

a WOW Lab

BLUEPRINT

Wind Power - Outdoor Windmill

Shopping List - 10 ft. Outdoor Windmill

The list is divided into consumable and reusable items. Quantities listed assume that one windmill will be built. The listed initial cost assumes that the activity has never been performed before and that all of the materials must be purchased. Photos of some of the items can be found on page 6. The legend below provides details of where the materials can be found:

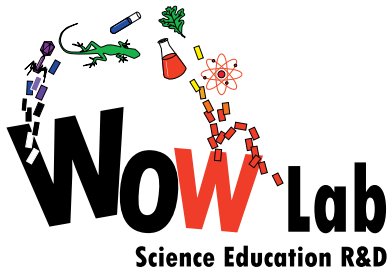
A = Arts and Crafts Store
D = Dollar Store
E = Educational Supplier

G = Grocery Store
H = Hardware Store
O = Online

P = Pharmacy
S = Specialty Store
U = University

Stage I - Construction of the Support Tower

REUSABLE ITEMS			
Item	Amount Required	Purchase Code	Total Cost
1 in. wood screw	6	H	\$5.50 (for 100)
1.25 in. pipe straps (preferably steel)	2	H	\$1.00
3/4 in. to 1/2 in. reducing coupling (figure 3)	1	H	\$4.00
3/4 in. steel tee fitting (figure 4)	1	H	\$2.50
1 in. to 3/4 in. reducing coupling	1	H	\$3.00
3/4 in. x 2 in. nipple	1	H	\$1.00
washer	4	H	\$3.00 (for 100)
3.5 in. hose clamp	2	H	\$3.00
15 ft. ratchet tie down (figure 6)	4	H	\$25.00
2 in. x 4 in. x 3 ft. piece of wood	1	H	\$2.30 (for 8 ft.)
7.5 in. plastic zip-ties	8	H	\$3.00 (for 20)
10 ft. steel pipe	1	H	\$10.00
4 in. x 1.5 in. piece of dense cardboard	1	—	free
3 in. x 2 in. piece of standard box cardboard	2	—	free
COST OF REUSABLE ITEMS STAGE I:			\$63.30



Tools

- screwdriver set or drill
- scissors
- wood saw

Stage II - Construction of the Blades

Large butterfly clips may be found at an office supplies store.

REUSABLE ITEMS			
Item	Amount Required	Purchase Code	Total Cost
4 ft. x 1/2 in. dowel	4	H	\$20.00
4 ft. x 1/4 in. dowel	1	H	\$1.50
canvas (canvas dropcloth)	3 ft. x 5 ft.	H	\$9.00
8 ft. x 1/2 in. x 1/2 in. wood strip	2	H	\$2.00
fast drying wood glue	250 ml	H	\$4.00
large butterfly clips	24	S	\$10.00
COST OF REUSABLE ITEMS STAGE II:			\$46.50

Tools

- staple gun
- scissors
- mitre saw
- drill and drill bit set
- vice (optional)
- measuring tape



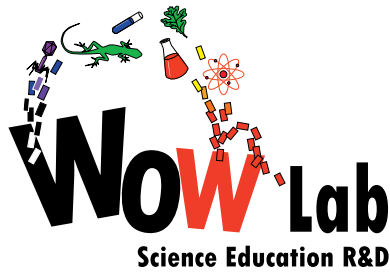
Stage III - Construction of the Rotor

See **figure 5** for an example of a constructed rotor.

REUSABLE ITEMS			
Item	Amount Required	Purchase Code	Total Cost
a circular piece of plywood with a diameter of 10 in. and 1 in. thick	1	H	\$5.00
3/8 in. pipe straps (figure 11)	12	H	\$3.00
size #8 bolts, nuts and washers	28	H	\$5.00
3/4 in. steel flange	1	H	\$5.00
1/8 in. wide eye screws	8	H	\$3.00
COST OF REUSABLE ITEMS STAGE III:			\$21.00

Tools

- pencil
- tape measure
- protractor
- drill and drill bit set
- scissors
- glue



Stage IV - Assembly of the Nacelle

See **figure 7** for an example of a constructed nacelle.

REUSABLE ITEMS			
Item	Amount Re-quired	Purchase Code	Total Cost
2 ft. x 2 in. x 4 in. sections of wood	1	H	\$6.00
20 in. hose clamp	2	H	\$3.00
12 in. hose clamp (figure 9)	2	H	\$3.00
3 ft. section of 2 in. PVC piping	1	H	\$0.50
3 ft. x 3 ft. piece of plywood	1	H	\$10.00
1 in. steel flange (figure 1)	1	H	\$5.50
1 in. x 6 in. steel nipple with at least one threaded end (figure 2)	1	H	\$5.00
electric motor (figure 8) (See <i>Additional Information</i> section for details)	1	H	N/A
1 in. wood screws	1	H	bought in Stage I
15 ft. insulated wire (figure 10)	2	H	\$4.00 (for 50 ft.)
COST OF REUSABLE ITEMS STAGE IV:			\$37.00

Tools

- flat head screw driver
- hand saw



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Wind Power - Shopping List

Stage V - Outdoor Assembly of the Windmill

REUSABLE ITEMS			
Item	Amount Required	Purchase Code	Total Cost
6 in. metal tent pegs	4	H	\$5.00
COST OF REUSABLE ITEMS STAGE V:			\$5.00

Tools

- hammer

INITIAL COST FOR CONSTRUCTING THE 10 FT. WINDMILL: \$172.80



Figure 1 - 1 in. Steel Flange



Figure 2 - 1 in. x 6 in. Steel Nipple



Figure 3 - Reducing Coupling



Figure 4 - Steel Tee Fitting



Figure 5 - Rotor



Figure 6 - 15 ft. Ratchet Tie Down



Figure 7 - Nacelle



Figure 8 - Electric Motor



Figure 9 - Hose Clamp



Figure 10 - Insulated Wire



Figure 11 - Pipe Strap