CEEE - Jr. Wind Kit Best Blade Test Lesson Plan

ENGAGE:

Ask: - "Who used electricity this morning? What for?"

- "What sources of energy can you name?" (Wind, solar, hydro, fossil fuels, etc.)
- "Can anyone guess what percent of Iowa's energy output comes from wind power?" (Answer = 27.4%)

EXPLORE:

- Students will now produce electricity themselves using model wind turbines!
- Model how to build the wind turbines, explaining the different parts, steps of putting them together, and attaching the LED stick.
- Demonstrate how students will achieve the goal of lighting up the LED bulbs.
- Have students build their wind turbines and attempt to light up the LED stick by blowing on the propeller, switching the alligator clips if necessary.

- Explain how electricity is made. - What is inside the nacelle?
- What is the difference between motors and generators? - Pass out motor/generator demos and have students explore them while explaining their parts and functions.

- Attach a PV panel to a wind turbine and demonstrate the connection of solar power to the turbine by shining a flashlight on the panel, causing the propeller to spin.

- Students are now going to find out how much voltage it takes to light an LED.
- Remove the PV panel and attach a multi-meter to the wind turbine. Set the multi-meter to 20V.
- Blow into the model turbine or use a hair dryer to demonstrate how the multi-meter will measure the power being created.
- Pass out hair dryers and multi-meters to students and have them measure the output voltage of their turbine by using a hair dryer to blow on both the front and back of their propellers.
- Record each student's/group's highest voltage for both the front and the back and record the all-time high numbers on the board.

ELABORATE & EXPLAIN:

- What makes a good turbine propeller? (Characteristics of the blades with the highest voltage output)
- Ask: - "Do you ever stick your hand out of the window when you are driving down the interstate?"
  - "Does your hand grasp more wind when it is cupped and facing forward or when it is flat?"
- Distribute alternate propellers and have students test the voltage from both the front and the back of the new ones using the hair dryers and multi-meters and compare them to the clear 4-bladed propellers.
- Have students record their highest readings.
- "What do the propellers with the highest voltage output have in common?"