Wired for Wind
Facilitator Outline

Materials:

Scissors	card stock	construction paper	printer paper	crayons and/or markers
Straight Pins	pencils with erasers (2 per participant)		pencils to draw with	Box fan
Turbine (optional)	Foam and paper boats (foam tray, skewer, construction paper sail) -Optional			

Do	Say	Materials	Time
Welcome & Introduction Sit the students in groups, so they may share materials, but they will mostly be working on their own small projects. They WILL discuss, compare and contrast each of their work to see why results may differ in the pinwheel construction sections. Introduce the engineering process. Hand out the chart to each table.	"Engineers have been able to harness the wind to generate electricity. We are going to learn about the power of wind and see how it can be used to generate power we can use. "First let's talk about how engineers work. They look at the problem, design a solution, then test it. If the solution works, then great! But usually the solution does NOT work the first time and some redesigning needs to be done. Then they test again, until they come up with a solution that works. Do your best to think like an engineer. If something doesn't work the first time, don't give up. Be persistent."	Engineering process chart	5 min

Part 1: How do we Observe and Measure Wind? Pages 10-11 Learn about the Beaufort Scale and make a chart. Grades 2 and up can make the chart. Grades K-1 can review the chart and look outside and categorize the wind at that time. Optional: Demonstrate the power of wind on a sail. (see page 6 in the leader guide). Have 2 or three pre made "sailboats" and place them on a large table. Using the box fan, apply the wind force to the sails. Which boat did best?		Beaufort scale handout Pencils to draw with Pre-assembled boats with different shaped sails Box fan	20 min

Part 2: How Does a Pinwheel use Wind Power? Handout the template for the rotational symmetry pinwheel. Students may color and decorate their pinwheel. Ideally, copy the pinwheel on different weights of paper so students can observe the differences when wind is applied. Have them cut out their pinwheel carefully and assemble it. Introduce the word, ***turbine***	"Let's make a pinwheel to show how air can create power. Decorate you pinwheel anyway you like. Note the weight of the paper you have used. You are making a turbine. A turbine moves and transfers the energy from the air. This can also be done with water. What are the differences between the pinwheels of different weights of paper?"	Symmetrical pinwheel handout Crayons or markers Pencils with erasers Straight pins	15 min

Part 3: How Can We Design a Better Pinwheel? (If Part 1 takes a little longer, this part may be omitted) Hand out the template for the 3 blade pinwheel. Have students decorate and assemble this pinwheel as well, then test it. Discuss the differences between the two designs. Demonstration: Show how wind applied to a pinwheel can generate electricity. Pre-assemble the device on page 22. Using the box fan, apply wind force to the pinwheel which will turn the motor and register the force generated on the volt meter.	"Is there a better way to make a pinwheel? Can we make a pinwheel that spins faster? Let's make a three blade pinwheel and test it." "There are places called wind farms where there are giant pinwheels set up in windy areas that turn the wind power into electricity. We can see how that works with this simple device." "The moving air, turns the turbine, which generates energy that we can measure."	Triangular pinwheel handouts Crayons or markers Pencils with erasers Straight pins Pre-assembled turbine and meter Box fan	
Conclusion Clean up Students may keep both pinwheels and Beaufort Charts			5 min