

marbleocity®

ARCHIMEDES SCREW

ASSEMBLY INSTRUCTIONS



LET'S GET THIS ROLLING!





Hello!

Thank you for being a Tinkineer! We've taken great care in creating the experience that you are about to embark upon. We want your build, whether performed alone or with a family member, to be something special and memorable. Hands-on fun awaits!

The kit you are about to construct is made of real wood, right here in the United States of America! Sometimes knots or other anomalies hidden in the material can cause a part to be cut incorrectly. Not to worry! If you encounter an issue that we didn't catch, visit our website and use the "Contact Us" button at the bottom of any page to let us know what you found. We'll make it right.

One of the things about a kit is that, while we've tried, we can't fully predict exactly how you will approach the build, what things you will find easy and what things you will find difficult. At the end of the day, it's important to us that you and/or your family have a wonderful experience. If you don't, it means that despite our best attempt, there may still be an instruction to tweak or an aspect of the design to improve upon.

We'd like to take this opportunity to open a two-way dialog. If you had a great experience, we want you to tell us and, of course, your friends. If you didn't, we would like the first opportunity to make things right for you. Please reach out to us using the website link and we'll get right back to you. Allow us to help - to offer a friendly construction tip or to ship a replacement part.

When you're finished, it would give us great pride to see how your completed model turned out. Share your photos, videos, and comments on our Tinkineer Facebook page and on Instagram. Tag us @tinkineer and/or contact us directly from the website.

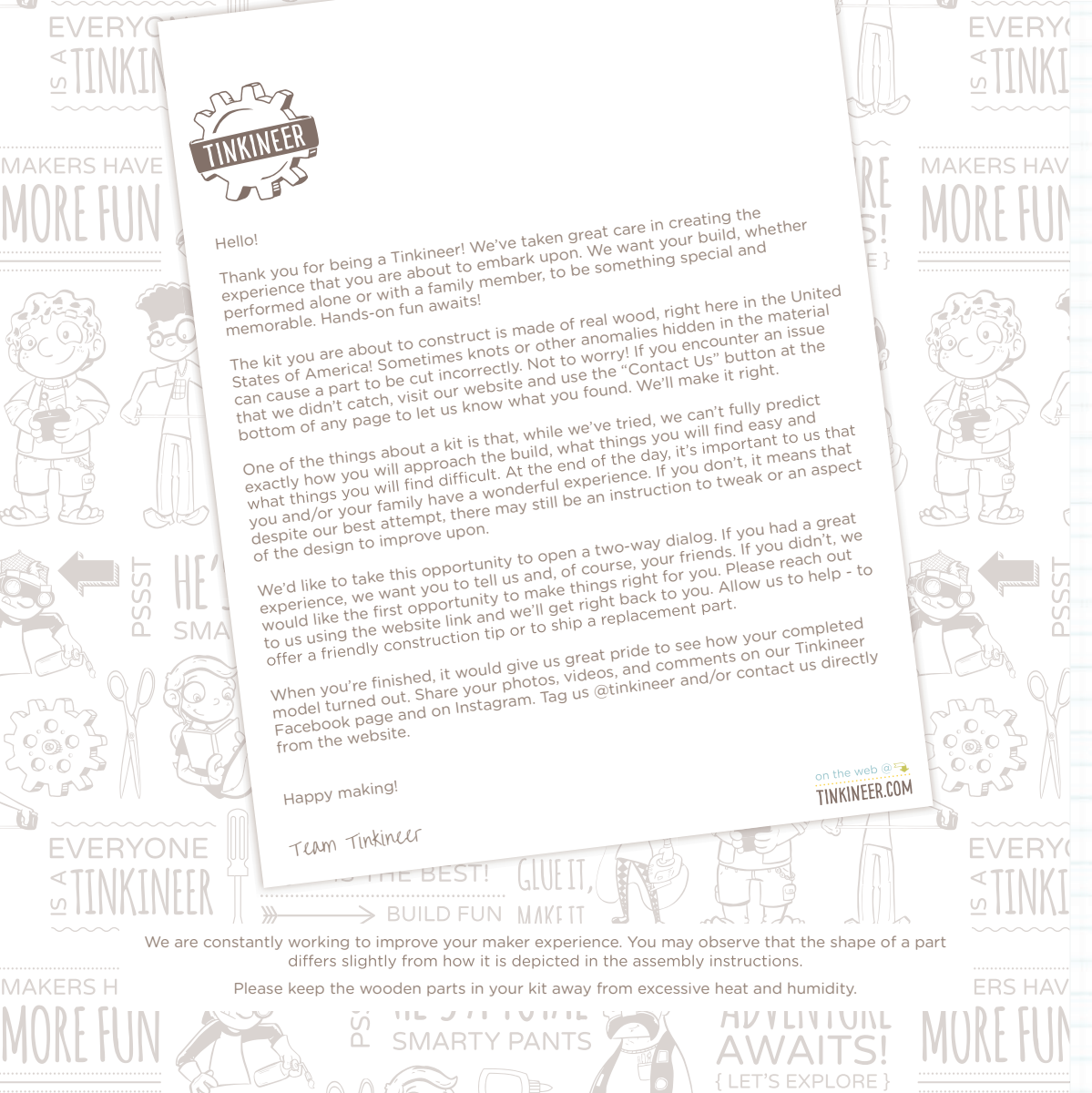
Happy making!

Team Tinkineer

on the web @
TINKINEER.COM

We are constantly working to improve your maker experience. You may observe that the shape of a part differs slightly from how it is depicted in the assembly instructions.

Please keep the wooden parts in your kit away from excessive heat and humidity.



WELCOME!



Hi! My name is Adam and I'm the creator of the Marbleocity® product line.

When I was a kid I loved machines, contraptions and, of course, marble ramps. I also loved building models but I found the plastic materials unsatisfying and model cement hard to work with. Today, amazing laser-cutting technology exists to craft highly detailed shapes out of wood. The real wood parts in your kit have a great tactile feel and can be assembled easily with household white glue.

The kit that you are about to build was carefully designed to be a great maker experience that you'll enjoy in and of itself. But beyond that there's a little physics and a lot of engineering experience waiting for you. The graphic novel that begins on the next page will teach you about a really clever engineering innovation that was originally designed thousands of years ago! Although conceptualized in ancient times, the Archimedes Screw still has useful applications today in our modern world!

Another goal of this Marbleocity maker project is to show how you – yes, you! – can build a seemingly complex machine out of simple parts. Simple parts become sub-assemblies and sub-assemblies come together to construct an amazing, working machine that you built yourself. So grab your glue and let's get started!

Adam B. Hocherman
Chief Tinkerer

GETTING HELP FROM OUR COMMUNITY

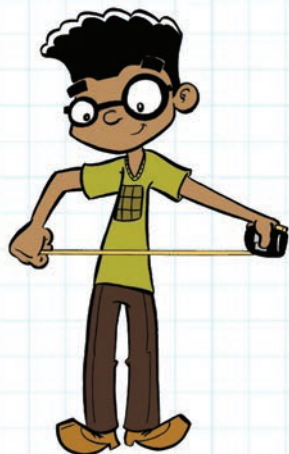
Have a question about a step you're working on? Need a video tutorial? We're building a community of Tinkerers – just like you! Please visit us online at Tinkerer.com/community.

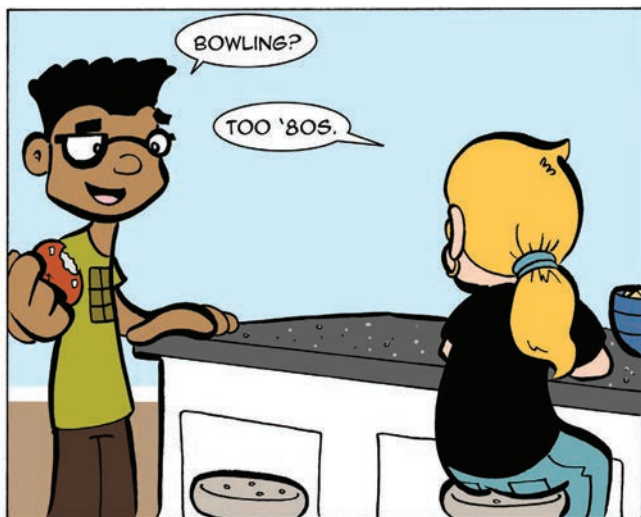
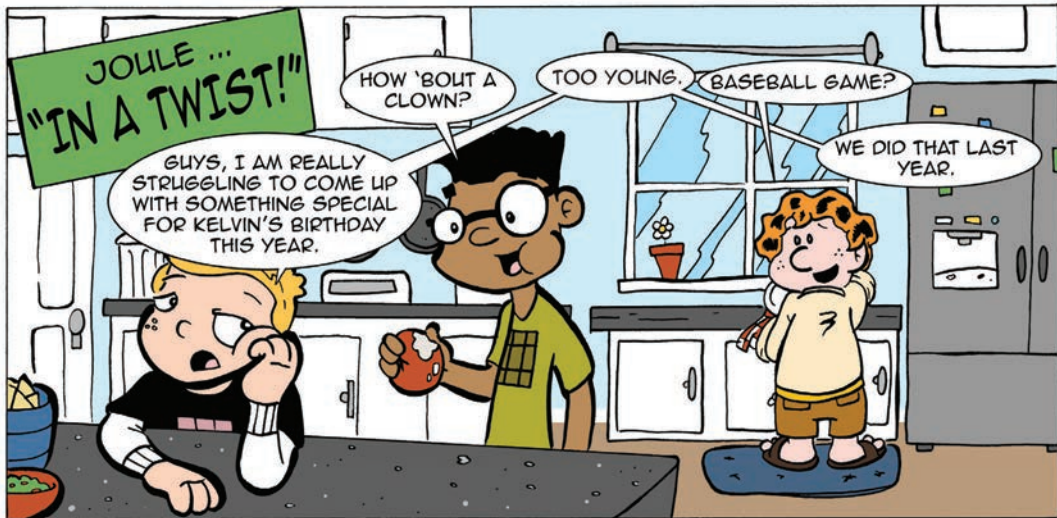
LEARNING MORE

Today you'll be building your very own model that utilizes an Archimedes Screw to lift marbles up in order to perform useful work ... well, in order to do something fun, anyway! If you'd like to learn more about the Archimedes Screw (and other clever engineering mechanisms) start at Wikipedia.org. You can also find a variety of cool videos highlighting real-world applications on YouTube.

A NOTE ABOUT SAFETY

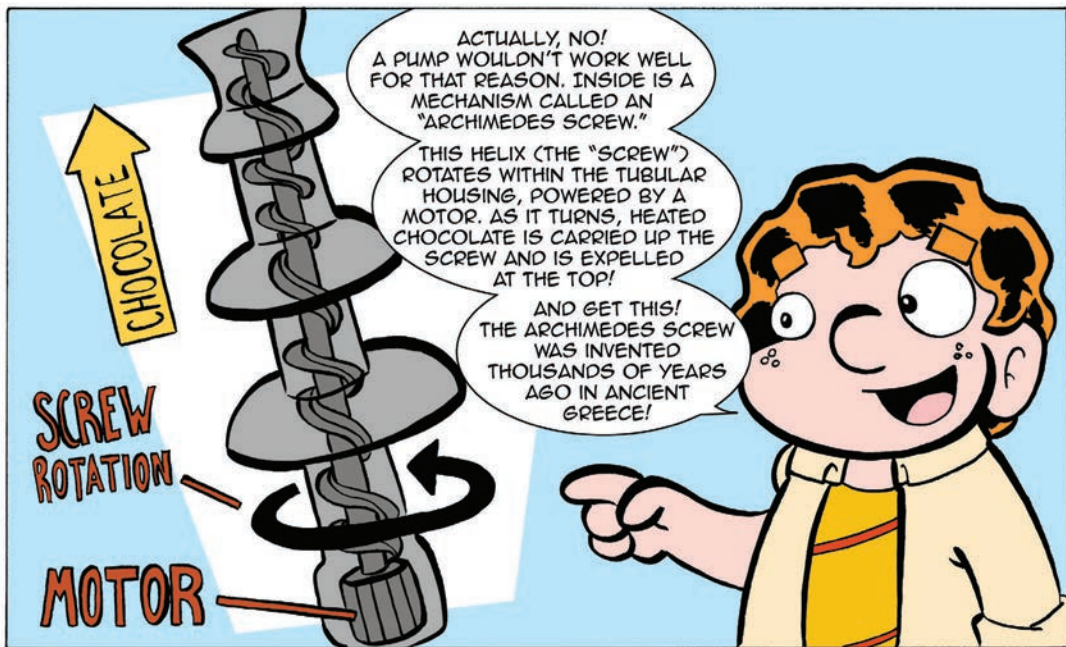
The kit that you are about to assemble is designed for children and adults ages 8+. It contains marbles and other small parts that can be a choking hazard for children under 3 years old. If you have younger siblings or other small children living in your household, please keep these small parts safely out of their reach.

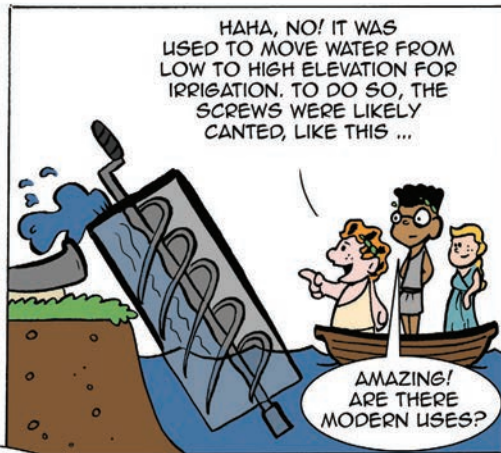












LET'S DO THIS!

READY TINKINEER?

For this project you'll need:



Elmer's® Glue-All® Multi-Purpose white glue. A good, household white glue is the best glue for the job - it's easy to work with, makes a strong bond in 20-30 minutes, and dries perfectly clear so your finished marble machine will look great! Elmer's® Washable School Glue will bond but Glue-All® is recommended for the best experience.



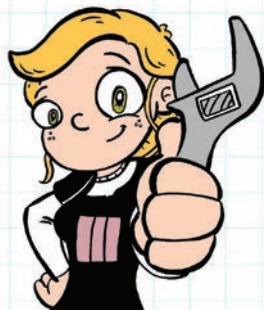
Wax paper. Scavenge a sheet of wax paper from your kitchen - it's the perfect work surface. Household white glue will not stick to it and you'll avoid mom's wrath by protecting the kitchen table.



Round toothpicks. These are perfect for applying glue. Make a puddle on your wax paper work surface and use the tip and/or edge of a toothpick to apply glue to your wood parts.



A wax stick is used to lubricate wood bearing surfaces that rub against one another.



TIPS ON TECHNIQUE

> [Check Tinkineer.com/community](https://www.tinkineer.com/community) for helpful videos.



Test Fit First!

Most steps can be test assembled without any glue at all! Check your part fit and marble operation first and then apply glue second.



Applying Glue to Flat Surfaces

Use glue sparingly - you don't need a lot! Wipe away excess glue using your finger or the edge of a clean toothpick.

BREAK SOMETHING? NEED A REPLACEMENT PART?

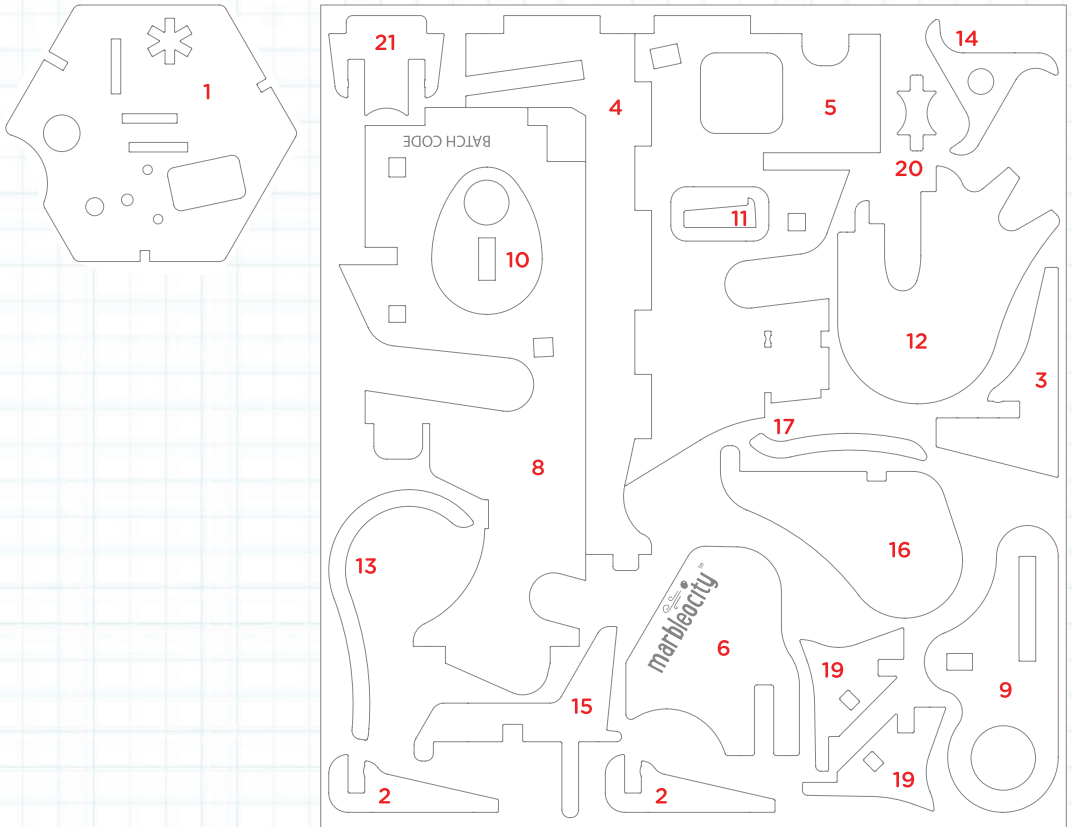
Marbleocity is a natural wood product! Sometimes a hidden knot can slip past our quality control gurus. If you need a replacement part contact us at [Tinkineer.com](https://www.tinkineer.com). Please have your batch code handy, which is located on the bottom of upright part #8. The batch code is the last six digits found on that part. See example at right.

603231

[example only]

HERE ARE THE PARTS!

All of the wooden parts required to create your model are pictured below. If you have trouble identifying a part during the build, you can find it below.



NOTE: Parts are not drawn to scale.

STEP 1

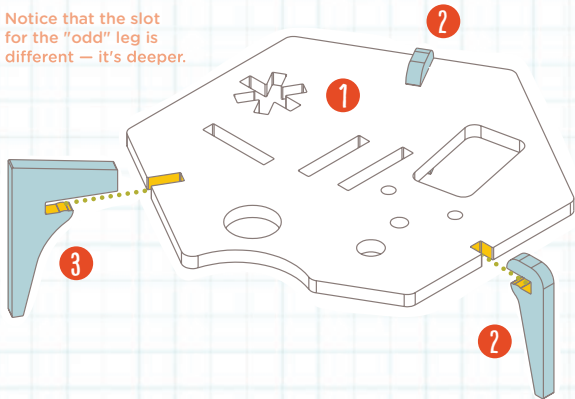
PLATFORM

Working on a sheet of wax paper, apply glue using a toothpick.

Start with the platform [1]. Attach the two identical legs [2] and the "odd" leg [3]. Notice that the slot for leg #3 is deeper than the other two slots.



Notice that the slot for the "odd" leg is different – it's deeper.



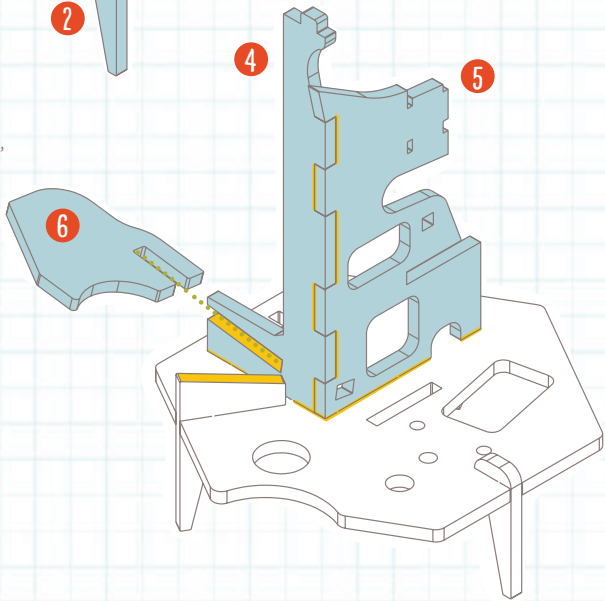
Use your judgement, but we've provided suggestions regarding where to add glue, highlighted in yellow.

STEP 2

UPRIGHTS

Working off the platform, glue uprights [4-5] together at right angles. Apply glue and then lower the new assembly down into the slots in the platform.

Next, slide feeder ramp [6] into place as shown.



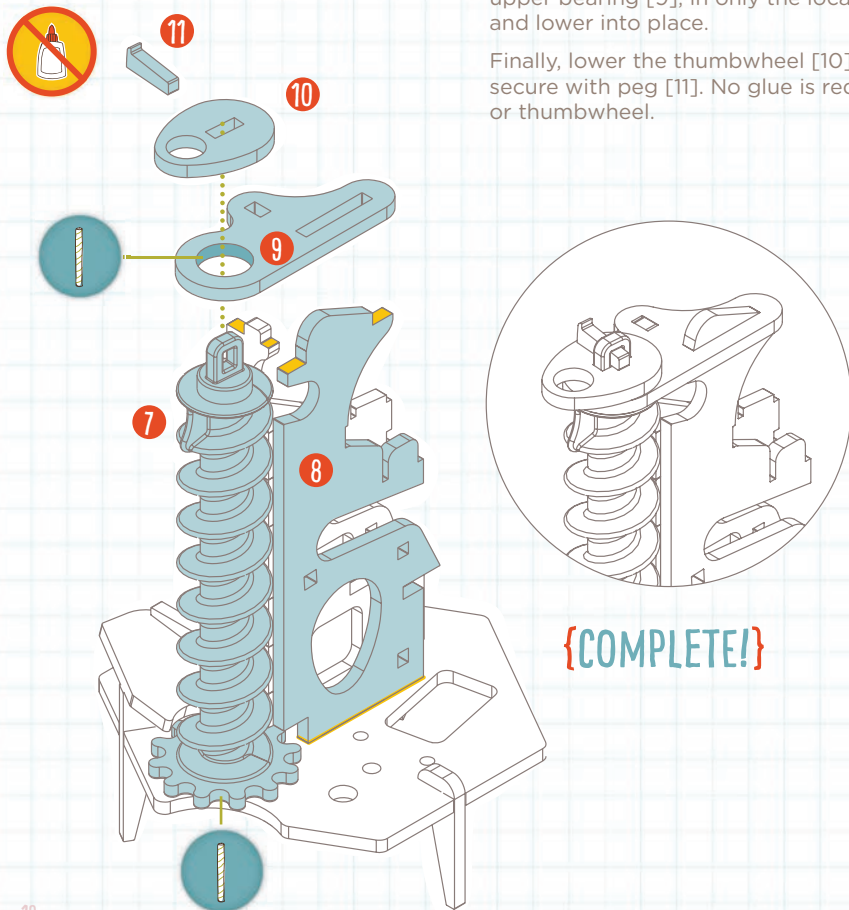
STEP 3

ARCHIMEDES SCREW!

It's time to install this model's namesake! Rub a little candle wax inside the holes which form the bearing surfaces for your Archimedes Screw.

Rest the Archimedes Screw [7] into place (no glue!) and then glue upright [8] to the platform. Add glue to upper bearing [9], in only the locations highlighted, and lower into place.

Finally, lower the thumbwheel [10] into place and secure with peg [11]. No glue is required on the peg or thumbwheel.



{COMPLETE!}

STEP 4

LOWER RAMP & PINWHEEL

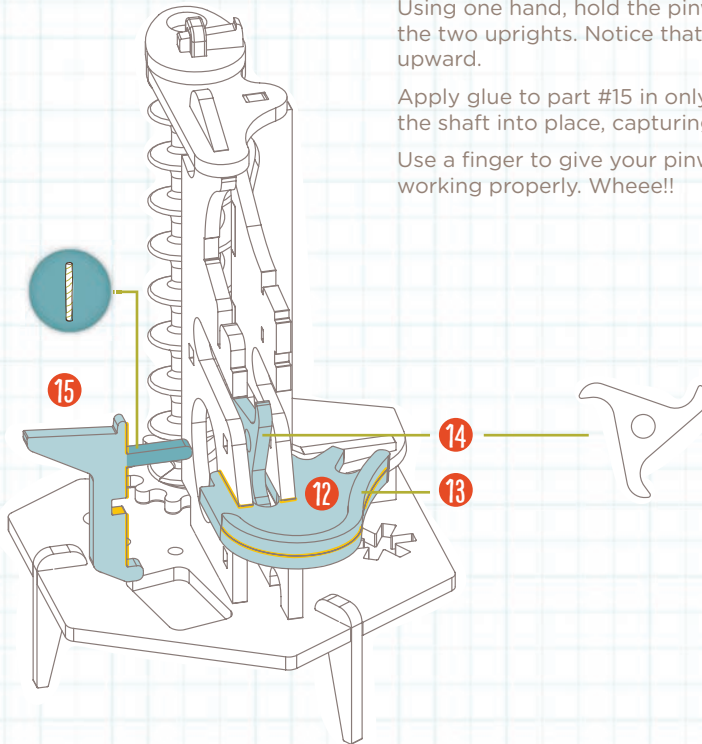
Install the lower ramp [12] by sliding it forward into the slots in the uprights. Add its rail [13], aligning the edges carefully.

Using your wax stick, add a little lubrication to the pinwheel shaft [15] before installing it. Next, install the pinwheel ... here's how!

Using one hand, hold the pinwheel [14] in place, between the two uprights. Notice that the pinwheel "claws" point upward.

Apply glue to part #15 in only the locations shown! Slide the shaft into place, capturing the pinwheel as you do so.

Use a finger to give your pinwheel a test-twirl to ensure it's working properly. Wheee!!



TIP

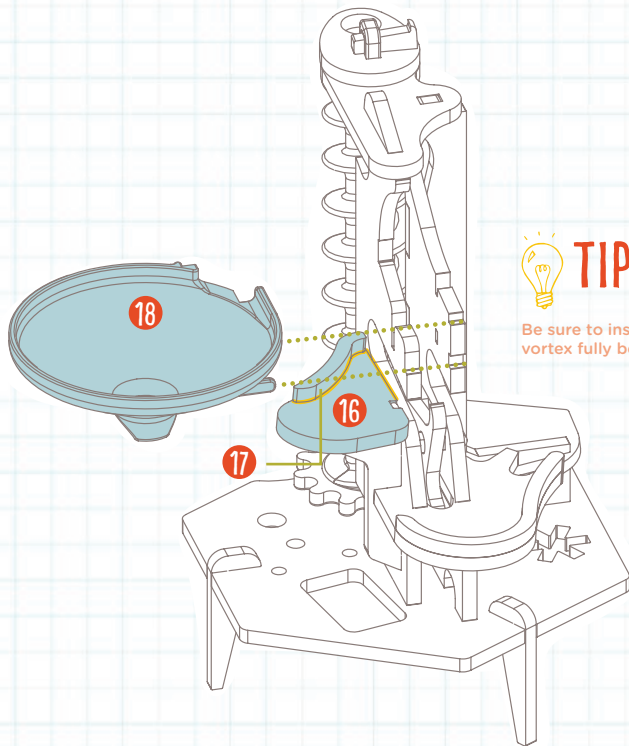
The pinwheel "claws" point upward. The marbles are "caught" here which is what creates the spinning action!

STEP 5

UPPER RAMP & VORTEX!

Install the upper ramp [16] and its rail [17] as shown in the diagram.

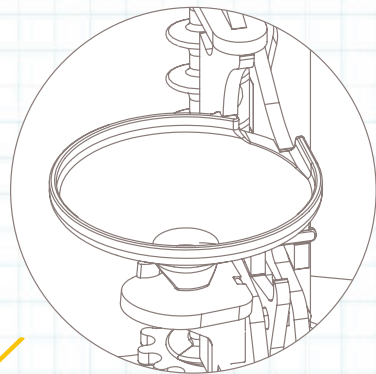
Next, without glue (yet), slide your vortex [18] into place. Its brackets span the two wooden uprights and protrude slightly on the far side (see insets). Add a dab of glue in these locations to hold the vortex in place.



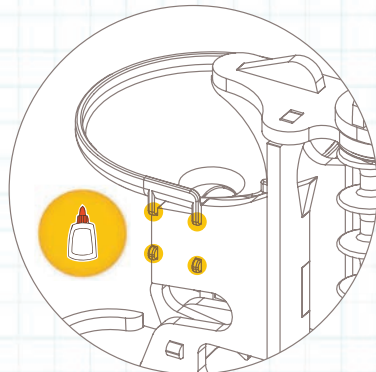
TIP

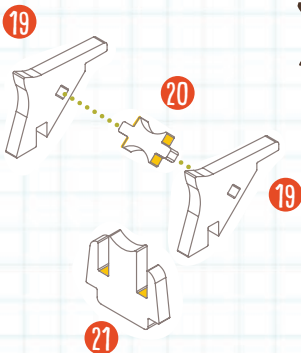


Be sure to insert your vortex fully before gluing.



{COMPLETE!}



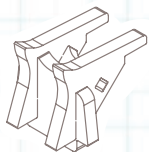


STEP 6

DIVERTER

Assemble your diverter from the four parts shown at right. Start by gluing the two sides [19 x2] to cross-brace [20]. Then take that assembly and drop it into the slots on diverter base [21].

You can position your completed diverter on your model, as shown below, while the glue dries. But be careful! The diverter does not get glued to the platform. You'll rotate this diverter later, when you link up additional Triple Play models!



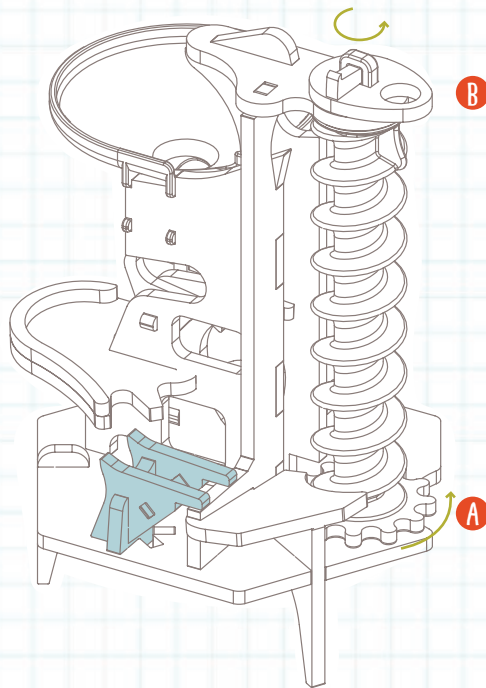
{COMPLETE!}

STEP 7

GO FOR A RIDE!

Congrats! You did it! You've completed your model! Let the glue dry and then take her for a test run.

Drop a few marbles at the bottom of the Archimedes Screw. Use your finger to rotate the screw at point [A] or use a pencil eraser (or similar object) to spin the screw at point [B].



POWER UP!

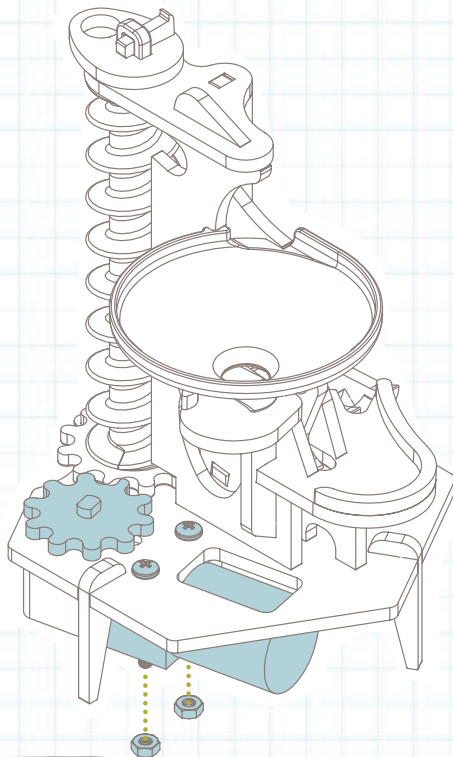
[OPTIONAL] ADD A MOTOR!

Individual Triple Play models can be operated by hand but for even more fun, add a motor kit (sold separately).

First attach the motor to the underside of the platform using the hardware included with the motor kit. Then, slip the 10-tooth gear onto the white motor shaft that protrudes above. Rotate the screw slightly, as necessary, to allow the gears to mesh properly.

The wires and battery box are not shown in this diagram. Follow the instructions included with the motor kit to make connections and get things running.

And, by the way, you will need a motor kit if you want to connect the Archimedes Screw to another Triple Play model. You can even connect it to a second Archimedes Screw kit, if you or a friend has one!

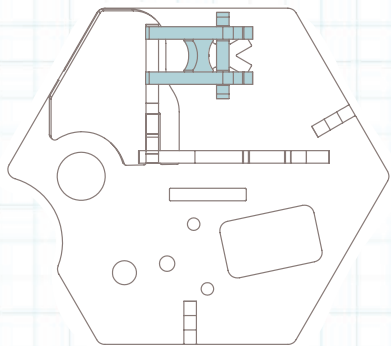


CONNECT!

CONNECTING MODELS!

The secret to connecting multiple models together is to rotate the diverter. The illustration at left shows a top view of the model after completed (some parts have been removed for clarity).

On the next page we'll show you how you can connect two or three models ...

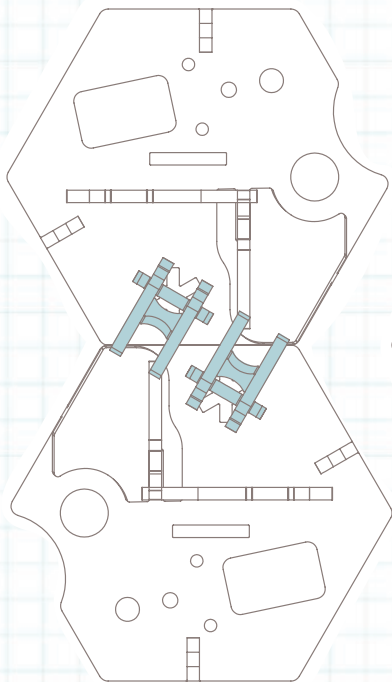


CONNECT!

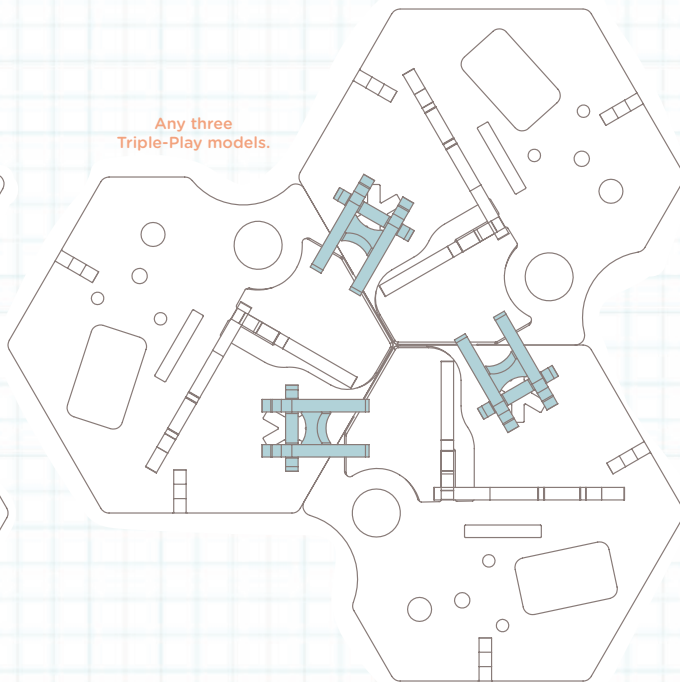
CONNECTING MODELS (CON'T)!

Two or even three Marbleocity Triple Play models can be motorized (motor kits sold separately) and connected for an even more dynamic marble machine experience! Notice that the diverter can be positioned in one of three different ways. Follow the diagrams below to arrange your models adjacently to one another and position the diverter on each model accordingly.

Any two
Triple-Play models.



Any three
Triple-Play models.



WHERE TO GO FROM HERE?

CONGRATULATIONS!

You've just built a complex, three-dimensional marble machine out of flat wooden parts and learned some physics in the process. Nice work!

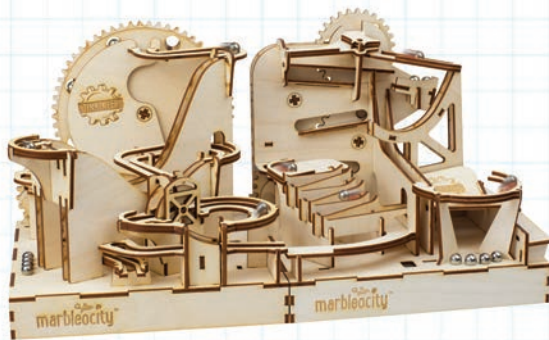


TELL US ABOUT IT! SHOW US!

We hope you enjoyed building/making with us. We'd love to see your Archimedes Screw. Did you decorate your model? Where did you put it?



Share your photos and comments on our Tinkineer Facebook page and Instagram feed. Tag us @tinkineer. Or contact us directly at www.tinkineer.com/community.



MAKE MORE!

Good news, there are more Marbleocity kits available! Check out additional Triple Play models like Chaos Mountain or our try a kit from our "Mini" series, such as the Mini Skate Park pictured here. For the intermediate maker, there are larger models which offer a more challenging build and more complex rolling action!

POWER UP AND CONNECT!

Add the optional Motor Kit to power your Marbleocity model and keep those marbles rolling. Then you're ready to connect for the most epic experience! Connect any three Triple Play kits together (mix and match)! In addition, our two large Marbleocity kits are designed to interact together such that marbles pass between those models. So cool!

VISIT TINKINEER.COM/PRODUCTS TO LEARN MORE. WE'LL SEE YOU THERE!

EVERYONE
IS A TINKINEER



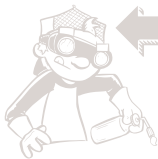
LEARNING
IS THE BEST!
BUILD FUN

TRIM IT,
GLUE IT,
MAKE IT.



EVERYONE
IS A TINKINEER

MAKERS HAVE
MORE FUN



PSSST

HE'S A TOTAL
SMARTY PANTS



ADVENTURE
AWAITS!
{ LET'S EXPLORE }

MAKERS HAVE
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LEARNING
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CUT IT,
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GLUE IT,
MAKE IT.



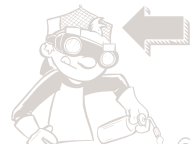
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{ LET'S EXPLORE }

MAKERS HAVE
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 **WARNING:**
CHOKING HAZARD.

Kit contains marbles and small parts.



We wanna hear about all the fun you had!

Contact us at: Customer Service, 1400 E. Inman Pkwy.,
Beloit, WI 53511 • playmonster@playmonster.com • 1-800-524-4263.
For more fun, visit playmonster.com

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