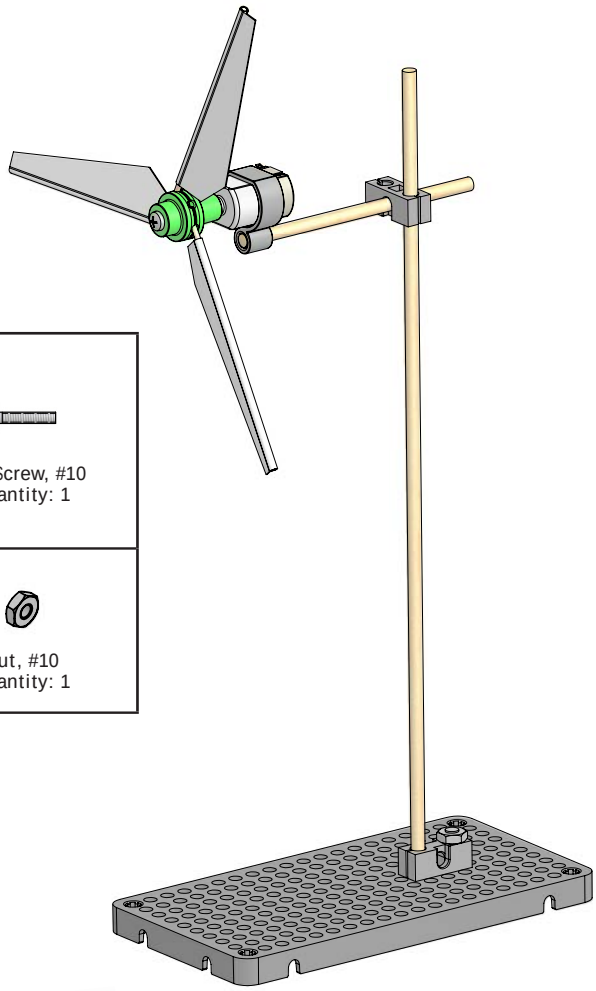
Mini Wind Turbine

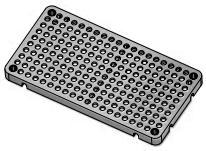
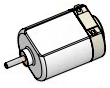
The Activity

Design and build a wind powered generator. Create the stand, mount the generator, then experiment with and evolve your own blade designs.



What Will You Need?

Materials to build one mini wind turbine:

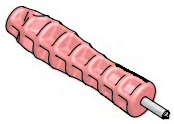
 Perpendicular Block Quantity: 2	 300mm (~12in) Dowel Quantity: 2	 Hole Plate Quantity: 1	 5/8 Screw, #10 Quantity: 1
 5/8 Screw, #6 Quantity: 1	 Mini Hub Cover Quantity: 1	 Mini Hub Base, Motor Mount Quantity: 1	Nut, #10 Quantity: 1
 1.5V Motor Quantity: 1	 Mini Motor Mount Quantity: 1	 150mm (10in) Skewers Quantity: 10	

Materials, required, but not supplied in the kit:

 Tape	 Material for Blades

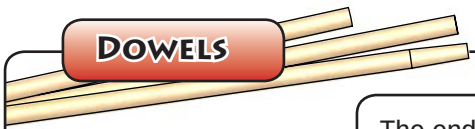
Note: Mini Hubs come in Dowel mount or motor mount. This activity requires a mini hub motor mount.

Tools to build a mini wind turbine:

 Cutter	 Reamer	 Wax, Soap or Crayon	 Optional: Pliers	Multi-Meter & Test Leads	Load: Resistor, Motor

Built it, test it, change it. TeacherGeek™ components allow you to design and engineer your most imaginative mechanisms. Combine them with other materials and products. More resources are available at teachergeek.com.

Dowels



Dowels vary in diameter. Some may be too large or small to use.

The ends of dowels may taper and need to be cut off to fit tightly into holes.

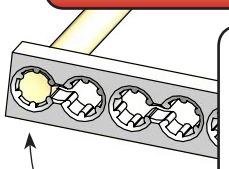
Cutting

Dowels and Connector Strips can be cut with a multi-cutter (best method), saw, side cutters or pruning shears. Wear safety glasses when cutting.

Multi-Cutters

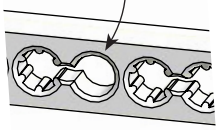
Mini Wind Turbine

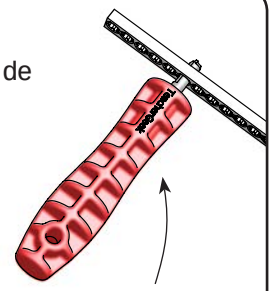
Holes & Reaming



Components come with holes that dowels press securely into.

Reaming holes to allow dowels to rotate and slide freely.

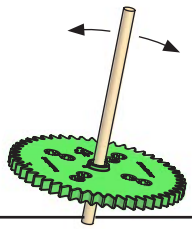


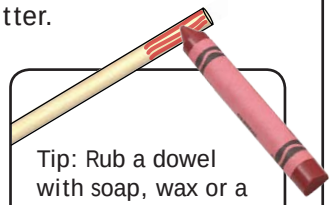


Turn a reamer back and forth through a hole.

Push, Wiggle, Tap

Push dowels into holes by:
1. Wiggling and pressing with your hands
2. Tapping dowels with a hammer or the side of your cutter.



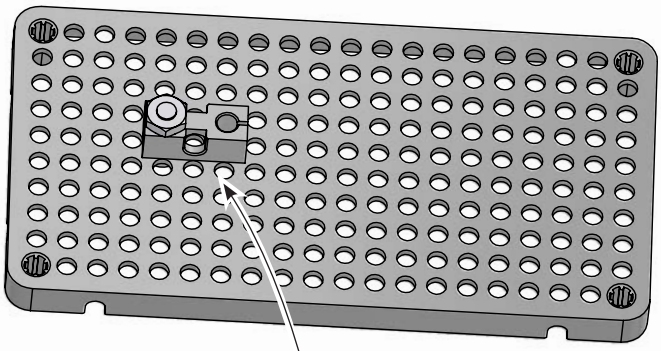


Tip: Rub a dowel with soap, wax or a crayon to allow it to slide easier into and out of holes.

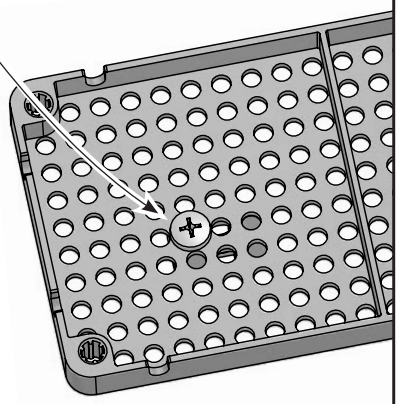
Start Building!!!

WARNING!!! Most holes should not be reamed. Do not ream holes which dowels should stay pressed into.

Step #1

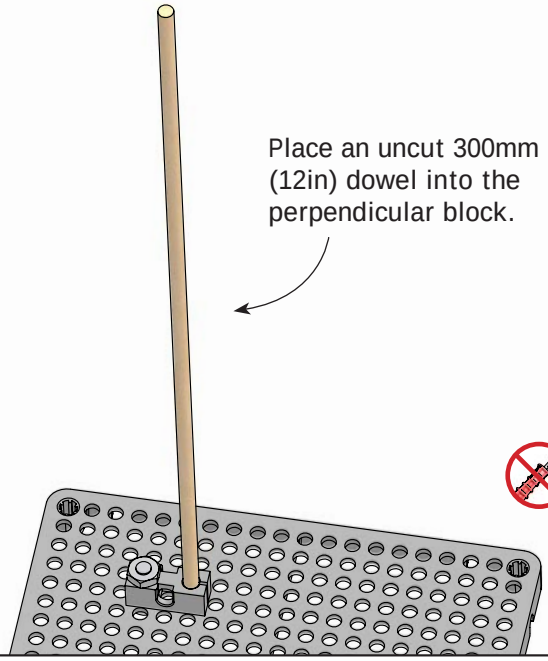


Mount a perpendicular block to the hole plate using a #10 screw and nut.



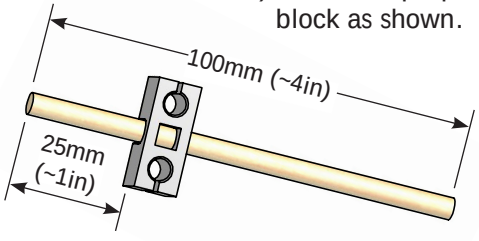
Step #2

Place an uncut 300mm (12in) dowel into the perpendicular block.



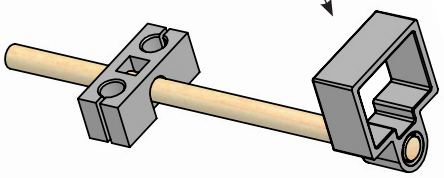
Step #3

A) Cut a 100mm (4in) dowel.
B) Slide on a perpendicular block as shown.



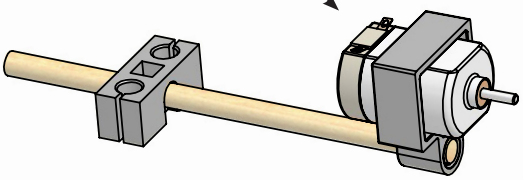
Step #4

Push a mini motor mount onto the assembly from Step #3.

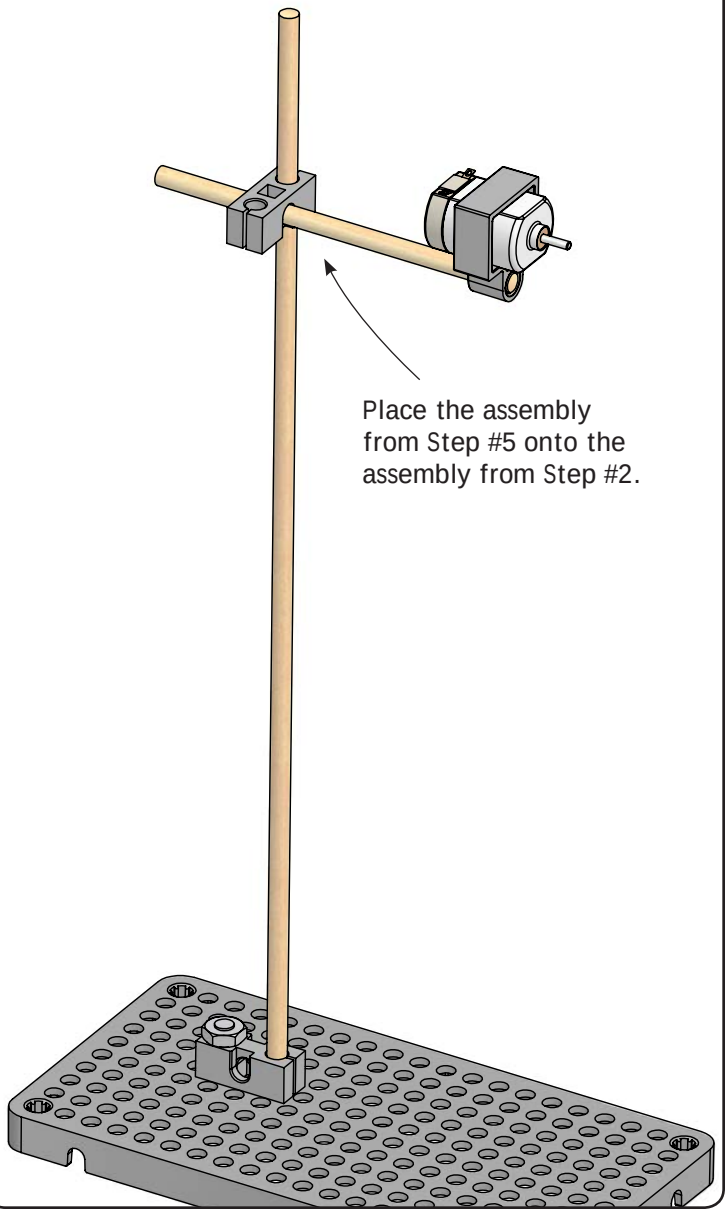


Step #5

Place the motor into the mount.



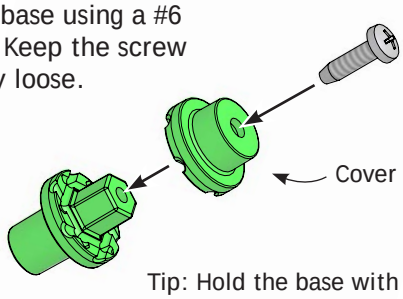
Step #6



Place the assembly from Step #5 onto the assembly from Step #2.

Step #7

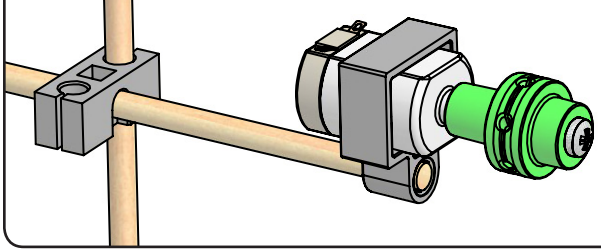
Attach the mini hub cover to the base using a #6 screw. Keep the screw slightly loose.

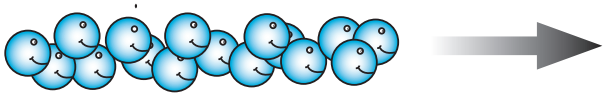


Tip: Hold the base with pliers when turning in the screw.

Step #8

Press the mini hub onto the motor shaft.

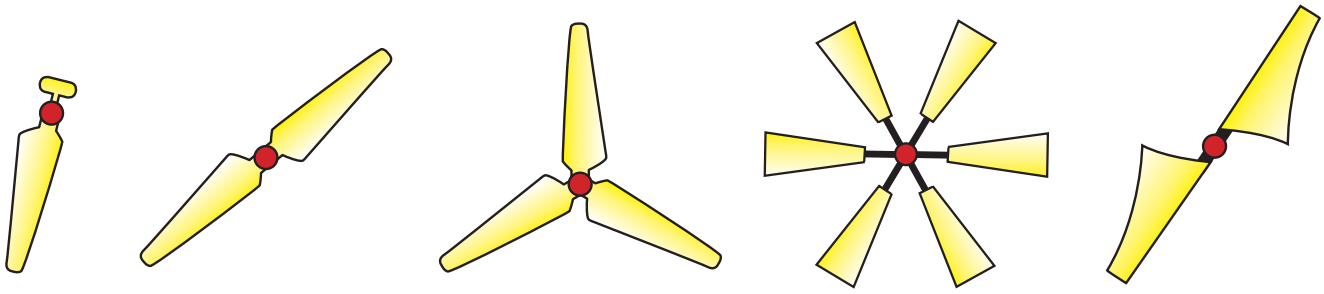




Your motor will create an electrical current (flowing electrons) when turned. The faster it turns, the more current it will create.

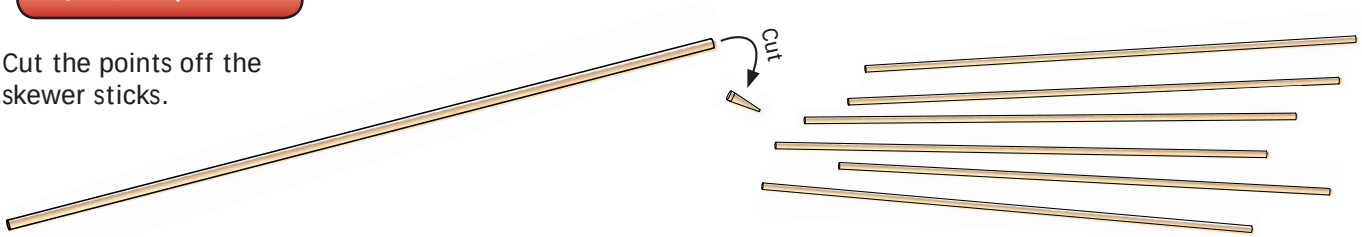
Blades

It is now time for you to experiment with blade configurations. You will be able to change the shape of your blades, the number of blades used (between 1 and 6), and the blade angle.



Step #9

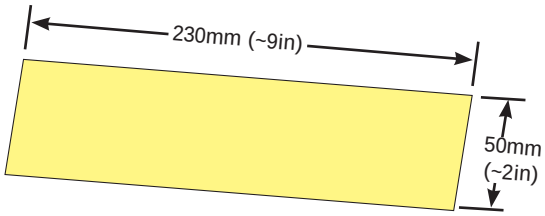
Cut the points off the skewer sticks.



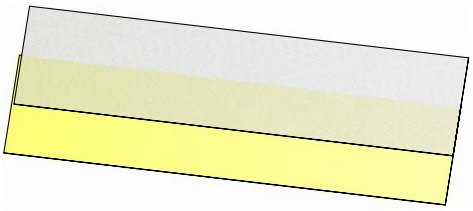
Step #10

You will need materials for your blades (poster board, cardboard, plastic, aluminum flashing, etc). You will also need tape. Duct tape works best.

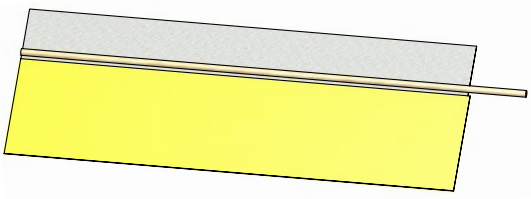
Below is one of best methods used to create a blades. You will need to create 3 blades to start.



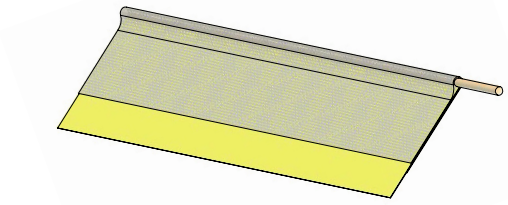
A. Cut a section of blade material.



B. Place tape half over the edge of the blade material.



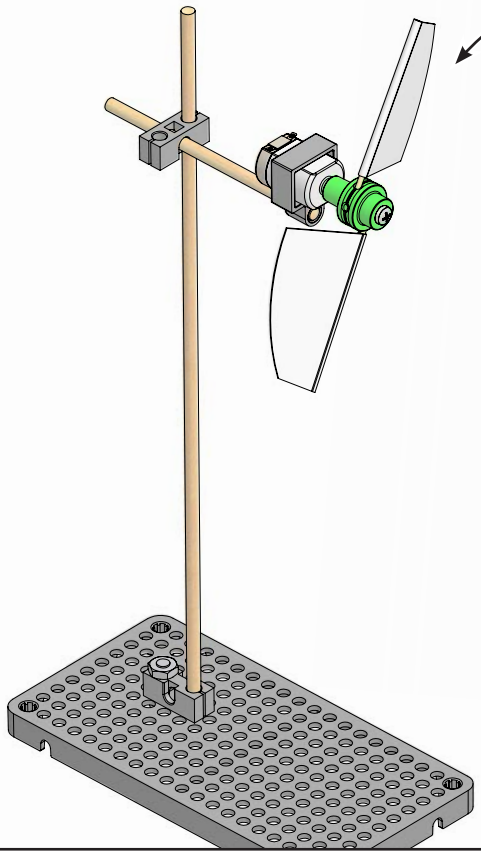
C. Place a skewer stick at the edge of the blade material, overhanging to one side.



D. Fold the tape and skewer stick over onto the blade material. Press to secure the tape.

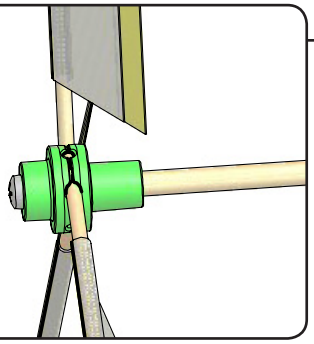
Step #11

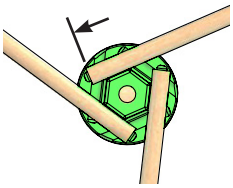
Attach the blades to the hub.



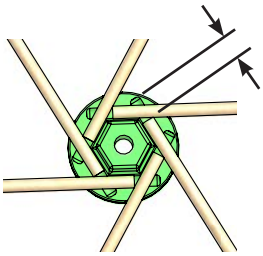
A. Loosen the hub screw 1/4 turn to allow blade skewers to slide in.

B. Tighten the screw when blades are positioned properly..



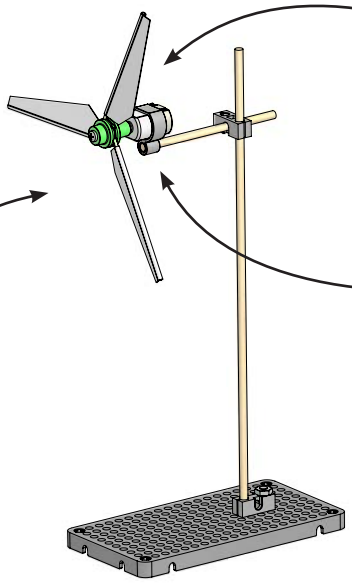


Three or fewer sticks can be inserted all the way into the hub holes.

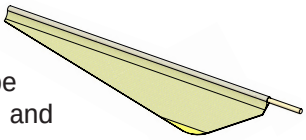


Six Skewer sticks can be inserted in a hub as shown.

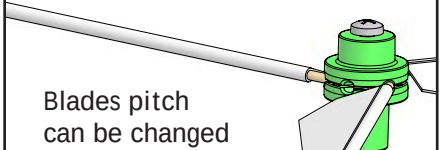
Experiment & Innovate!!!



Blades can be cut, shaped, and redesigned.



Blades pitch can be changed when the hub screw is loose.



Want to learn how to use and measure the energy output of your turbine?

Download the “Energy Output” document at TeacherGeek.com.