G y r e s

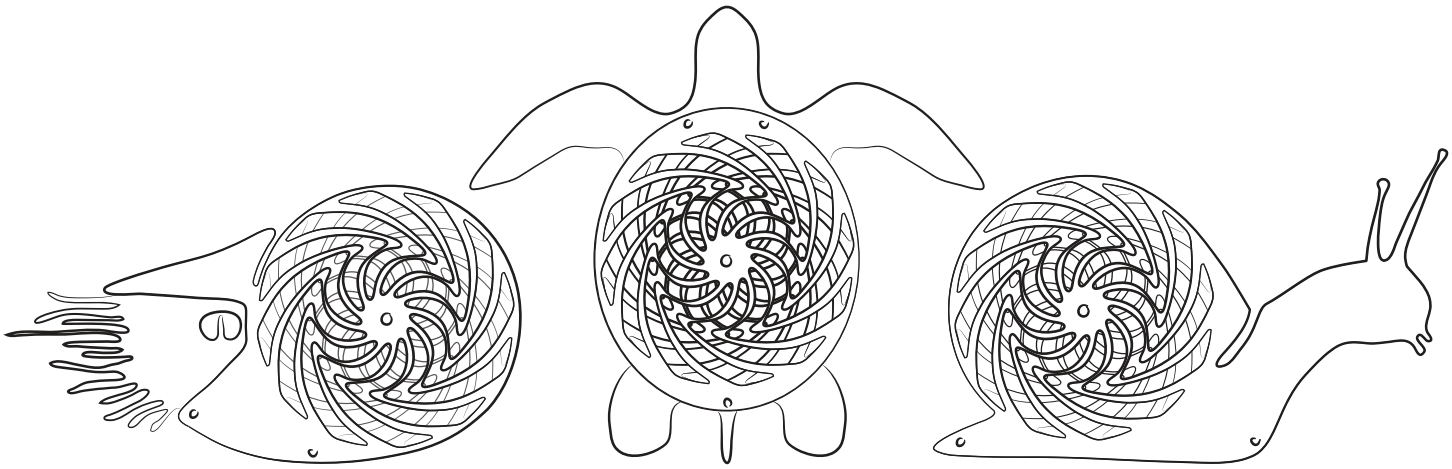
simple kinetic sculptures

sample

Important information:

McMaster Carr, a supplier whose part numbers are referenced throughout this document, can only ship within the United States. Builders outside of the U.S. must find an alternate supplier for the required hardware.

Hardware part numbers and availability are subject to change.
Verify that all hardware or equivalents are obtainable prior to purchasing these plans.



The parts list in this sample plan set is for Gyre Turtle.
The Snail and Nautilus Gyres use the same hardware as the Turtle, but quantities vary.

design by Derek Hugger

WARNING!

Gyres are not toys. They contain small pieces that could be hazardous to small children.

Gyres are cantilevered from their wall mounting points. As such, if used improperly, they can be separated from and fall from the wall where they are mounted.

Gyres must only be placed in locations where the people who can reach them understand how to properly use them.

The Basics

Contents

These plans include all the information required to build Gyre. They provide an outline of the build process, tips for an accurate and successful build, lists of required tools and off-the-shelf components, a complete parts list, full scale patterns for all plywood parts, and step-by-step assembly instructions.

Before Building

Read and understand all instructions before building. Failure to do so will lead to increased frustration levels, lengthened build times, wasted material, and other vexing occurrences.

Build Process

Always wear eye protection and any other necessary personal protective gear. Read, understand, and abide by all manufacturer instructions and warnings for all tools used.

1. Use a light duty/general purpose spray adhesive to temporarily bond the patterns to plywood. Apply the adhesive evenly and sparingly.
2. Drill the holes first, and then cut out the parts. Hole alignment between parts is critical to proper function, so care must be taken to drill the holes accurately. Take time to cut out the parts accurately. An accurately cut part will require less sanding and less modification later.
3. Remove the patterns from the cut plywood parts, and then sand the parts to remove rough edges and any residual adhesive.
4. Following the assembly instructions, build all subassemblies and then the Top Level Assembly. While assembling, cut and tap all aluminum tubes and brass tubes as required. See Plywood Thickness Compensation in Tips + Tactics.
6. If desired, disassemble Gyre to finish its components. Do not remove the bearings once they're pressed in. Do not get stain or finish into the bearings.

Notes

When printing the patterns, always print at 100% scale. Do not use the "scale to fit page" option.

Gyre contains many moving wood parts as well as wood parts that stack onto one another. As such, using a quality, flat Baltic birch plywood is very important. Cheaper, lower quality plywood, such as types often found at home improvement stores like Home Depot, can be warped and knotted.

Changing humidity levels can cause wood parts to swell and move. Some binding or changes in performance may occur with changes in humidity. As humidity levels return to normal, so too should the system's performance.

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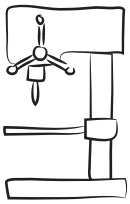
Tools

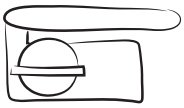
Required

Power Tools


bandsaw


scroll saw


drill press


belt/disc sander

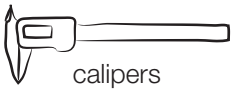
General


brad point drill index
1/16" to 1/2"
in 1/64" increments


drill bit #29


tap 8-32


hacksaw


calipers


precision files

Drivers


phillips #1


hex 5/64"

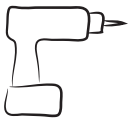
Supplies

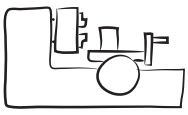

sandpaper

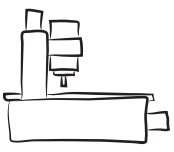

spray adhesive

Recommended (but not required)

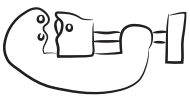

mini chop saw


drill


metal lathe


cnc router*


vice


tube cutter


reamer
0.2530"

* A CNC router is an optional replacement for the bandsaw and scroll saw for cutting the plywood parts.

Tips + Tactics

Tapping

Gyre's metal tubes must be tapped for an 8-32 thread. Expand the 0.12" inner diameter holes with a #29 drill bit before tapping the threads. When tapping the metal tubes, use plenty of lubricant. Never force the tap; if it feels like it's going to break, it probably will. For every 1/2 to 3/4 turn the tap advances into the metal tube, back it out about 1/4 turn. Repeat this process until the tube is threaded to the desired depth - advance a bit, then back out a bit, advance a bit, then back out a bit.

Aluminum Tube Notes

When a hole diameter callout in a plywood part matches the diameter of a mating aluminum tube, that tube must press tightly into the plywood and must not come loose or rotate freely. If a tube does not press firmly into its mating plywood part(s), that tube may be glued into place.

The bearings should slide snugly down the Gyre's central aluminum tube. If any force is required to install the bearings onto the tube, sand or grind the tube down until the bearings slip over it. Do not over sand or over grind the tube, as the bearings and Spinner Wheel Asm will then feel loose. Do not sand or grind the section of the tube that presses into the plywood.

Wall Mounting

Use the Wall Mount Template as a guide for locating Gyre's two mounting points on a wall. The large horizontal and vertical lines indicate the center of Gyre. Mount into studs or use appropriate anchors to ensure that Gyre will not fall or otherwise separate from the wall.

General Operation

Gently spin the Spinner Wheel Asm to generate Gyer's optical effects. Note that plywood density is not constant, and as such, it is normal for the Spinner Wheel Asm to be slightly off balance; it will likely oscillate back and forth a bit like a pendulum once it slows down.

Parts + Assemblies List

Type	Description	Qty
1/2” Plywood	Spinner	1
1/2” Plywood	Turtle Mount	1
1/2” Plywood	Turtle Shell	1
1/4” Plywood	Spinner Cap	1
1/4” Plywood	Turtle Front Flippers	1
1/4” Plywood	Turtle Rear Flippers	1
Metal	Aluminum Tube	4
Metal	Brass Tube	1
Metal	Bearing	2
Metal	LSHCS 3/8”	2
Metal	LSHCS 3/4”	3
Metal	Screw	8
Metal	Washer	2
Subassembly	Spinner Asm	1
Subassembly	Turtle Asm	1
Subassembly	Turtle Mount Asm	1
Top Level Asm	Gyre Turtle	1

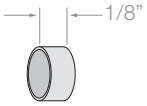
Metal

Description	Qty	McMaster Carr P/N *
Aluminum Tube (see image below)	4	89965K23
Brass Tube (see image below)	1	8859K25
Bearing (see image below)	2	57155K376
LSHCS 3/8" Low Socket Head Cap Screw, 8-32 Thread, 3/8" Length	2	93615A315
LSHCS 3/4" Low Socket Head Cap Screw, 8-32 Thread, 3/4" Length	3	93615A323
Screw Pan Head Self Tapping Screw, #2, 1/2" Length	8	92470A098
Washer #8	2	90107A010

Aluminum Tube 1/4" Outer Diameter, 0.12" Inner Diameter

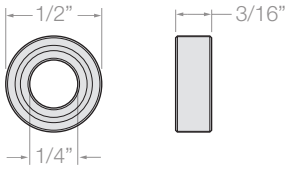
Drill thru the tube with a #19 drill bit,
then tap both sides for 8-32 threads.

Brass Tube 9/32" Outer Diameter, 0.253" Inner Diameter



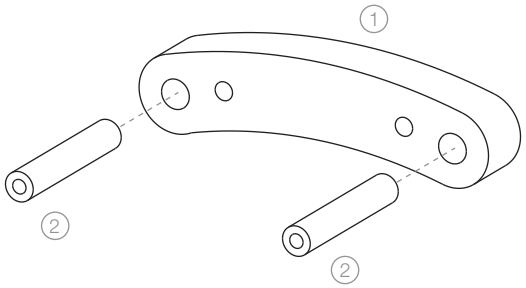
Cut length may vary. See Brass Tube Notes in Tips + Tactics.

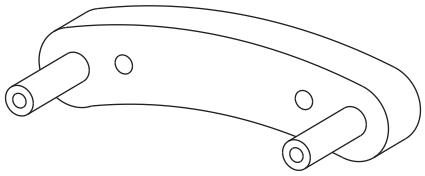
Bearing Double Shielded, ABEC-5



* Part numbers referenced are from www.mcmaster.com.

Wall Mount Asm





1	Turtle Mount	1x
2	Aluminum Tube	2x

Ensure the Aluminum Tubes press tightly into the Wall Mount.

Using the Wall Mount Template as a guide, mount this assembly to the wall.