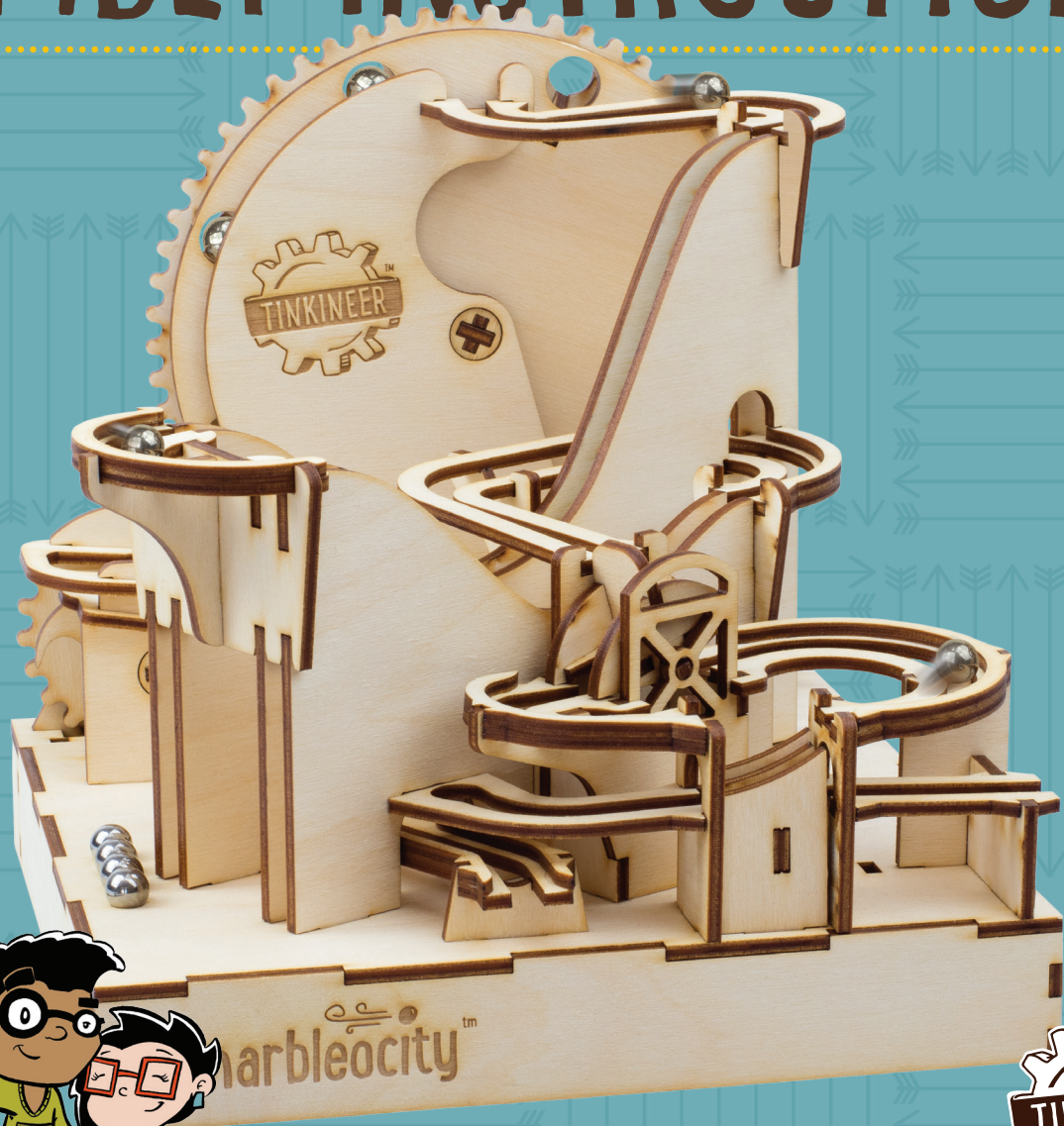


marbleocity™

DRAGON COASTER

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

At Tinkineer 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 some of the science that goes into real roller coaster design. Our goal is to expose you to some introductory physics that you'll encounter when you get to high school. More importantly, the construction of the Marbleocity Dragon Coaster will show you 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 Tinkineer

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 Tinkineers – just like you! Please visit us online at Tinkineer.com/community.

LEARNING MORE

The physics that you'll be learning about today is called Conservation of Energy and it's one of the fundamental tenets of our favorite area of physics, called "mechanics". You'll see these concepts again, most likely in your introductory high school physics class. With Marbleocity our goal is to expose you to the high-level concepts so that when you get to the classroom the subject matter is familiar. If you'd like to learn more, on your own, there are great resources available on the web. If you're looking for a place to get started, check out Khan Academy at khanacademy.org/science/physics.

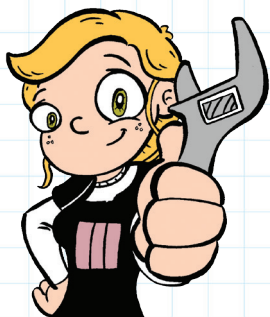
A NOTE ABOUT SAFETY

The kit that you are about to assemble is designed for children and adults ages 12+. 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.

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LET'S DO THIS!



Hope you enjoyed Iggy's adventure and that you picked up a little physics along the way! Now it's time to build the real thing and see those principles in action. The "build" is designed to be performed in five, one-hour sittings.

The "days" are designed to allow glue to dry at critical points so that your final result comes out perfectly. Don't be afraid to take your time! What you're building is not only fun to look at — it's a machine that really operates! Take time to make sure that tabs are fully inserted into slots and that mating surfaces are flush. Follow the tips on this page to achieve a great finished product!

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!



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.



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



TIPS ON TECHNIQUE >

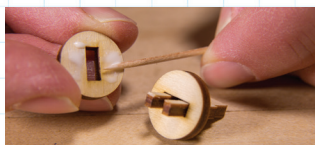
Check [Tinkineer.com/community](https://www.tinkineer.com/community) for helpful videos.

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 enough glue so that your parts feel tacky when pressed together but don't go overboard! Wipe away excess glue using your finger or the edge of a clean toothpick.

Applying Glue to Perpendicular Parts



Lay glue into corners like these using the edge of your round toothpick. In this way, you can test-fit first and add glue second.

"Check Square"



In engineering the word "square" means "at ninety degrees". Check square, using the included tool, any time you are assembling perpendicular surfaces like these.

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 on one of the Paddle Wheel Bracket, part #21.

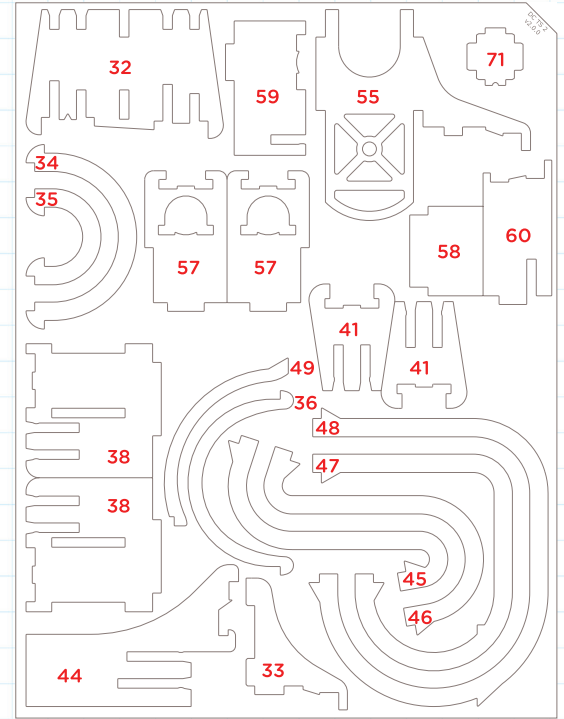
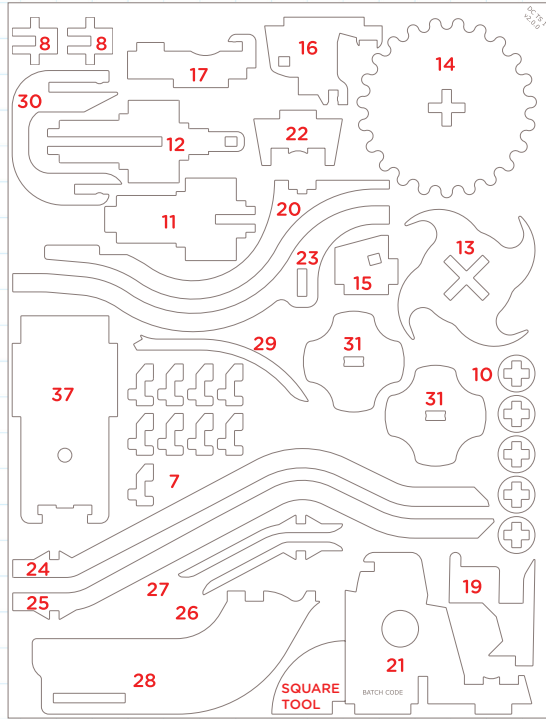
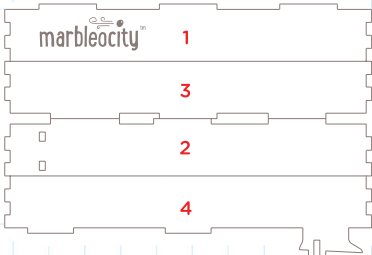
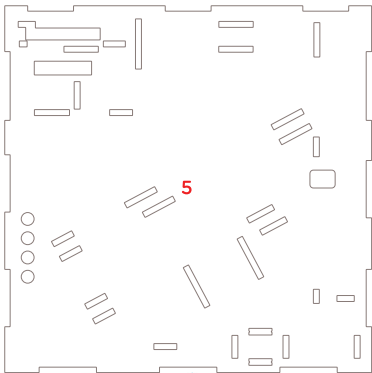
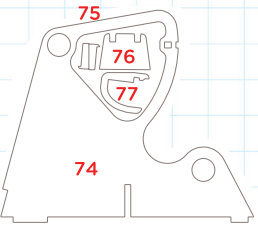
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(example only)

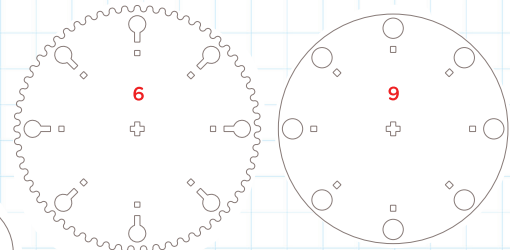
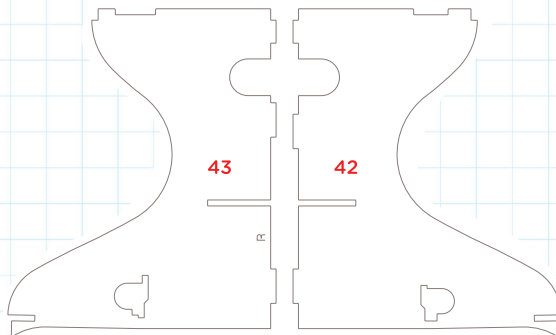
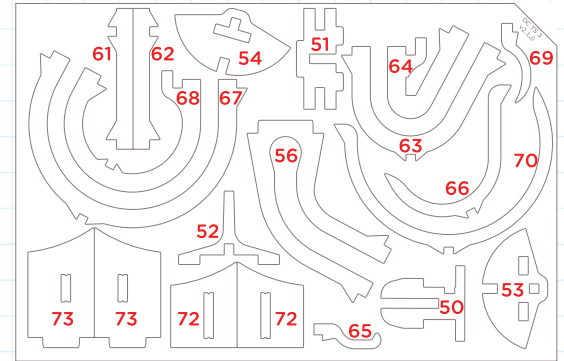
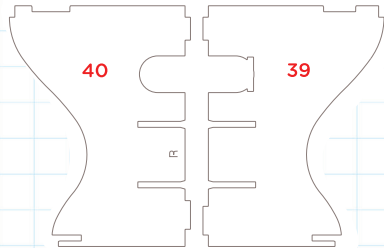
* Elmer's® Washable School Glue will bond but Glue-All® is recommended for the best experience. Do not use glue sticks or generic products.

HERE ARE THE PARTS!

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



NOTE: Parts are not drawn to scale.
One spare part #7 and one spare part #10 are provided.



DAY 1

ALLOW
60 MINS



For the first few steps, we'll show you exactly where to add glue, highlighted in yellow.



NEED
HELP?

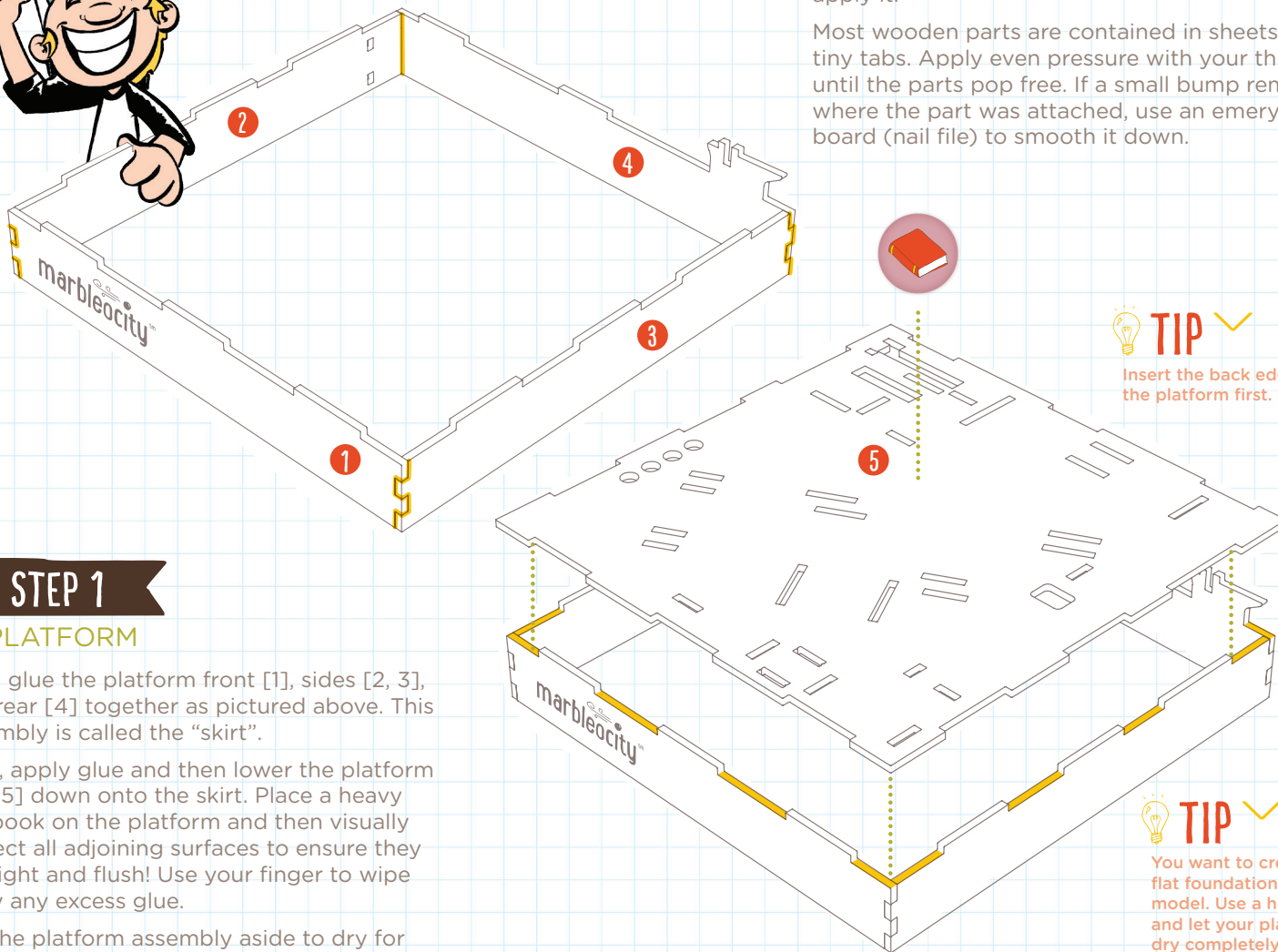
See troubleshooting tips and helpful videos at tinkineer.com/community.

LET'S GET STARTED!

PREPARATION

Spread a sheet of wax paper over your work surface. Make a small puddle of white glue, about the size of a dime, to work from. Remember, a little glue goes a long way — use a toothpick to apply it.

Most wooden parts are contained in sheets by tiny tabs. Apply even pressure with your thumbs until the parts pop free. If a small bump remains where the part was attached, use an emery board (nail file) to smooth it down.



TIP

Insert the back edge of the platform first.



TIP

You want to create a nice, flat foundation for your model. Use a heavy book and let your platform dry completely. If the sides of your skirt are slightly bowed, press them inward. They will dry straight beneath the weight of the book.

STEP 1

PLATFORM

First, glue the platform front [1], sides [2, 3], and rear [4] together as pictured above. This assembly is called the “skirt”.

Next, apply glue and then lower the platform top [5] down onto the skirt. Place a heavy textbook on the platform and then visually inspect all adjoining surfaces to ensure they are tight and flush! Use your finger to wipe away any excess glue.

Set the platform assembly aside to dry for 30–60 minutes. While the platform dries, work on the remaining steps in today's build.

STEP 2

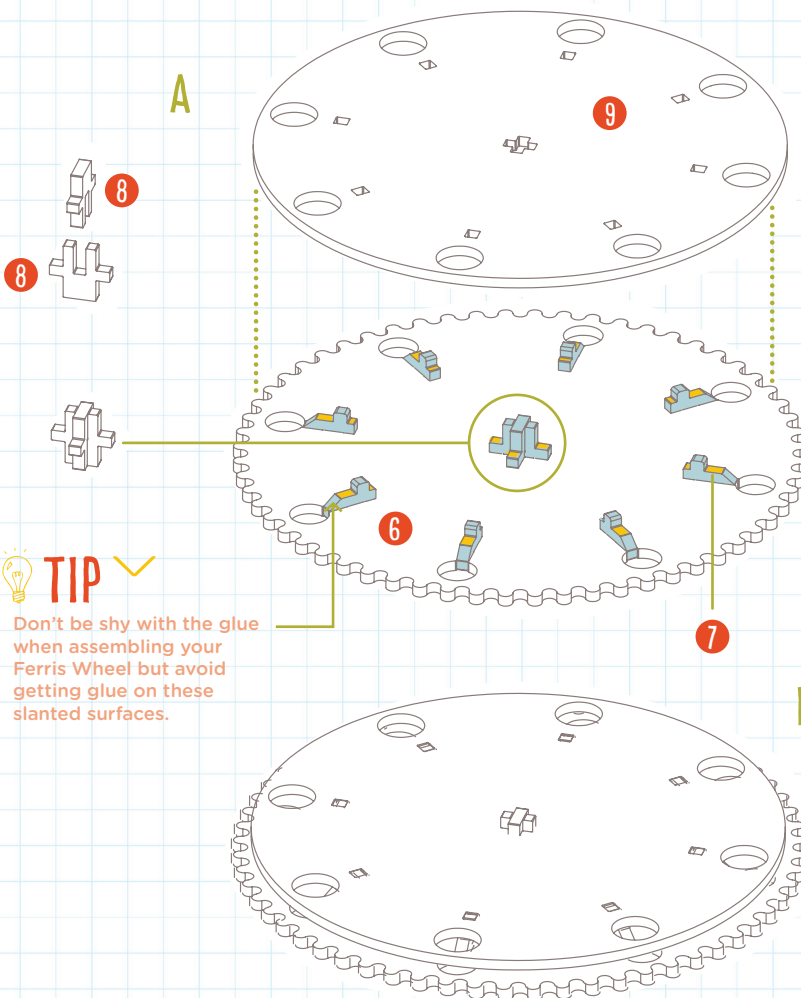
FERRIS WHEEL

Let's construct your Ferris Wheel. Before you begin read through steps 2-4, in full.

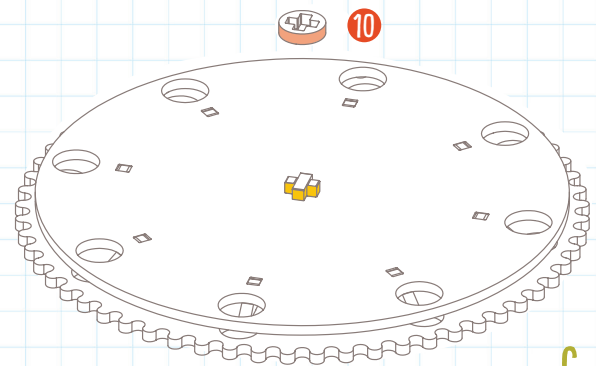
Ready? Begin by placing your Ferris Gear [6] down on your work surface. Glue eight small ribs [7] into place as shown in illustration (A).

Next, construct your axle from two identical parts [8]. Apply glue to one side and press the axle through the cross-shaped hole in the center of your Ferris Gear. You'll notice that the axle protrudes from the Ferris Gear on the far side.

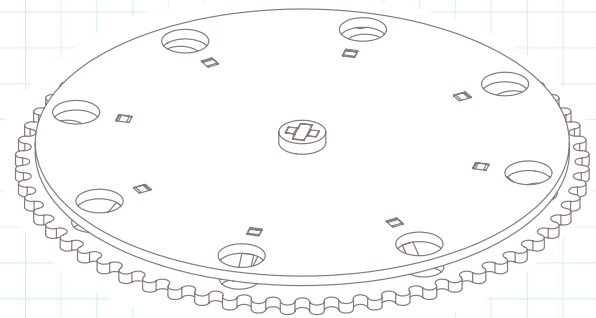
To complete the next task, you'll have to pick up your Ferris Gear or use the Rear Ferris Bracket [74] as a helpful temporary spacer (see diagram, next page). Apply glue to all ribs and the exposed side of your axle, then lower the Ferris Wheel Front [9] into place. At this point your assembly looks like illustration (B).



TIP ✓
Don't be shy with the glue when assembling your Ferris Wheel but avoid getting glue on these slanted surfaces.



TIP ✓
Your bearings [10] are what rotate in the Ferris Wheel brackets. Ensure that no glue dries on or around your bearing surfaces (highlighted in orange, above).



{COMPLETE!}

STEP 3

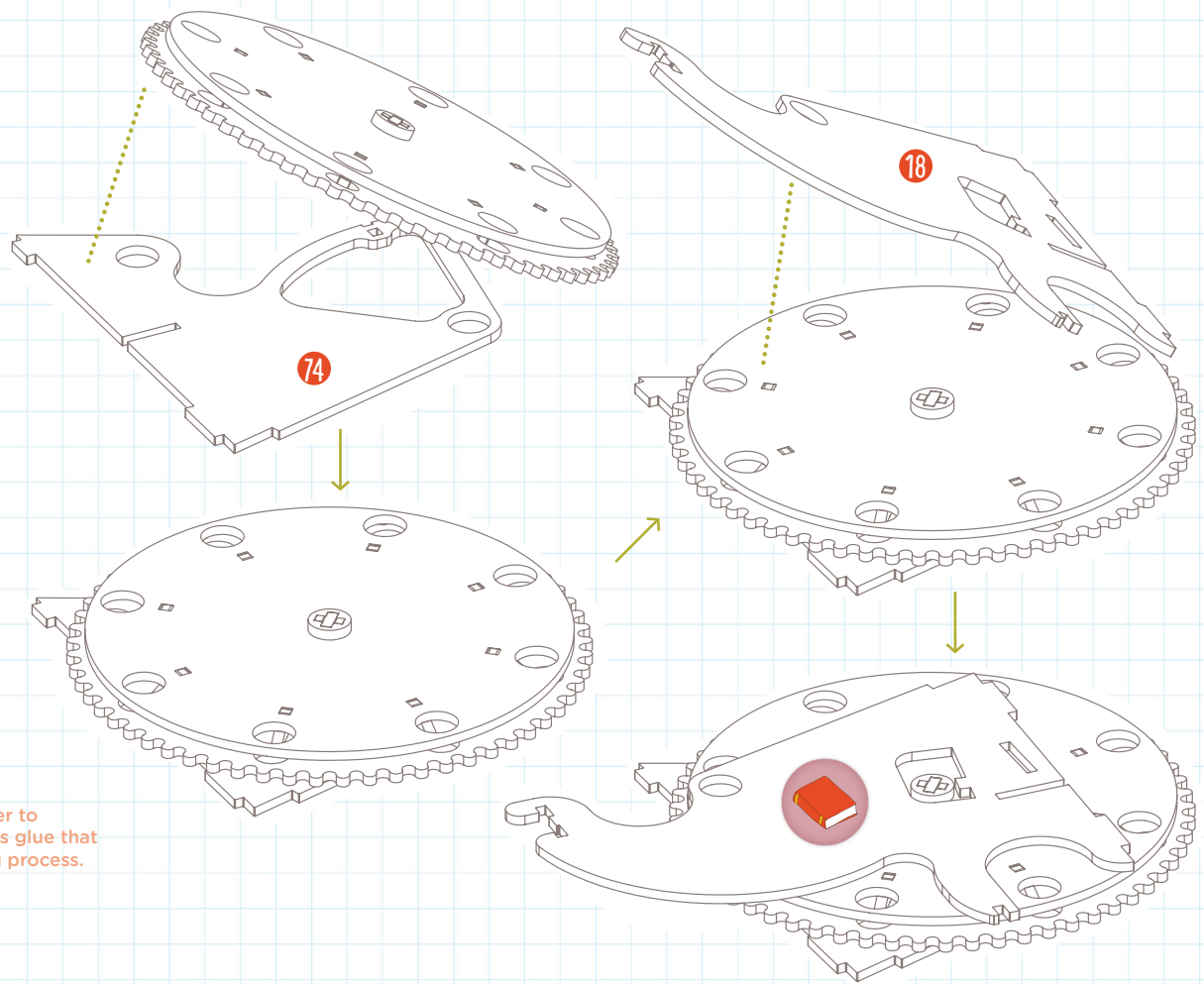
ADD BEARINGS

Apply glue and add a Bearing [10] to each side of your Ferris Wheel assembly, as shown in illustration (C). Wipe away any excess glue from the bearing surfaces using your finger or a toothpick.

STEP 4

DRY TIME

To ensure that your Ferris Wheel dries nice and flat, you will let it dry beneath a heavy textbook. The bearings protrude so use your Ferris Brackets [18, 74] as temporary spacers. Sandwich your Ferris Wheel between these brackets and place a stack of heavy books on top. Allow the Ferris Wheel to dry overnight. You won't install it until Day 5.

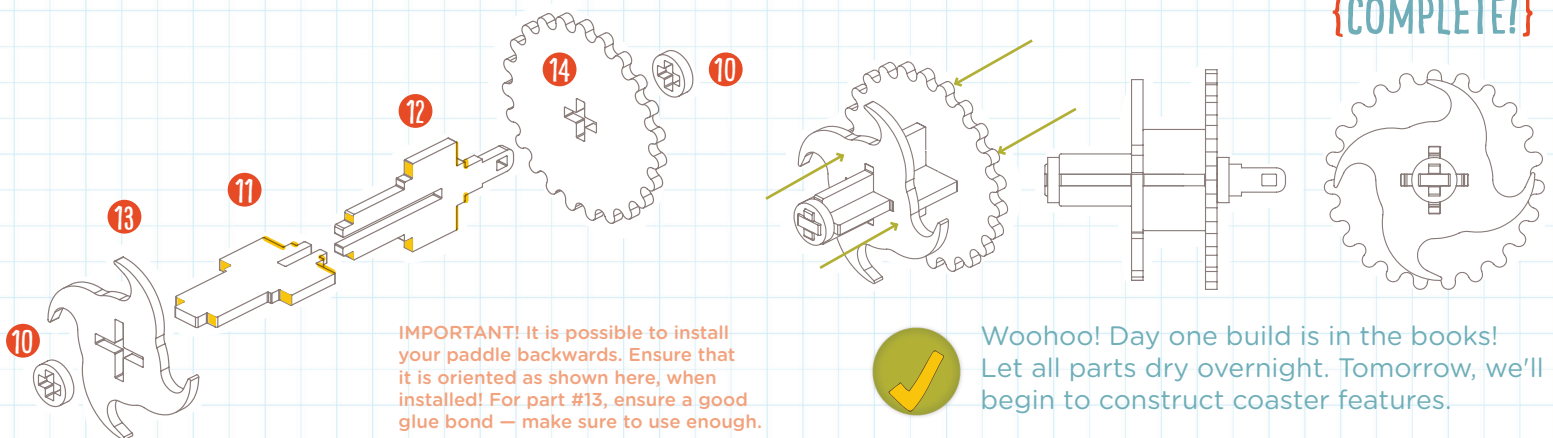


Use a couple of sheets of wax paper to protect your books from any excess glue that may squeeze out during the drying process.

STEP 5

PADDLE WHEEL

Create your paddle wheel assembly as shown. Begin by assembling your axle [11 to 12]. Next, slide Paddle [13] and Gear [14] onto your completed axle, noting the orientation of the paddle, as shown. Use your fingers to apply pressure (see arrows below) to ensure that these parts dry square. Finally, glue your bearings [10 x2] onto either side to complete your paddle wheel assembly.



IMPORTANT! It is possible to install your paddle backwards. Ensure that it is oriented as shown here, when installed! For part #13, ensure a good glue bond — make sure to use enough.



Woohoo! Day one build is in the books! Let all parts dry overnight. Tomorrow, we'll begin to construct coaster features.

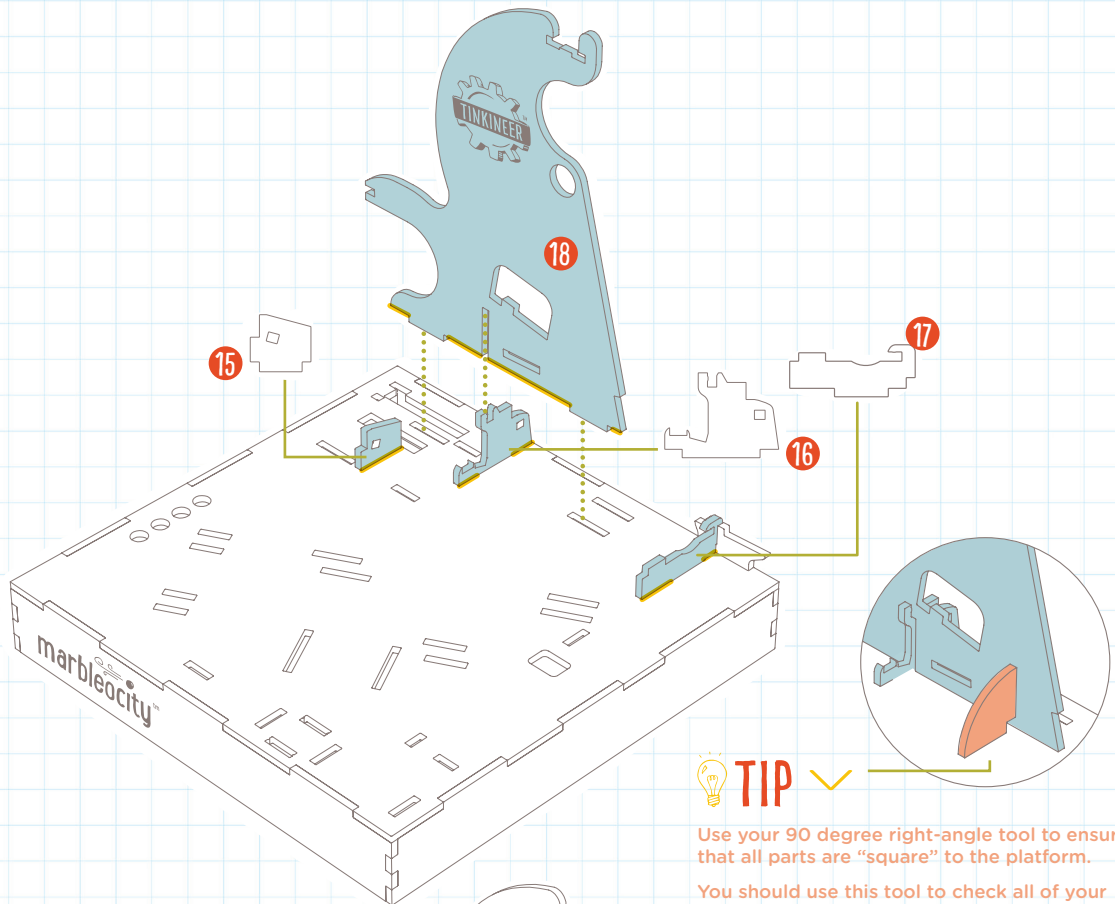
DAY 2

 ALLOW
45-60
MINS

STEP 1

FERRIS BRACKET

Glue brackets [15, 16, 17] to the platform. Now, apply glue to the Front Ferris Bracket [18] and lower it into place as shown. Use your square tool to check that all parts are square while drying.



TIP

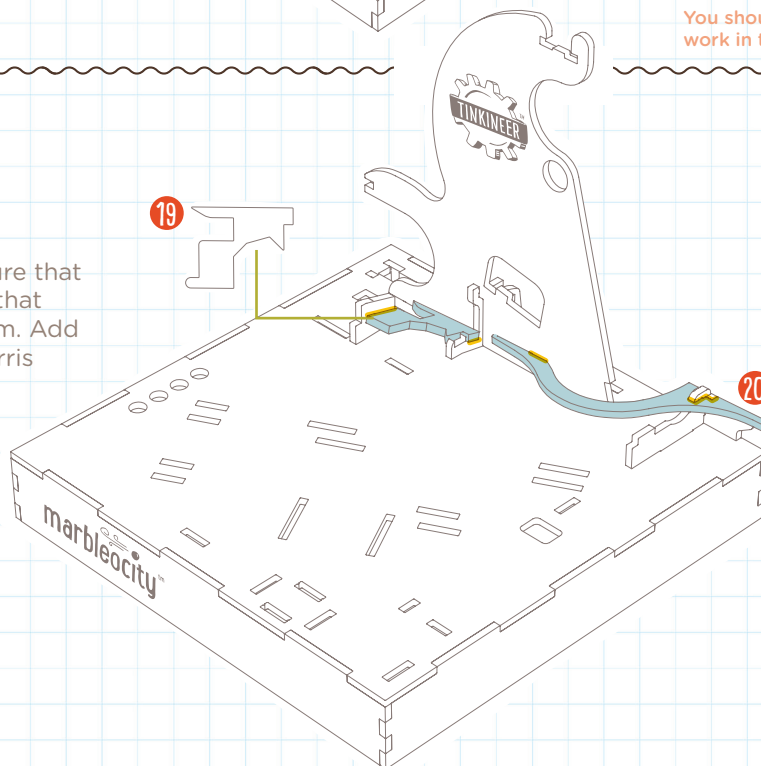
Use your 90 degree right-angle tool to ensure that all parts are “square” to the platform.

You should use this tool to check all of your work in this and future steps!

STEP 2

TRACKS

Install Feeder Ramp [19], making sure that it remains flush to bracket #15 and that bracket #15 is square to the platform. Add Rail [20]. Double check that the Ferris bracket is square while drying.



Great job! You've got the hang of the glue technique. From here on, use the same approach but we won't highlight each and every spot.

Refer to the gluing techniques on page 12 if you need a refresher.

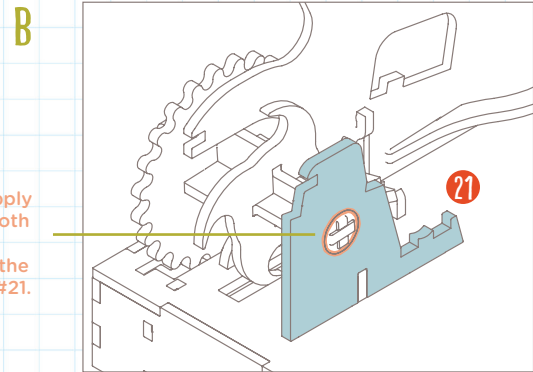
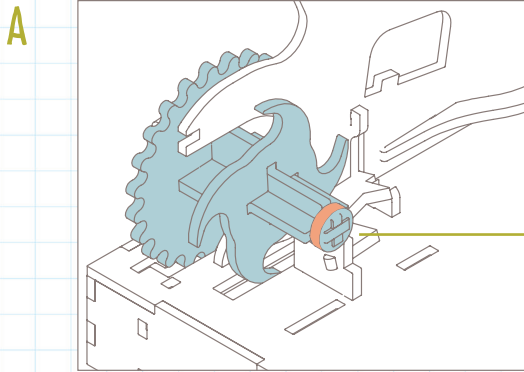


STEP 3

INSTALL PADDLE WHEEL

Now it's time to install the Paddle Wheel assembly you completed yesterday! **IMPORTANT:** Use a wax candle to lubricate both bearing surfaces and the hole in Paddle Wheel Bracket [21]. Now position the Paddle Wheel assembly as shown in illustration (A). Apply light glue to bracket #21 and glue it to the platform while seating the bearing into the hole as shown in illustration (B).

The rear of this assembly is ultimately held in place by the rear Ferris Wheel Bracket [74] which isn't installed until the very end. For now, simply let your Paddle Wheel assembly rest lightly on the platform.



IMPORTANT! Apply candle wax to both of your bearing surfaces and to the hole in bracket #21.

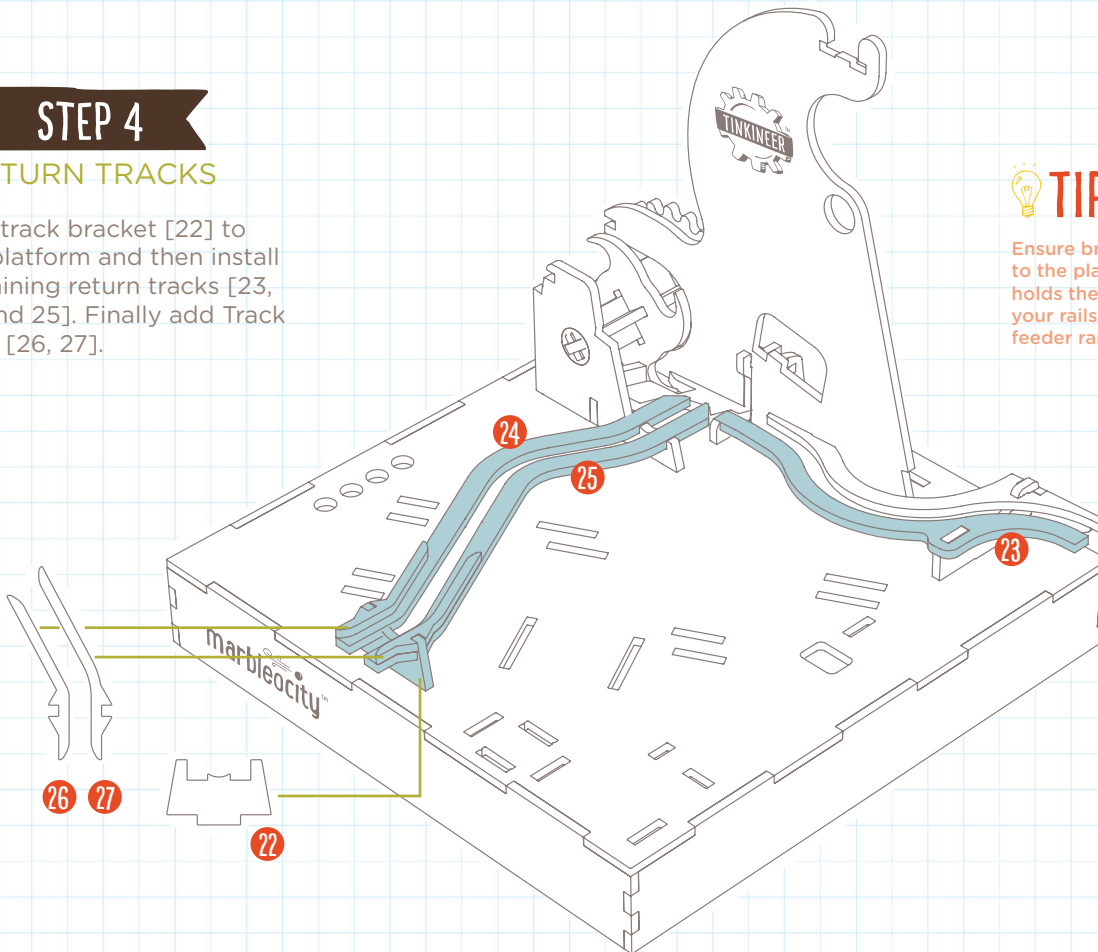
STEP 4

RETURN TRACKS

Add track bracket [22] to the platform and then install remaining return tracks [23, 24 and 25]. Finally add Track Rails [26, 27].



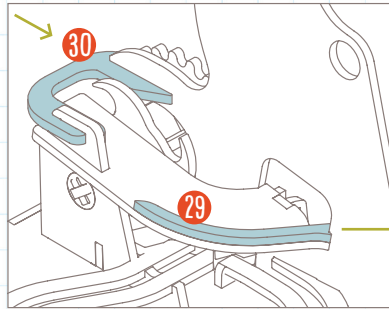
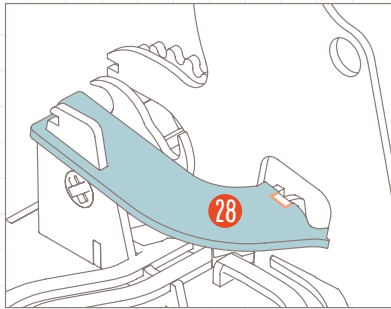
TIP ✓
Ensure bracket #22 is square to the platform as this bracket holds the proper position of your rails where they meet the feeder ramp.



STEP 5

FEEDER RAMP

Lower Feeder Ramp [28] into place and add Rail [29]. Ensure the feeder ramp sits flush to the gear train wall (see highlighted area). Finally, slide safety rail [30] into place as shown. It's a slight press-fit; no glue required! If you need to access your paddle wheel assembly later, you can easily remove this part.



Yay! You're done already! Rest up for a longer build day tomorrow.

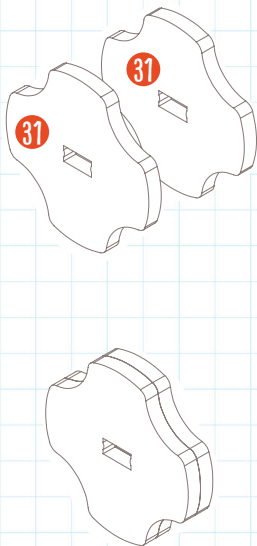


Ensure rail #29 is flush with the edge of the Feeder Ramp.

STEP 1

DRIVE KNOB

Assemble the two halves of your Drive Knob [31]. Ensure that the lower knob edges and center holes align perfectly.

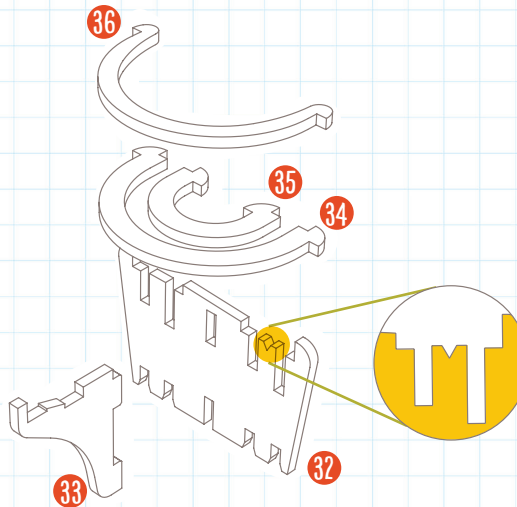


{COMPLETE!}

STEP 2

HAIRPIN TURN

Assemble your hairpin turn. Notice that part #32 has a small notch in it. This notch must be on the right, as shown in the diagram! Once oriented, glue Bracket [33] into place. Finally, drop your Rails [34, 35] and Guardrail [36] into place and set the completed hairpin assembly aside to dry.



Ensure that the highlighted surfaces are aligned with one another.

{COMPLETE!}

DAY 3



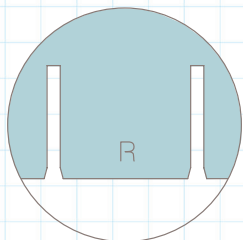
ALLOW
45-60
MINS

STEP 3

DIPS

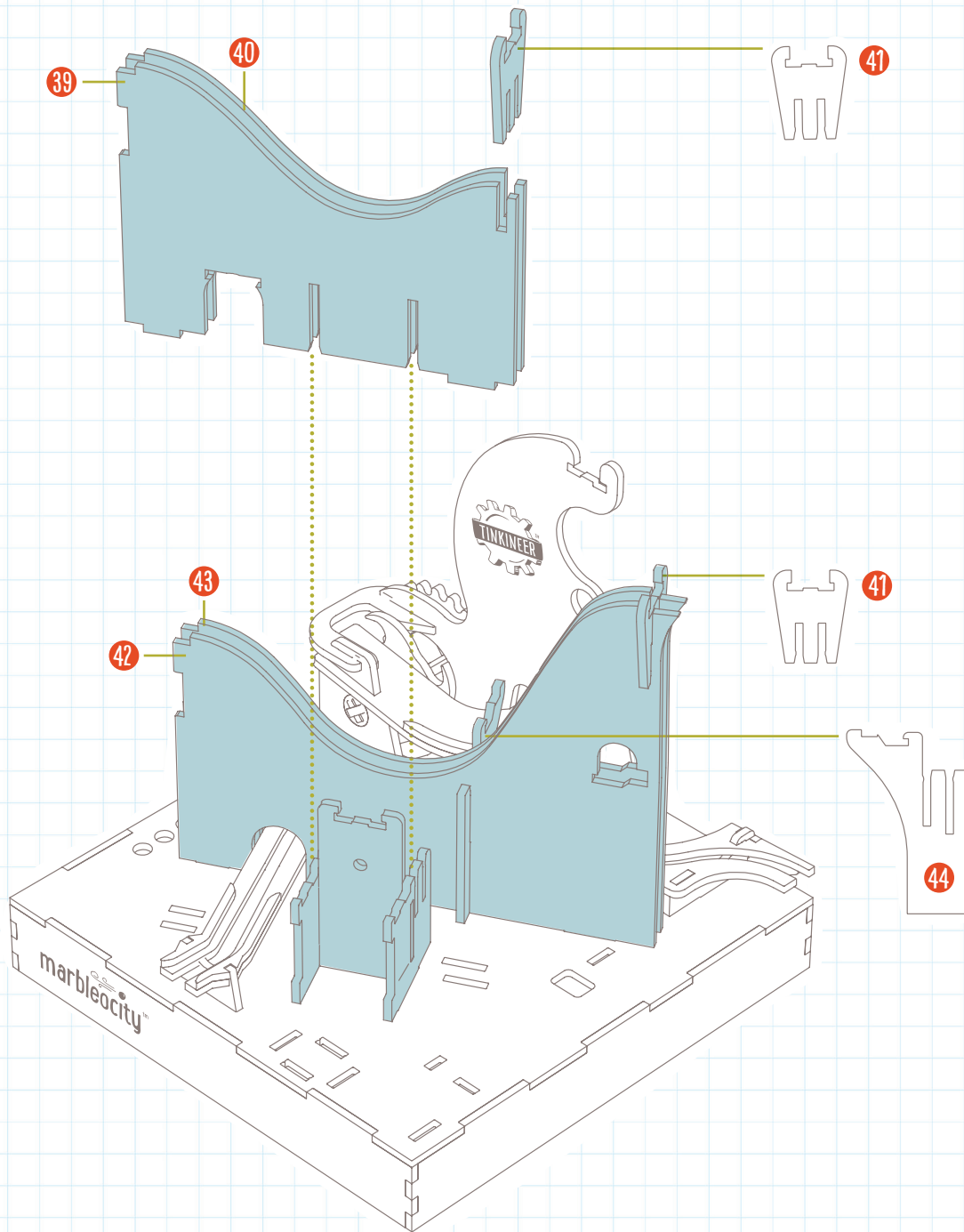
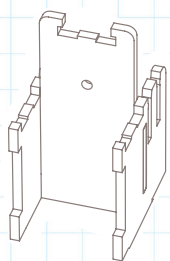
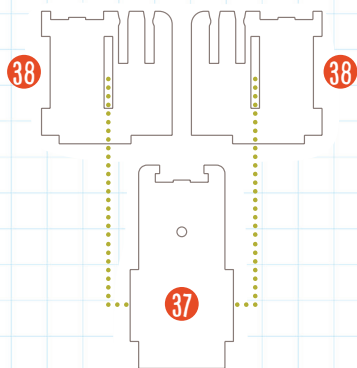
No coaster is complete without a dip and you've got two to build! Start with the small dip. Build the lower bracket assembly shown [37, 38 x2] and install it to the platform. Next, lower your front [39] and rear [40] small dips into place. Finally add top bracket [41], making sure to seat it fully.

The large dip (shown installed) consists of four parts [41 - 44]. You should assemble the entire dip off the platform, check the fit, and then glue it in place. Using your square tool, check that both dips are square to the platform before they dry!



IMPORTANT!

The front and rear dip parts are different! Look for the letter "R" on the rear part for each dip.



Start Here! Build this bracket first and install it to the platform.

STEP 4

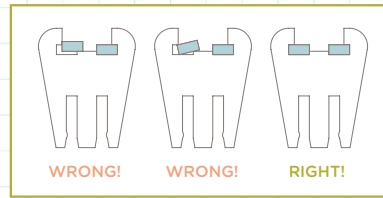
ADD TRACKS

Test fit all tracks before gluing!

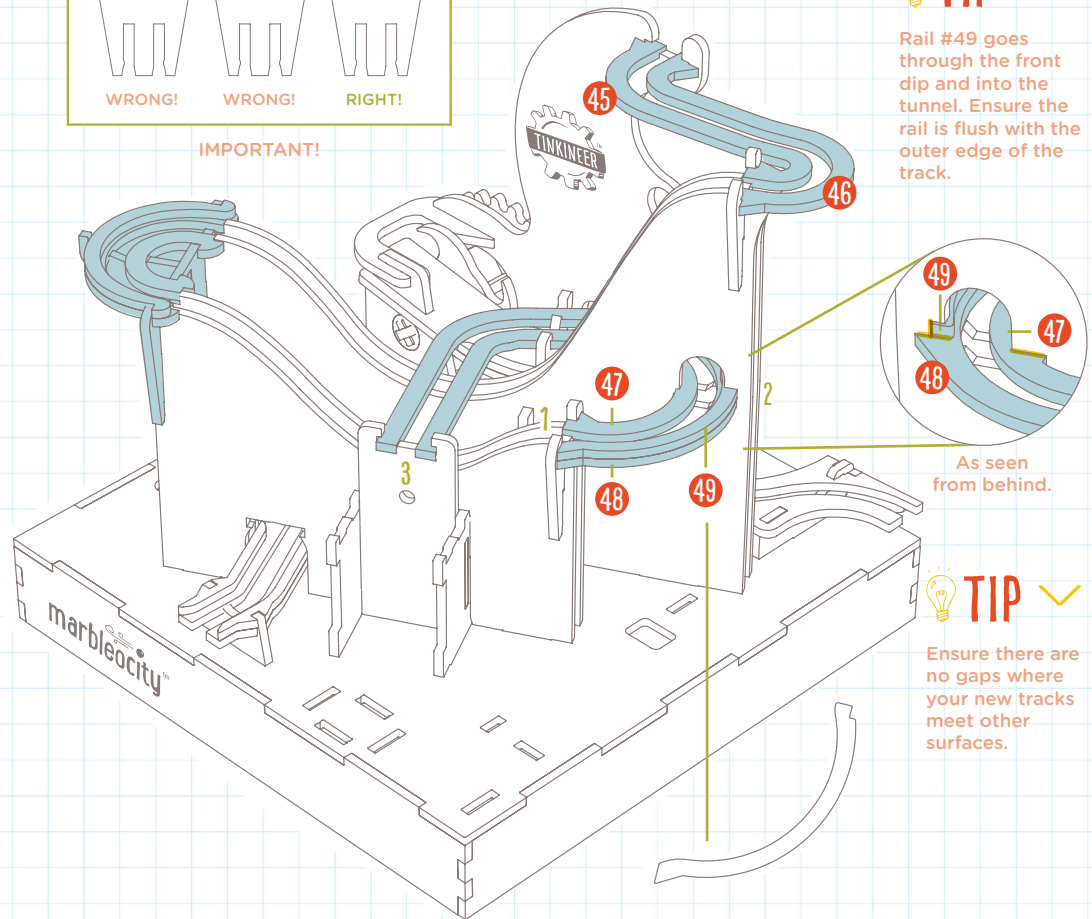
Begin by installing the hairpin turn assembly you built earlier today. Now add your Top Tracks [45, 46], 270 Degree Turn Tracks [47, 48], and Safety Rail [49]. These parts can all be installed without glue, first, and then you can add the glue in after (refer to p 12).

When installing the 270 degree turn, thread the track through the tunnel and then follow the insertion order shown (1, 2, 3). At point #3 you can gently bend the top of the upright track bracket toward you and then insert the end of the track into the slot designed for it. Ensure all tracks are fully seated!

Test then glue! Nudge a marble from the very top. If it doesn't roll all the way to point #3, check all of your fits and try again.



IMPORTANT!



TIP ✓

Rail #49 goes through the front dip and into the tunnel. Ensure the rail is flush with the outer edge of the track.



TIP ✓

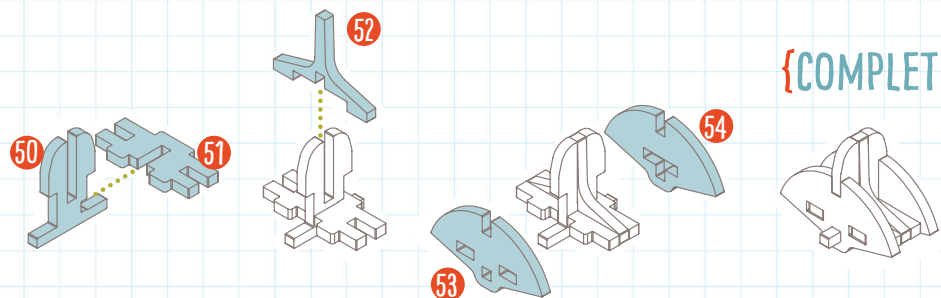
Ensure there are no gaps where your new tracks meet other surfaces.

STEP 5

FLIP-FLOP

Assemble your flip-flop. Glue Paddle [50] to Base [51]. Next, add Center Ramp [52], as shown. Finally glue Sides [53, 54] into place.

“Clamp” the sides together using your thumbs and forefingers while the glue sets up to ensure your flip-flop dries square and tight.



Well done! Your coaster is, well, starting to look like one! Tomorrow is an exciting day ... we'll finish your coaster descent.

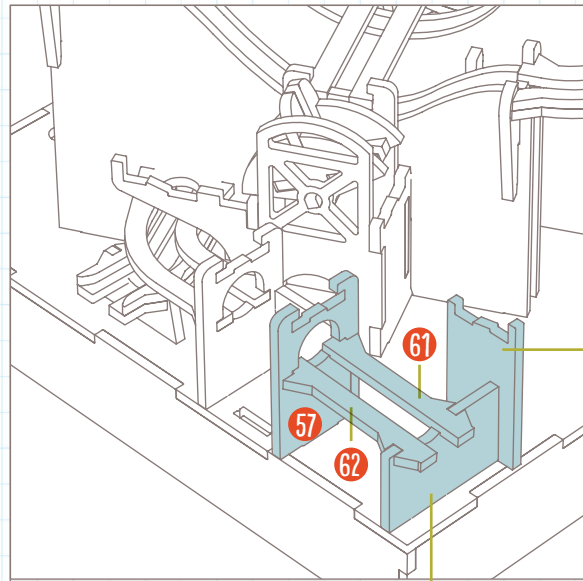
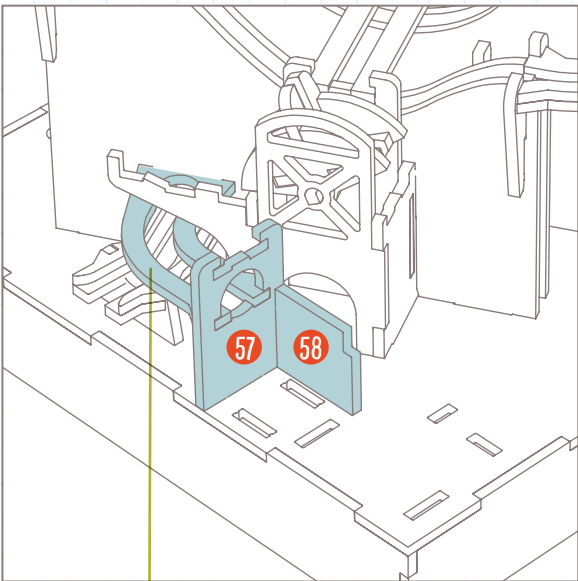
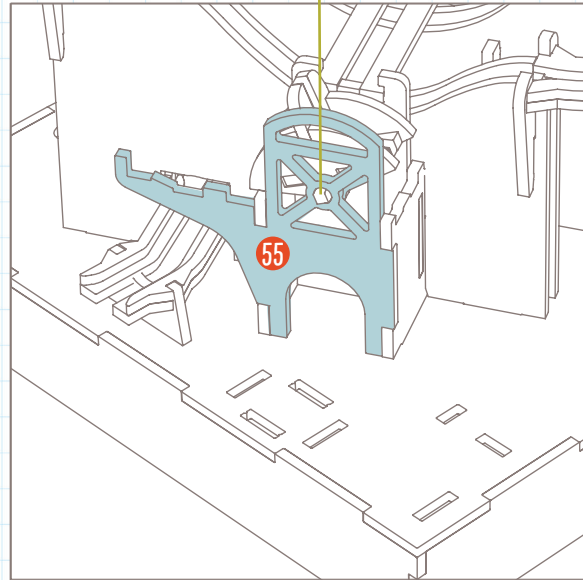
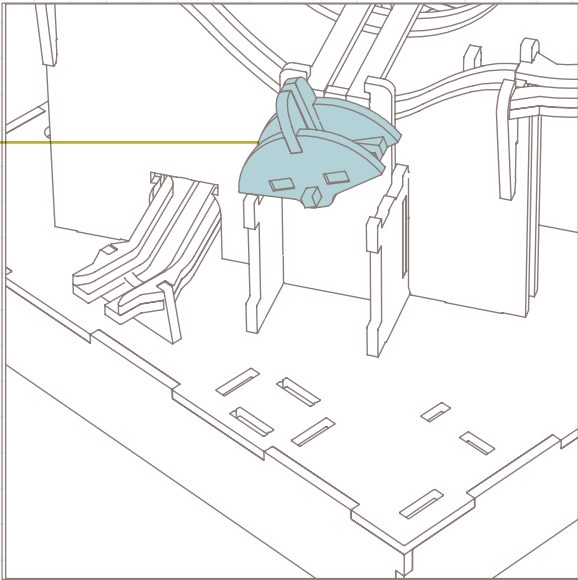
DAY 4

STEP 1

LOWER INFRASTRUCTURE

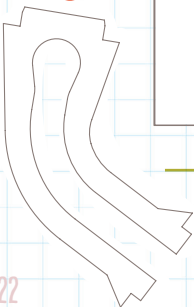
 ALLOW
45-60

Follow the sequence below to install your flip-flop and add the other parts shown. If you're having trouble identifying a part, remember that you can always match the part number to the diagram on page 13.



TIP ✓
IMPORTANT! Test your flip-flop, with a marble, before gluing. It should fall freely from side-to-side. Lubricate with a little candle wax as necessary. If there is major friction, something is wrong — review the fits of your flip-flop assembly.

56



60

59

STEP 2

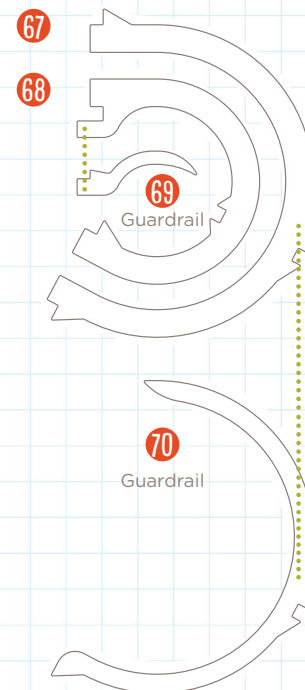
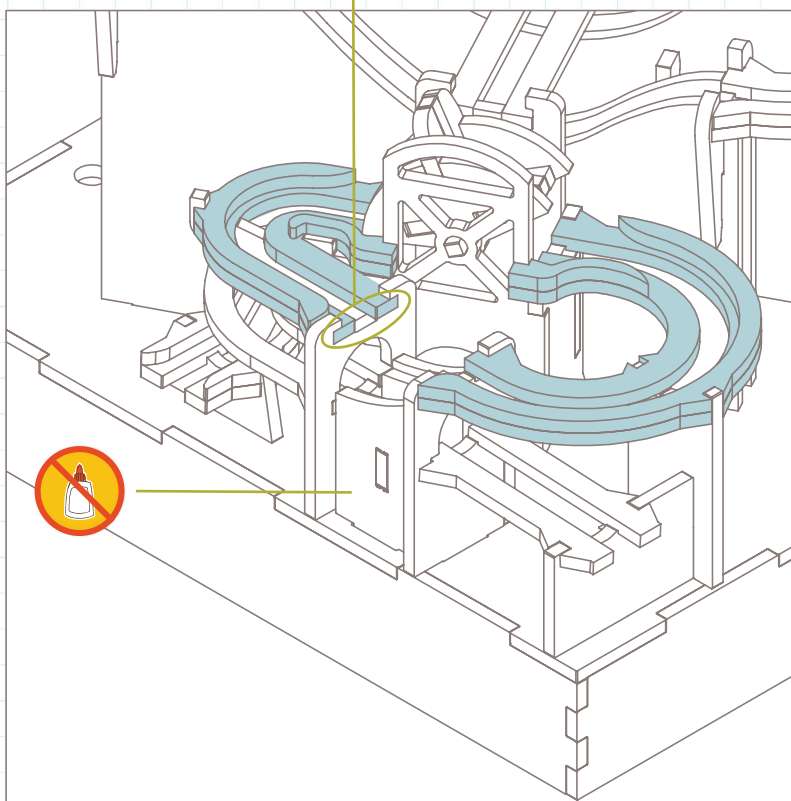
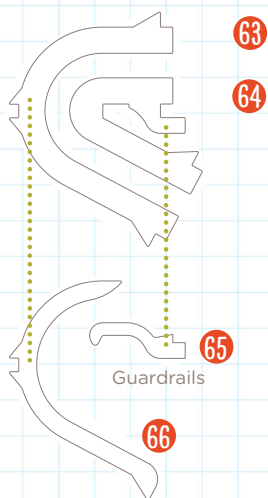
ADD LOWER TRACKS

Install your lower tracks as shown in the illustration. Each side consists of two rails and guardrails. Make sure to insert all tracks fully and test the operation of your marble in this section before gluing, making adjustments as needed.



TIP

IMPORTANT!
Ensure that ends of tracks are fully seated at all locations.



STEP 3

DIVERTER

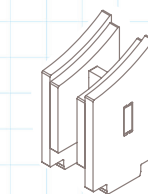
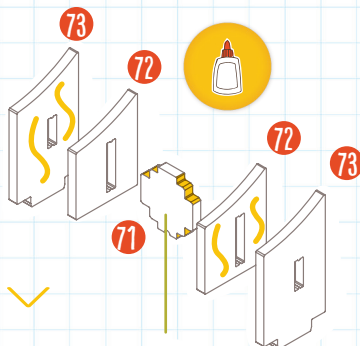
Glue the five parts of your Diverter [71 - 73] together as shown.

Next place it (no glue!) onto the platform in the location shown above to dry. You'll find that it is a slight press-fit — make sure it is flush to the platform while drying.



TIP

IMPORTANT!
This part is **not** symmetrical!
Notice the small notch — it faces down.



{COMPLETE!}



Great work — the descent portion of your coaster is complete! Tomorrow is the last day of the build. You'll install your geartrain and your model will be done!

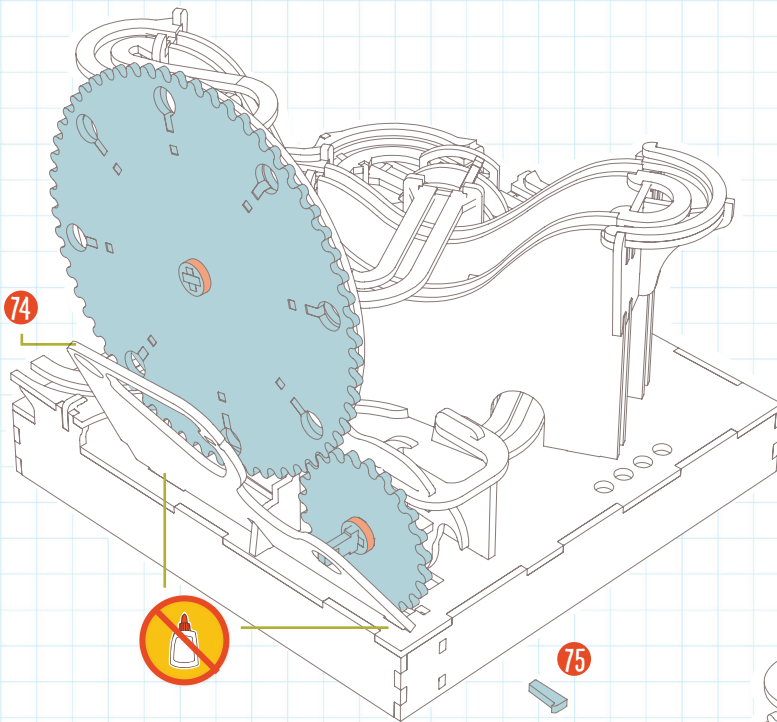
DAY 5

 ALLOW
30-60 MINS

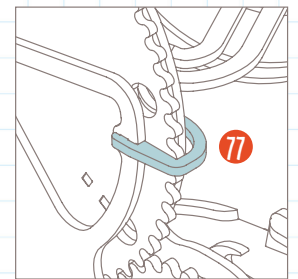
STEP 1

INSTALL FERRIS WHEEL

Lubricate all bearings and holes with your candle wax. The Ferris wheel installs with the toothed gear facing the rear of the model. Insert the front bearing into the front bracket and then fold the Rear Ferris Bracket [74] into place as shown (no glue). Secure it with Peg [75].



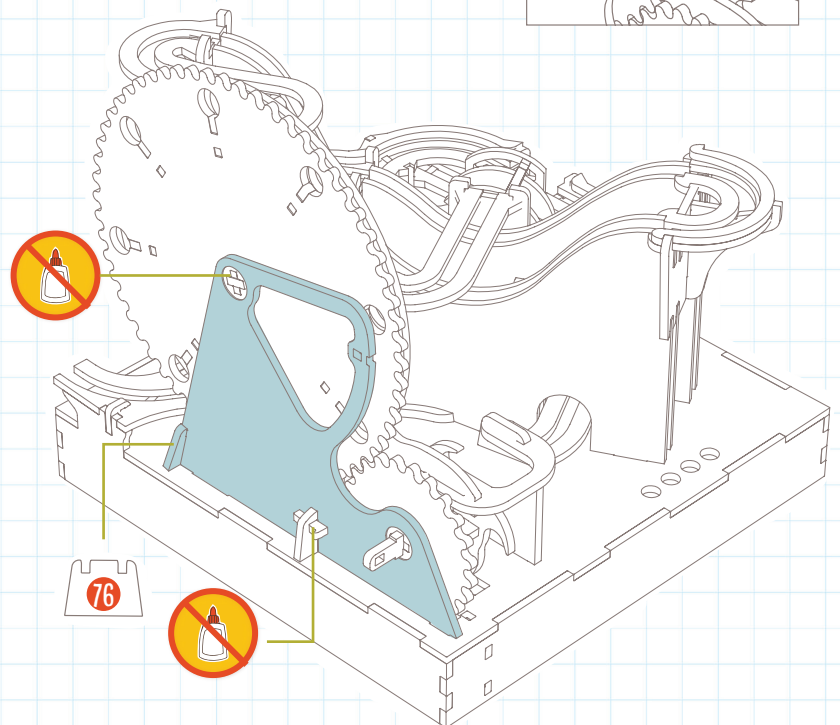
OPTIONAL: If your Rear Ferris Bracket is bowed you can use the optional Ferris Bracket Clip [77]. It's easy to install — attach it to the rear bracket first and then use a dab of glue to secure it to the front.



STEP 2

LOWER FERRIS BRACKET

Test the operation of your gear train - it should rotate smoothly. The candle wax lubricant may feel slightly tacky at first but will break in quickly as it spreads evenly over the bearing surfaces. If all looks good, lightly glue the Lower Ferris Bracket [76] into place. If you ever need to access your Ferris wheel you can pop this part out and then remove the peg and rear bracket.



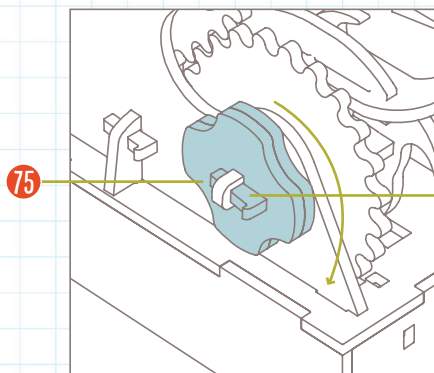
STEP 3

COMPLETE YOUR COASTER!

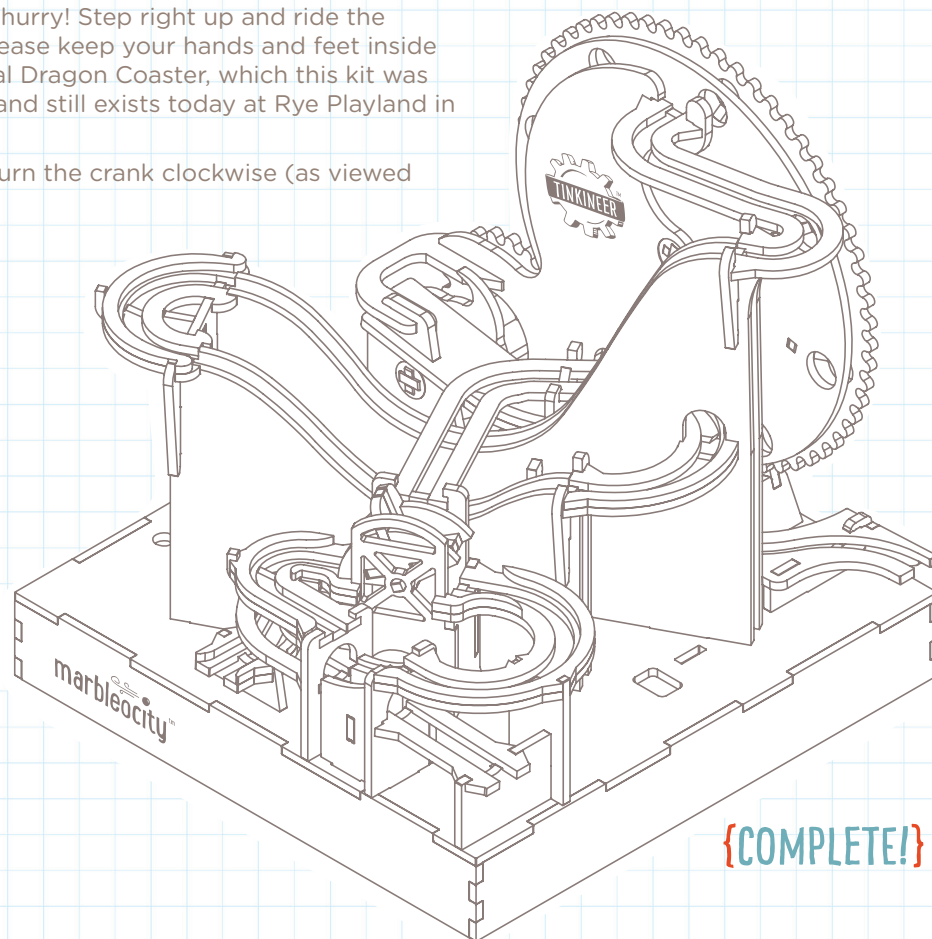
You're almost done! The final step is to slip your Drive Knob onto the shaft and secure it with another peg [75]. No glue is required. If your drive knob halves aren't perfectly aligned you may feel some friction when installing. Be gentle to avoid damaging your axle.

You're ready to ride! "Hurry, hurry! Step right up and ride the amazing Dragon Coaster! Please keep your hands and feet inside the ride at all times!" The real Dragon Coaster, which this kit was inspired by, opened in 1929 and still exists today at Rye Playland in Rye, NY.

Add some marbles! Slowly turn the crank clockwise (as viewed from behind) to operate.



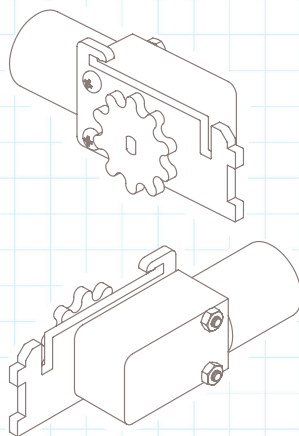
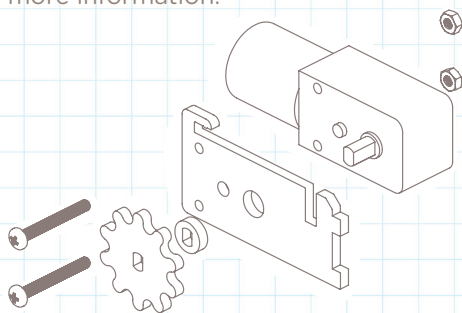
As seen from behind.



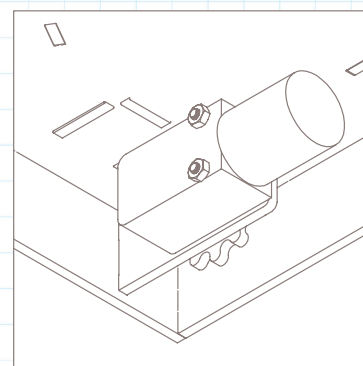
OPTIONAL

MOTORIZED YOUR COASTER

Did you know you can add an electric motor to drive this kit? If it wasn't included in the set you bought, check tinkineer.com/products for more information.

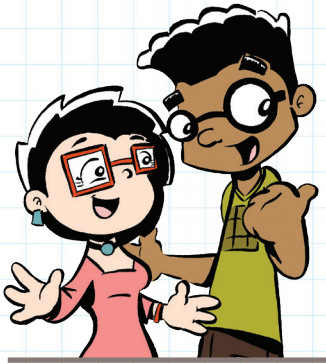


{COMPLETE!}



Shown installed below platform.

WHERE TO 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!

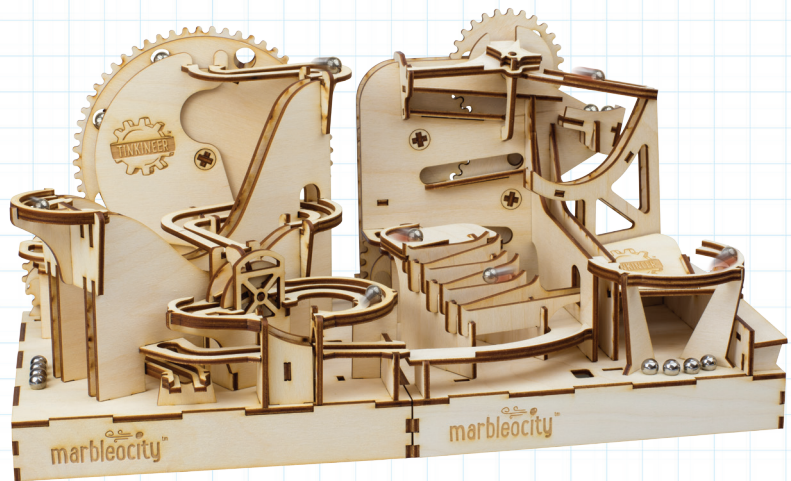
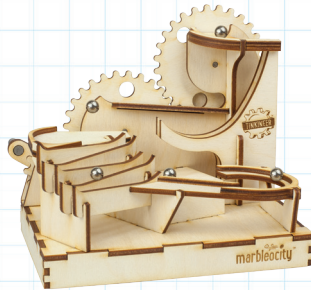
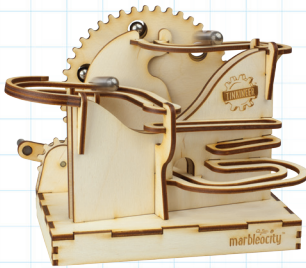
We hope you enjoyed building/making with us. We'd love to see your Marbleocity Dragon Coaster. Did you decorate your model? Where did you put it?



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.



Good news, there are more kits available in the Marbleocity line! They come in multiple sizes. You've just built the Dragon Coaster — the first model from our full-size series.

The Marbleocity Mini Coaster and Mini Skate Park are pictured above. These stand alone and you can build them in any order! Mini kits are a fun 1-2 hour project.

The real fun begins when you expand your marble empire by interconnecting the large kits! Build the full-size Skate Park next. It will work as a stand-alone model but since you've already built the Dragon Coaster you can link them together! Flip the diverter on your Dragon Coaster and now marbles shuttle off to the Skate Park and then return to the Dragon Coaster after they've completed their skateboarding adventure!

And don't forget that the large models can be motorized. The motor kit is available separately and mounts hidden beneath the platform. Awesome!

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



MAKERS HAVE MORE FUN

HE'S A TOTAL SMARTY PANTS

ADVENTURE AWAITS! {LET'S EXPLORE}

EVERYONE IS A TINKINEER

LEARNING IS THE BEST!

BUILD FUN

CUT IT, TRIM IT, GLUE IT, MAKE IT.

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⚠ WARNING:
CHOKING HAZARD.

Kit contains marbles and small parts.
Not for children under 3 years old.



PLAY MONSTER



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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