) *Replenish* the ability to restore stock of that resource
 - (c) *Potential Energy* is the energy possessed by a body by virtue of its position or state.
 - (d) *Kinetic Energy* is energy possessed by a body by virtue of its movement

¹See following pages

9. Kinds of NRG (slideshow)²
10. Explain Coloring/Designing
11. Coloring Activity
12. Group Presentations
13. Post-lesson Assessment³

NRG On Worksheets:

1. **Solar** energy occurs from the sun (light). Refer to the associated activity Solar Power for students to explore this energy form.
2. **Fossil Fuels** Formed from organic material over the course of millions of years, fossil fuels have fueled U.S. and global economic development over the past century.
3. **Wind** energy is generated from harnessing kinetic energy from wind.
4. **Water** energy can be used in hydroelectric, tidal harvesting, or energy storage. With hydroelectric, we begin with potential NRG stored in a reservoir. Once we allow water to flow down through a turbine, the potential NRG becomes kinetic NRG. The kinetic NRG spins the turbine and generates electricity.
5. **Trees/Biofuels** are fuels from bio material like trees or plant material. In most of the 19th century we mainly used timber for NRG production. Coal was first used in 1880 as a way to stave off the burning of our forests
6. **Coal** was initially used in 1880 for electricity production of large scale production. By 1961, coal was a major NRG source.

TYPES:

- (a) Anthracite (burn in home, very clean)(used in iron ore production)
 - (b) Bituminous (not very clean; mostly used in large scale production)
 - (c) Lignite (very bad; drops life expectancy b/c of particulate matter ~ 5 microns)
7. **Oil** is a fossil fuel, meaning that fossil material under large amounts of pressure, results in crude oil; most common type of NRG used today; transportation is ~25% of carbon emissions

²See attached Powerpoint

³See following pages

8. **Agriculture** is responsible for about 13% of all carbon emissions (food/water for animals, transportation, etc.)

Pre-Lesson Assessment:

Ask students to brainstorm ideas about where and when we use energy. (Possible answers: We use energy all the time. Humans use energy to be active – to walk, talk, play basketball, etc. We use energy to power our appliances, vehicles, lights, etc. Cells use energy to perform the most basic life functions. Life as we know it would not be possible without energy production and consumption.)

Guess The Amount!

Ask students the following questions and ask them to guess at the different percentages of NRG use. Discuss and explain answers.

- What percent of the energy the world uses today is derived from fossil fuels (e.g., coal, oil, natural gas)? (Answer: 85-90%. This means that only 10-15% of the energy we use is from renewable energy sources such as sun, wind and water.)
- The U.S. has only about 5% of the world's population. What percent of the world's energy do we use? (Answer: More than 30%. This means that the U.S. uses a lot more energy than other countries. Why do the students think that is? Discuss the amount of toys, appliances and other electric powered items in a single person's home.)
- What percent of the electricity consumed in the U.S. is used for light bulbs? (Answer: 25%. This means that we leave a lot of light bulbs on when unused. Can the students think of a time where they could save some electricity by turning off a light bulb?)

Post-Lesson Assessment:

Ask students the following questions. Discuss the answers.

- How do we know the energy is there? (Answer: We can see it, feel it, hear it, etc.)
- Ask students to describe where this energy comes from. (Answer: ultimately all of it comes from natural resources (renewable and non-renewable), but it is often moved (transferred) and changed (transformed) in the process.)
- Ask students to describe where they get their energy. (Answer: from food) Ask them to describe what might happen if suddenly there was no more food. (Illuminate on food scarcity and the need for more vegetarian diets.) (This could get dark quick, so judge the room.)