Renewable Energy Literacy

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Goals

- Introduction to renewable energy concepts and terminology
- Building solar cars for a 4-H science trunk
- Interacting with the technology
- Troubleshooting problems
- Learn about the curriculum we are working on

Key questions

- What do you know about renewable energy?
- What do you know about solar energy?
- How is it used by people?
- Why are people using solar energy?
- Do you have any questions about solar energy, or is there anything you want to learn about it?

How is light energy converted into electricity?

- Photovoltaic (PV) cells are made from a mineral called silicon.
- When **photons**, which are tiny particles of light, hit the silicon it excites the atoms. In all the excitement, the electrons of the silicon atoms become free and begin moving.
- A solar panel functions like a battery because it can directly power electrical devices with sunlight.

Key Terms

- Voltage
  - The force or “pressure” pushing the electricity through the circuit. Measured in volts.
- Electric circuit
  - The closed path from the positive side to the negative side of the battery or solar cell.
  - Electricity will only flow through a closed path.
- Terminal
  - A piece of metal used to make an electrical connection.
- Solar cell
  - A device that converts sunlight into electrical energy. A group of several solar cells connected together is a solar panel.

Solar car inventory

- 4 eye screws
- 2 rectangular wood blocks
- 1 rectangular sheet of corrugated plastic
- 1 piece of plastic tubing
- 4 rubber wheels
- 4 plastic wheel rims
- One large gear
- Two axles
- One motor with small gear
- One 1.5 volt solar panel with alligator clips
- One motor mount
- One rubber band
- One push pin

Build a solar car

- Using the parts you have build a solar car.
- Yes, you need to use all of the parts in your bag.

Your car should look like this

Let's go outside and race our cars

- Trouble shooting problems:
  - Gear not engaging/turning
    - Make sure gears are engaged with each other
    - Adjust the eye screws
    - Make sure wheels move freely (plastic shim should not be in contact with eye screw)
  - Gear spinning on axle
    - Use scotch tape around axle to secure gear
  - My car is going backwards
    - Polarity: switch alligator clips on motor terminals

Find your car speed in miles per hour

- How many seconds does it take for your car to travel 20 feet?
- How do we do that?
  - What do we know?
  - What do we need to know?

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

Find your car speed in miles per hour

- Conversions
  - 3600 seconds in 1 hour
  - 1 mile has 5280 feet

We've talked about the science, interacted with the technology, engineered a car, now let's do the math (STEM).

- 20ft/your cars speed in seconds x 3600 seconds/hour x 1 mile/5260 feet = _____miles/hour

How do we make our cars go faster?

- Adding solar panels
- Solar collectors
- Use a protractor to find the ideal angle to place the solar panel

Let’s clean up

- Disassemble cars, leaving the chassis assembled with the motor mount attached, and return parts to bag.
- Be careful here, the inclination is to pull the motor mount off.


Questions?

Contact information

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