

The “Not So Perfect” Fish Windmill
A.K.A. Does It Work Or Not?
A.K.A. Am I Wasting My Time With These Plans?

Like other crazy ideas for furniture or my kinetic sculptures, I tend to dive into the energy and vibe associated with a cool project like this without really knowing if the finished project will turn out the way I envision. My egg shaped windmill being a great example where the first iteration of that design didn’t catch enough wind to turn easily in the wind. I had to add more surface area to the blades for it to work, and it still requires faster wind speeds to turn. In lighter breezes, it just sits there even though it looks pretty cool. My granddaughter does enjoy giving it a spin by hand. That said, there’s no point in hiding or faking the end results of this project, so I’m telling you the unvarnished truth.

WHY FISH? We live on a small lake that has been dry since we moved to this home. Back in 2020, a series of connected lakes and earthen dams overflowed and the dams failed, flooding several communities in our county. It’s taken years to rebuild homes, lives, dams and communities but now we expect to see some water come back next year as the reconstruction of the dams comes to a close. Dams hold water. Held water leads to restoration of the lakes. Lakes hold fish. Because it’s Michigan, I expect to see an entire community of Bluegills and Minnows congregating under our dock here. Bluegills and Minnow shapes for a sculpture seemed an appropriate tribute for the return of the lake.

THE OTHER SHOE I chose a horizontal design for this sculpture, and placed the fish designs on the center hub distributed as points on a hexagon. I tried to make the Bluegill shapes as big as I could while still fitting them around the perimeter of the hub. As you see in the video, my first testing in the shop with a high speed blower does make the Bluegills turn in the wind so I got prematurely excited about my next successful kinetic sculpture. **(THUD)** *The shoe drops.*

I really love the look of this small sculpture and it followed all the same design principles I used in my other two successful garden windmills; high speed bearings to eliminate friction, 35 degree flat windmill blade angles, wider surfaces to catch wind. Except, it didn’t turn at all in moderate winds like by double wheel flower or my egg windmills do. It takes very strong winds for this sculpture to work, so it mostly sits out there in our back yard landscaping looking cool, fishes smiling at you, not turning at all. My granddaughter doesn’t seem to care. It gives her something to play with and it’s still a nice decorative garden sculpture.

ACCEPTANCE So now you know the whole story, warts and all. If you like how it looks and you don’t mind that you have to make it an interactive sculpture; (meaning you might need to give it a manual spin), then please enjoy this project and the designs and drawings below. For that matter, you could make more of a farmyard sculpture too, exchanging fish for pigs or cows. Make it your own and have some fun!

GENERAL OVERVIEW:

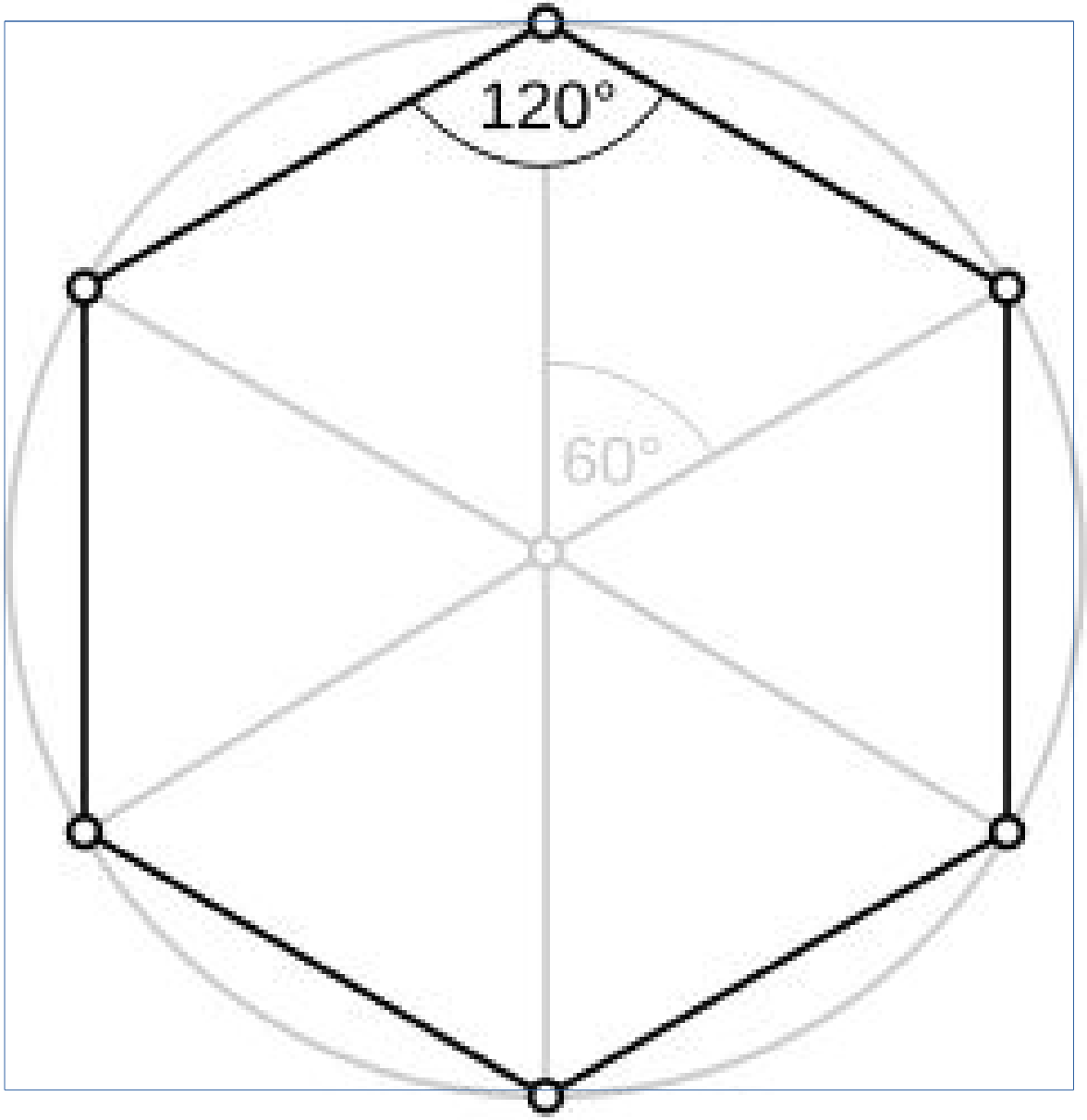
Unlike some of my other furniture build and birdhouse plans, this project leaves plenty of room for your own personal preferences and artistic interpretation. Before cutting my first fish templates, I had changed the design to enlarge the fish and then have fewer of them on the main hub (Originally I planned for an octagon layout with 8 smaller fish shapes). I also chose to use a rare hardwood that might be hard to get in your area. The point is, it may not make sense to list out all the specific detailed cut dimensions and products I used when getting some materials may be difficult. It's also easy to change some of the design details and make this project your own. That said, this isn't a detailed set of build plans, but I wanted to share the overall design templates I used to cut out my pieces. Refer to the video to see how all those components come together and use these templates and graphics as your own starting point.

Change It – Make It Your Own Design: I liked a number of fish shapes for this windmill, but ultimately chose to use fish varieties that are common to our lake, namely Bluegills and Minnows. I also know that wider bodied fish species like Bluegills, Crappie or Sunfish will catch more wind. Skinny Pike, Perch or Gar fish shapes might not. Use the attached printed cut outs or feel free to pick another wide body fish you prefer for your windmill.

Size: My finished windmill will be relatively small at about 20 inches wide and flat, with a height off the mounting pole of 10 inches. You can make it smaller or larger to suit any space limitations you may have in your garden. This flexibility of design also means that your finished project dimensions may be different than mine and that's okay!

What Matters Most: The actual size of your hub, or length of your brass rods or the wood materials you choose for your project matter far less than a couple of key design elements. **First,** the larger and wider your fish shapes can be, the better chance they will have to catch wind. **Second,** the angle of the fish at 35 degrees off from the 90 degree center line of your brass rod is optimal for wind capture. **Third,** The installation of your bearings on your main spinning hub must be perfect in order to eliminate any friction and allow your windmill hub to spin freely in the wind. Check out the build video to see how these elements were managed during the assembly.

Safety: If you are uncomfortable using power tools as shown in the video, please ask someone more experienced to help you with this project. Woodworkers enjoy helping out other creative woodworkers! Please read all safety and usage instructions for any power tool, adhesive, or wood finish you use and be sure to wear all recommended protective equipment during the project. Protect your eyes, ears, fingers and lungs while making a joyful mess in your garage or wood shop!



The Six Inch Template

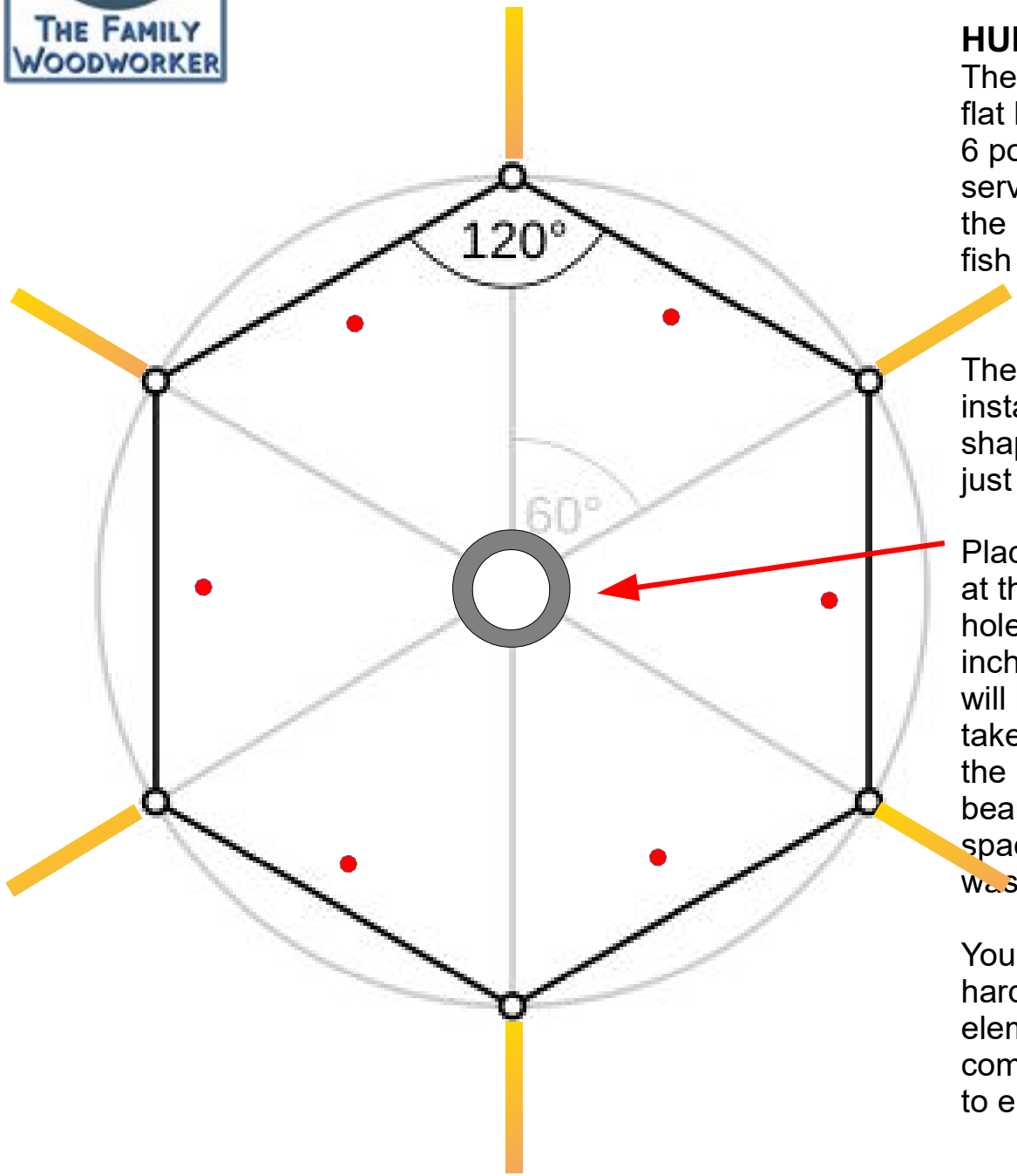
This matches the 6 inch diameter main hub used in the video. Print this, enlarge or reduce the image as needed to meet your needs or lumber limitations.

Wood Selection

I used a heavy and oily hardwood known as “Ipe” which withstands the outside elements very well. You may choose to use another hardwood variety that works well in wet conditions, sealed periodically with an exterior wood preservative. This hub should be 1 ½ inches thick. I do not recommend using soft woods like Pine, Poplar or Cedar as they may not handle the stresses of rotational motion as well.

Fish Thickness

While I cut down my thicker Ipe wood stock into ½ inch thicknesses for the fish, it would be easier to use standard ¾ inch hardwood lumber like Maple for your project. Ipe is very dense and holds up well at ½ inch on my other sculptures. Other wood varieties may need to be thicker to handle higher winds.



HUB LAYOUT:
The windmill will turn on the center of a 6 inch round flat hub, with wooden fish images placed equally in 6 positions around the hub. This hexagon graphic serves to show the 6 inch round outline as well as the locations of the brass rods used to attach the fish on the main part of the sculpture.

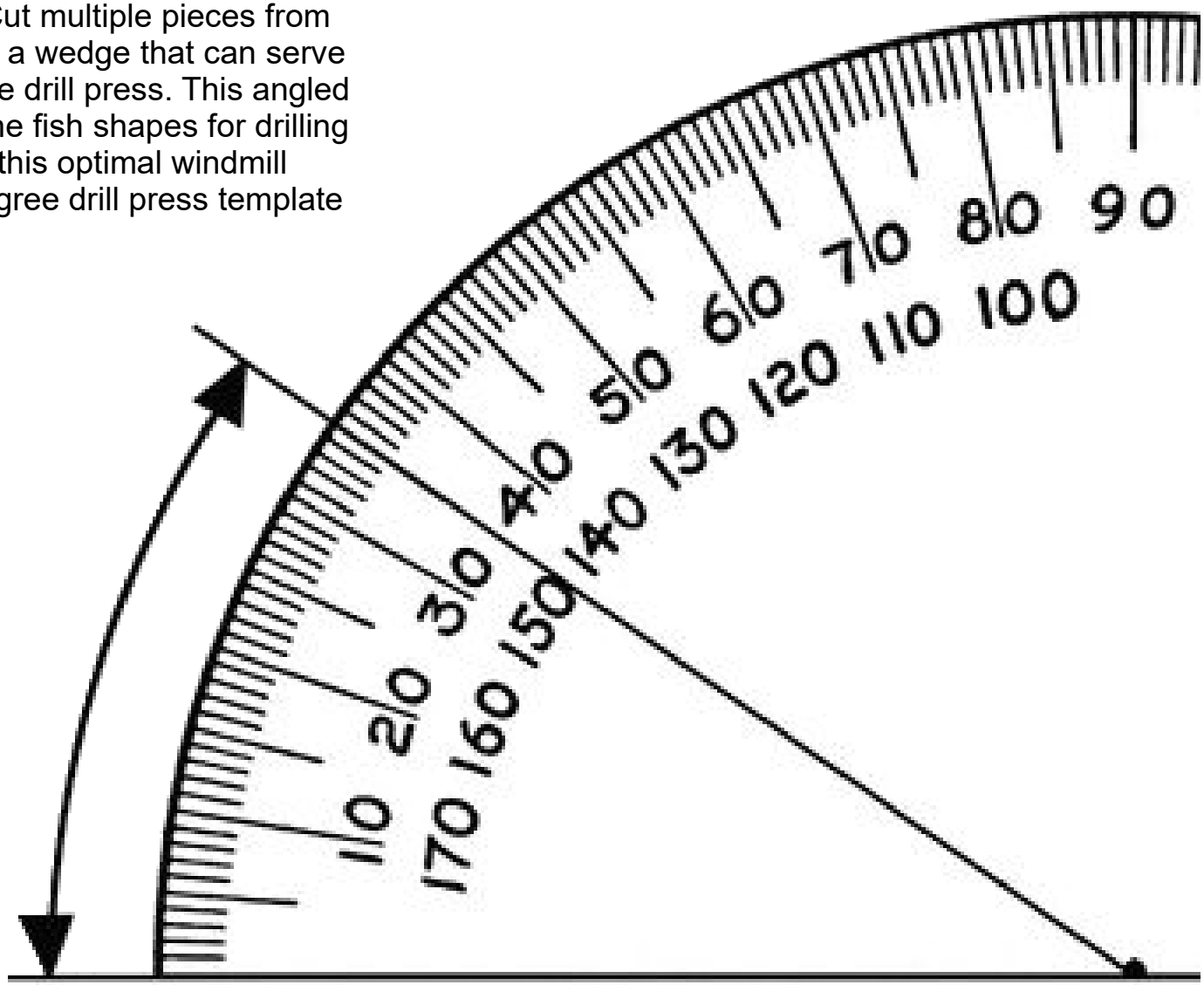
The red dots indicate the location of the thinner rods installed vertically that will attach to smaller minnow shaped pieces. This added step is optional and is just for appearances.

Place a set of standard 22 MM roller blade bearings at the center of the round flat hub. This centered hole can be cut with a 22MM Forstner bit, or a 7/8 inch Forstner bit also works for me. These bearings will be epoxied in place on the main hub, with care taken to apply the adhesive only on the outer rim of the bearing and drilled hole walls. Connect as many bearings as you need to fill the hole. Separate or space the bearings with roller blade spacers or washers as needed.

Your wood should be 1 ½ inches thick in a hardwood choice that is resistant to outdoor elements and moisture. See the video for more commentary on how to install the bearings properly to ensure frictionless rotation.

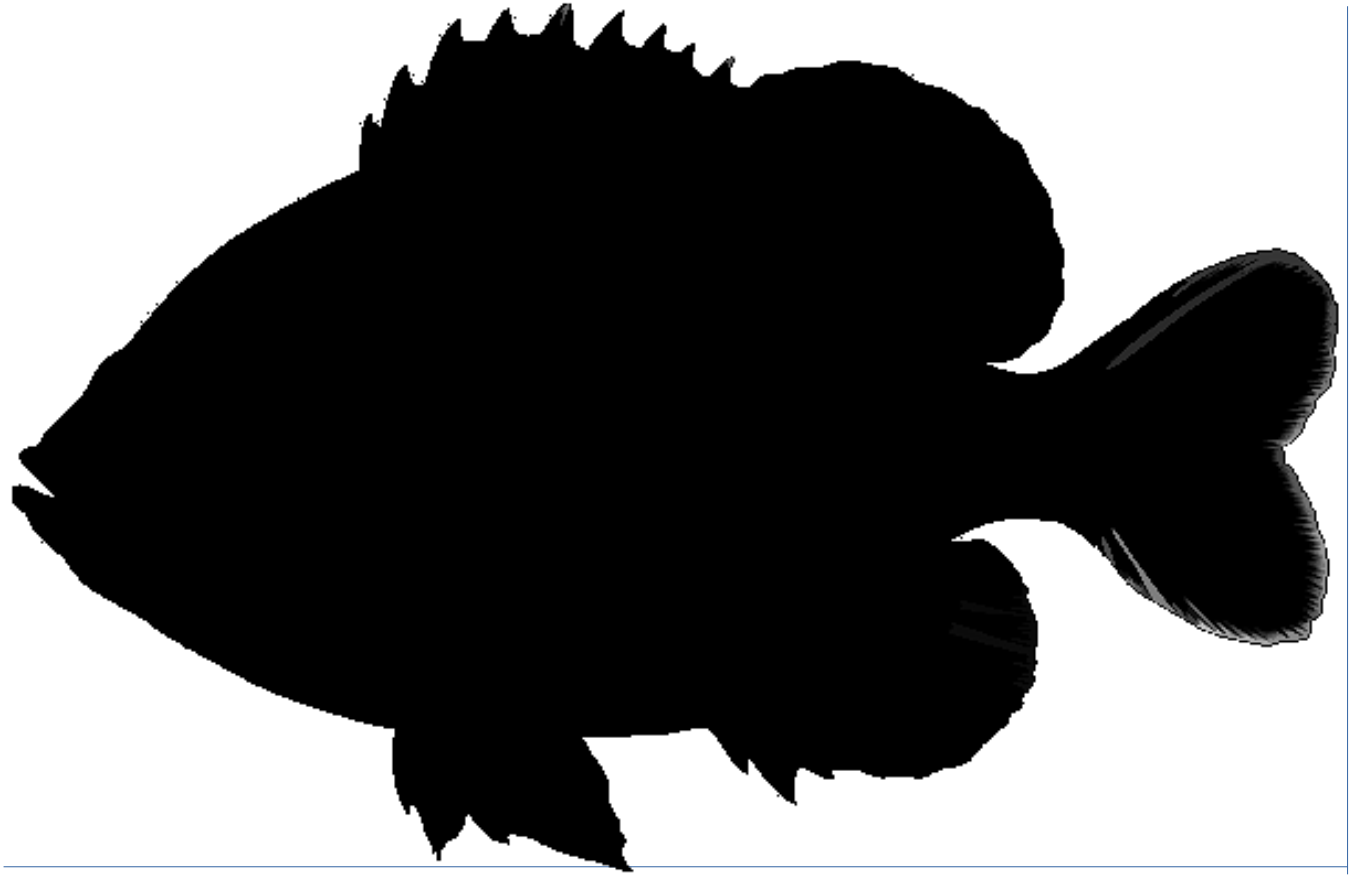
The Optimal Windmill Angle

Print this page / enlarge the angle and make a wood template (like in the video) cut at a 35 degree angle. Cut multiple pieces from scrap 2X6 to make a wedge that can serve as a platform on the drill press. This angled platform will hold the fish shapes for drilling your brass rods at this optimal windmill blade angle. 35 degree drill press template shown below (left).



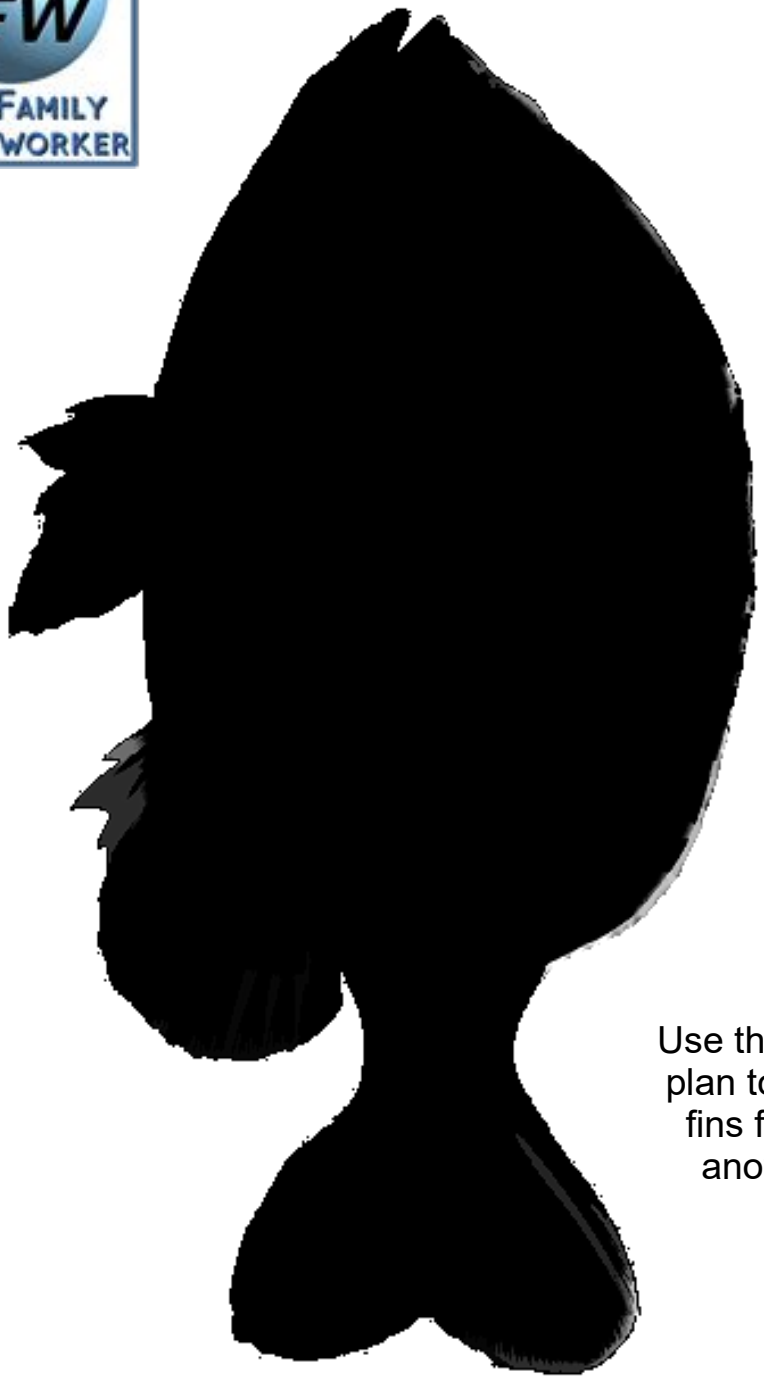
Double faced tape holds the fish down on the 35 degree wedge during drilling.

Bluegill graphic printed on 11 X 8 ½ standard paper but can also be adjusted to fit an international A4 paper standard. Actual size of the fish graphic can vary to suit your own size preferences for this garden windmill. Top fin will be removed for the wooden cut-out to be replaced by a 20 mil copper sheet insert as in the video. You can choose to duplicate this graphic and cut the entire fish outline out of wood, skipping the copper insert if preferred.

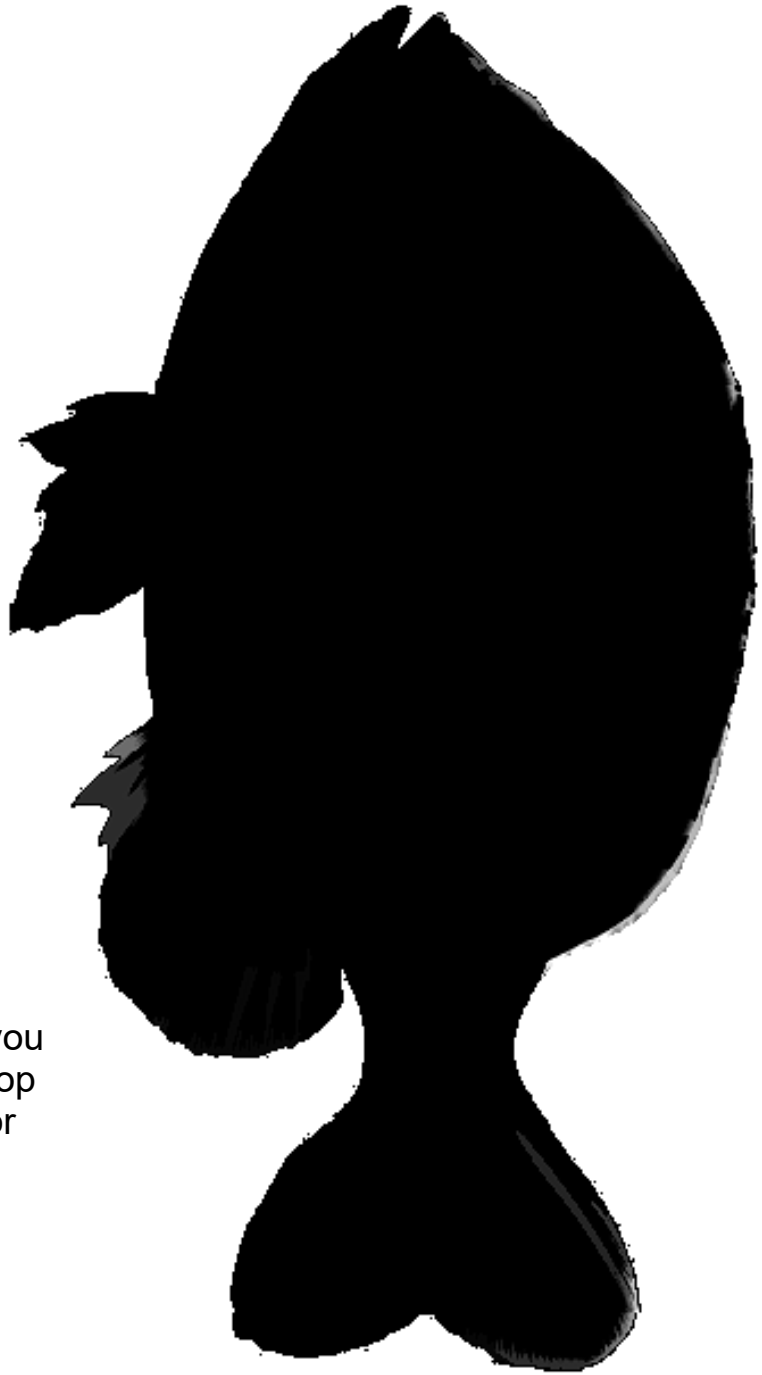


4 ½ Inches

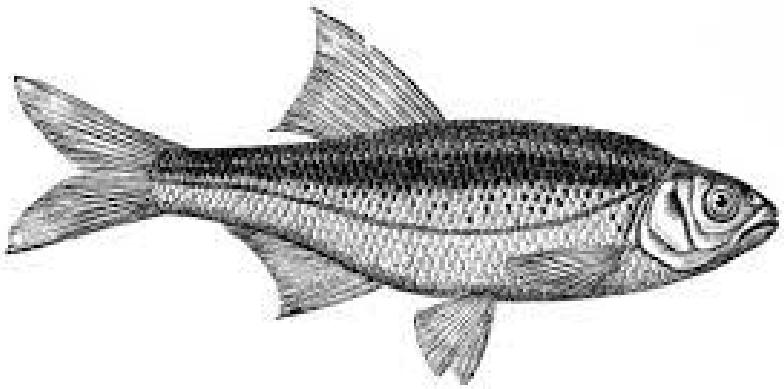
7 inches

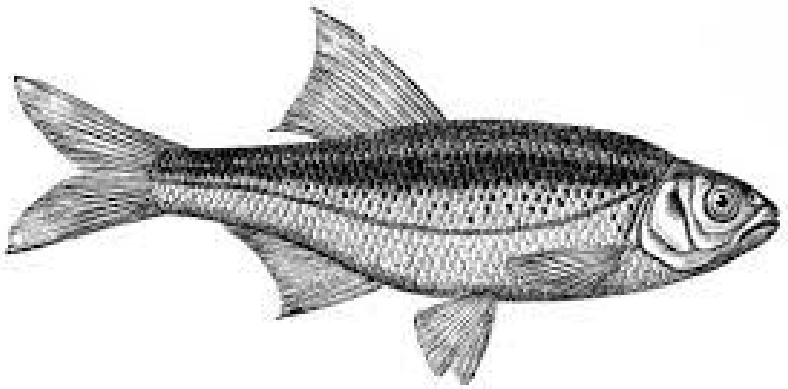


Use this graphic if you plan to create the top fins from copper or another material.

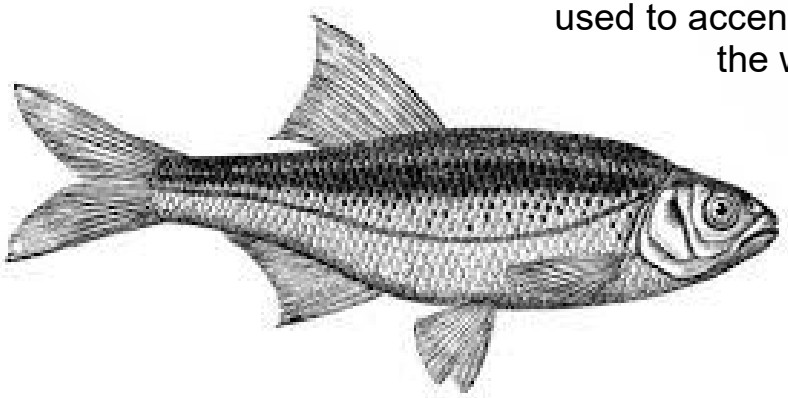


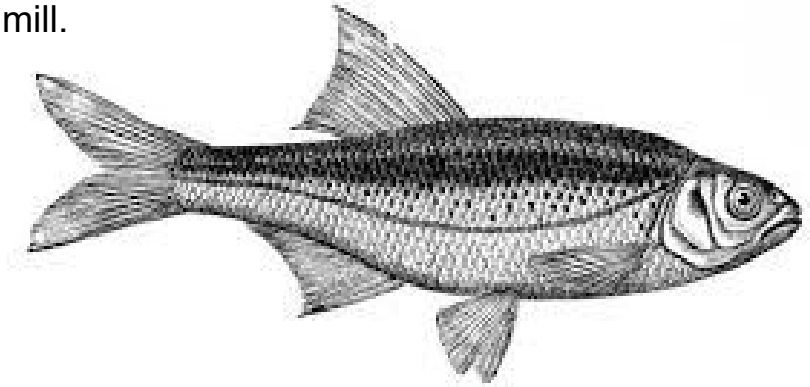
Use this graphic if you prefer to cut the wooden fish outlines that include the top fin..

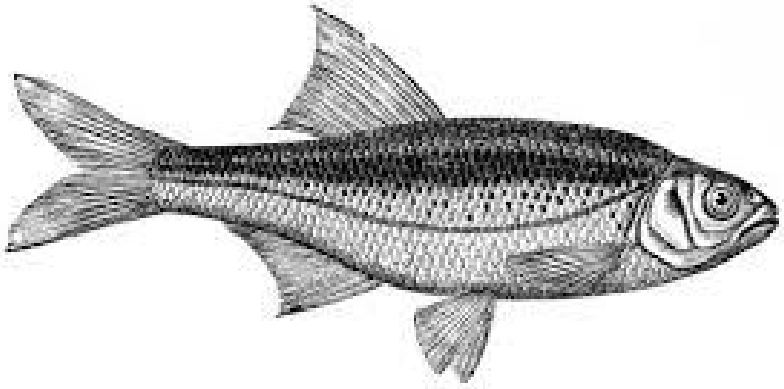


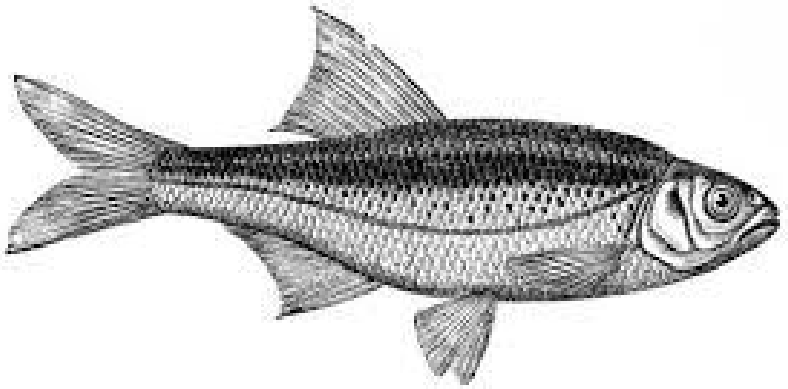


Smaller minnow graphics can be used to accent the upper part of the windmill.



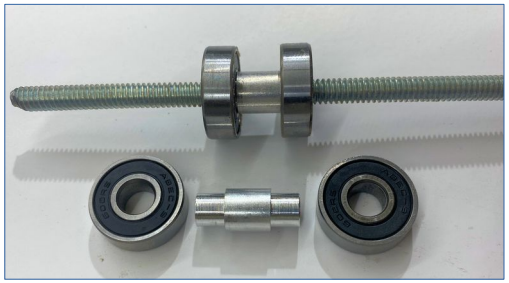






Other Materials:

Base:
You'll need a base thick enough to mount on a pole or post of your choosing, and to mount the threaded rod that will hold the upper windmill sculpture down. This base can be multiple thicker pieces of wood, epoxied together as shown left. I've mounted this base over a cut-off steel flower pot hook, though you could mount the base on top of a thicker post in your own garden. Hardwood materials are preferred for the base here, sealed well against wet weather conditions.



Bearings / Threaded ¼ inch bolt or threaded rod:
Standard sized roller blade bearings and a single spacer are required for the spinning part of the windmill. I prefer bearings that are pre-greased and sealed with rubber rings. Amazon sells these pretty cheaply. All bearings will mount over a ¼ inch piece of threaded rod, epoxied in place in the top of the base shown above.

Brass Rods:
I used (3) 14 inch brass rods cut in half to give me (6) ¼ inch brass rods at 7 inches long. I also used a 36 inch piece of 1/8 inch brass cut down to smaller lengths to support the minnow shapes on top of the windmill. See the video for more detail on how the brass rods were cut and shaped.

Other Materials:

Secret Copper Tarnishing Sauce
Wearing rubber gloves Mix the following:
1 cup of vinegar
½ cup of household ammonia (Mine was lemon scented and yellow)
1 Tbsp salt

Mix until salt is dissolved You may choose to let the copper soak, but it needs to be air dried in order for the oxidation to begin. In the video I used a spray bottle and a heat gun to accelerate the green patina. Do this several times to get a deeper green color. Note that the green oxidation will be easy to wipe off with your hands, but since you accelerated the oxidation process, it will turn more green after is spends some time outdoors. Sanding the copper sheet with fine grit sandpaper also aids the oxidation process.