

RENEWABLE ENERGY

LESSON PLAN



WOLF RIDGESM
ENVIRONMENTAL LEARNING CENTER

RENEWABLE ENERGY



CLASS DESCRIPTION: An Environmental Issues Class

This class focuses on producing energy on a individual and community level along with the energy and CO2 footprints associated with different fuel choices. Students explore functioning renewable energy systems at Wolf Ridge Environmental Learning Center. STEM methods provide a means of experimenting with one of three renewable energy technologies: wind turbines, photovoltaic panels, bio-fuel heating.

Total time: 3 hour (indoors)

Audience: 6-20 students, 4th grade through adult

Activity level: easy

Travel: less than one mile

Total uphill travel: 0

GUIDING QUESTION

What is the value of renewable energy and how can we incorporate it into our lives?

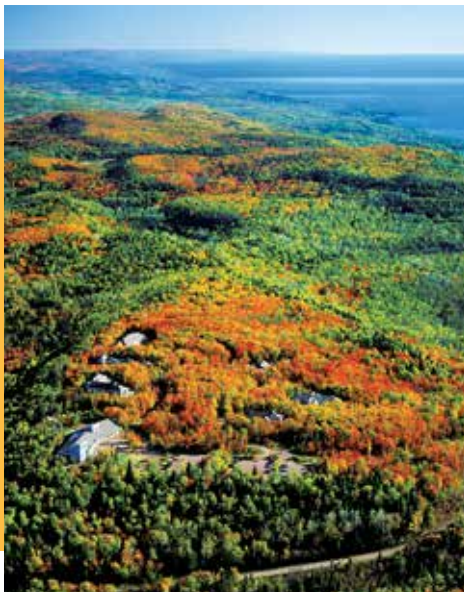
CONCEPTS

1. Renewable energy is energy that comes from the sun in more recent times. Non-renewable energy is the sun's energy stored deep in the earth.
2. We consider environmental health, money, and resource availability when deciding on an energy source.
3. Humans have the ingenuity to create solutions to our problems through engineering.
4. Awareness, knowledge, and appreciation lead to an understanding of our impact on earth.

OUTCOMES

Upon completion of Renewable Energy class students will be able to:

1. Define renewable and non-renewable energy sources, and give examples of each.
2. Describe four renewable energy systems used at Wolf Ridge, including the source of energy and whether it produces heat or electricity for our daily lives.
3. Understand how technology can reduce the impact of CO2 pollution.
4. Use engineering practices to design the most efficient wind turbine.
5. Recommend personal actions they will take to reduce their energy and CO2 footprint.



Our mission is to develop a citizenry that has the knowledge, skills, motivation and commitment to act together for a quality environment.

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Wolf Ridge Environmental Learning Center and the USDA are equal opportunity providers and employers.



Equipment

Classroom

- Everything Depends on Energy poster
- Serving our Energy Freedom poster
- energy bike
- entertainment center
- 100 watt PV panel
- solar hot water demo
- 2 - 2 watt interstate batteries
- Maxx 700 watt DC to AC inverter
- Morningstar Prostar solar charge controller
- 12 volt outlet
- 8 - USA compared to world pie plates
- 9 - USA energy consumption pie plates
- energy detective card
- 7 - wind turbine engineering data sheets
- 3 - about wind uses for people
- height of wind tower and air chasity

Energy Tour

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Wind Lab

- 6 - experiment stations
- 4 bluebase white head kid wind garometer with volts
- 6 comfort zone 20 fans
- 2 blue base geared generator with volt meter
- 5 blade boxes with hubs, blades, ends
- 1 can

Appendices

- Glossary
- Additional Information
- Optional Activities
- References
- Sources
- Class Sheets
- Spiral Learning Sheet
- Planning Outline

Set-up (30 min.)

- Classroom/class prep description
- Safety Management

I. Where can energy come from? (15min.)

- A. Energy bike
- B. Energy source options

II. How does Wolf Ridge decide on energy sources? (45 min.)

- A. Production & Consumption
- B. East Dorm Solar Hot Water
- C. Energy Center Biomass
- D. Science Center - Solar Panels
- E. Science Center - Wind Turbine

III. Why do we use renewable resources? (15 min.)

- A. Location informs resource decisions
- B. Climate change and CO2 pollution

IV. How can we influence renewable energy technology? (80 min.)

- A. Wind Turbine Design Stations
- B. Ideal turbine design
- C. Our turbine

V. Why consider energy sources? (15 min.)

- A. Energy Footprint

VI. What are my contributions? (10 min.)

Clean-up (20 min.)