

# Blade Engineering Pack



User Guide

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## Materials Included

- Balsa wood blades
- Phillips head screws

## Items Required (not included)

- HD Bond II (or other white glue)
- Hobby knife
- Sandpaper
- Phillips screwdriver
- Washers
- Blade-reinforcing tabs
- Ruler
- Ballpoint pen
- WinDynamo Wind Generator (II or III)
- Safety glasses

## Cautionary and Warning Statements

- This kit is designed and intended for educational purposes only.
- Use only under the direct supervision of an adult who has read and understood the instructions provided in this user guide.
- Read warnings on packaging and in manual carefully.
- Always exercise caution when using sharp tools.
- This product is designed to be used only with the WinDynamo.
- Be sure to refer to the WinDynamo User Guide for any additional safety guidelines.
- Keep fingers away from rotating blades.
- Safety glasses required.

## Notes

- The Blade Engineering Pack is designed to be used with the WinDynamo, so students can design and test their own wind generator blades.
- The blade-reinforcing tabs are mandatory when attached to the WinDynamo to better secure the blades.
- The instructions for mounting the blades are the same for the WinDynamo III and WinDynamo II.

## Making the Blades

1. Measure and mark three 8" increments on a piece of balsa wood (Figure 1).
2. Cut along the measurements to make three 8" pieces of balsa wood (Figure 2).
3. Mark the balsa wood with guides for cutting your design (Figure 3).
4. Cut your design into each piece of balsa wood.
5. Use sandpaper to smooth the edges and to make each piece as identical as possible.



Figure 1



Figure 2



Figure 3

## Preparing the Blades

1. Line up one of the blade-reinforcing tabs flush with the edge of the blade. Make sure the side with the hole closer to the end is the one flush with the edge (Figure 4). **Note:** The blade-reinforcing tabs do not have to be centered.
2. Glue the blade-reinforcing tab to the blade.
3. Use a ballpoint pen to make a hole in the blade where the holes are in the blade-reinforcing tab. Repeat steps 1-3 for each blade.



Figure 4

## Mounting the Blades on the WinDynamo

1. Using the screwdriver, remove the six Phillips head screws and plastic washers from the three blade mounting surfaces (Figure 5).
2. Install the three generator blades you created on the blade mounting surfaces using the longer screws that come with the Blade Engineering Pack. The holes should line up (Figure 6).
3. Test out your blades with the WinDynamo.



Figure 5



Figure 6

## Ideas for Using the Blade Engineering Pack

- Use a multimeter to measure the voltage produced by different blade designs and record the results in a data table. These blade designs can also be tested with different fan speeds to see which design is best for which speed. Graph the results.
- Use a multimeter to measure the voltage produced when the pitch of the blades is changed and record the results in a data table. Graph the results.

