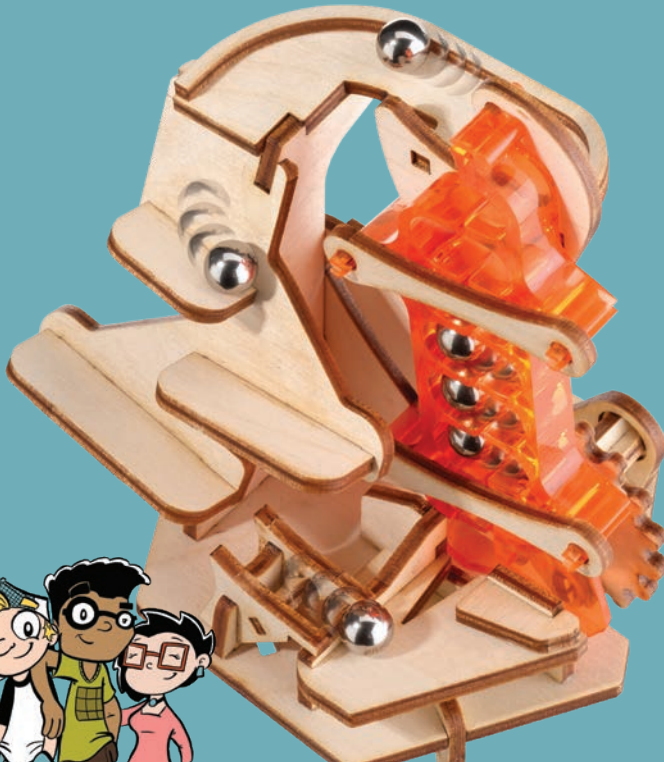


marbleocity®

4-BAR LINK

# 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! 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

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.

BUILD FUN MAKE IT.

SMARTY PANTS

AWAITS!

# 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 show you where you might find the 4-Bar Link engineering mechanism in your everyday life. A 4-Bar Linkage is one a common type of closed chain mechanisms that can create and control repetitive motion.

You may be surprised to see how many places these mechanisms pop up.

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. Hocheran  
Chief Tinkineer

## GETTING HELP FROM OUR COMMUNITY

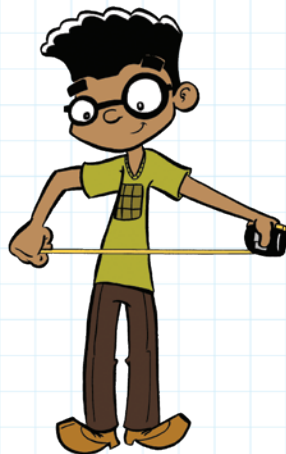
Have a question about a step you're working on? Need a video tutorial? We're building a community of Tinkineers just like you! Please visit us online at [Marbleocity.com](http://Marbleocity.com) or join our social media community on YouTube, Instagram, Facebook and Twitter.

## LEARNING MORE

Today you'll be building your very own 4-Bar Linkage. You'll be using your 4-Bar Link to lift marbles, but there are certainly other instances when this type of constrained, consistent and repetitive motion can be helpful. If you'd like to learn more, check out [Wikipedia.org](http://Wikipedia.org) for some information and examples. You'll also find some cool explanations and examples on YouTube.

## A NOTE ABOUT SAFETY

The kit that you are about to assemble is designed for children and adults ages 9+. 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.



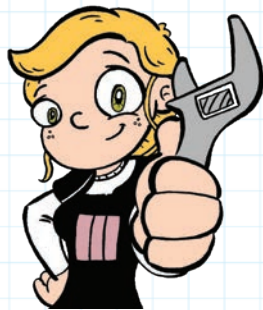
Wax paper. Scavenge a sheet of wax paper from your kitchen — it's the perfect work surface. Household white glue will not stick to it and you'll avoid mom's wrath by protecting the kitchen table.



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 >



### 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?

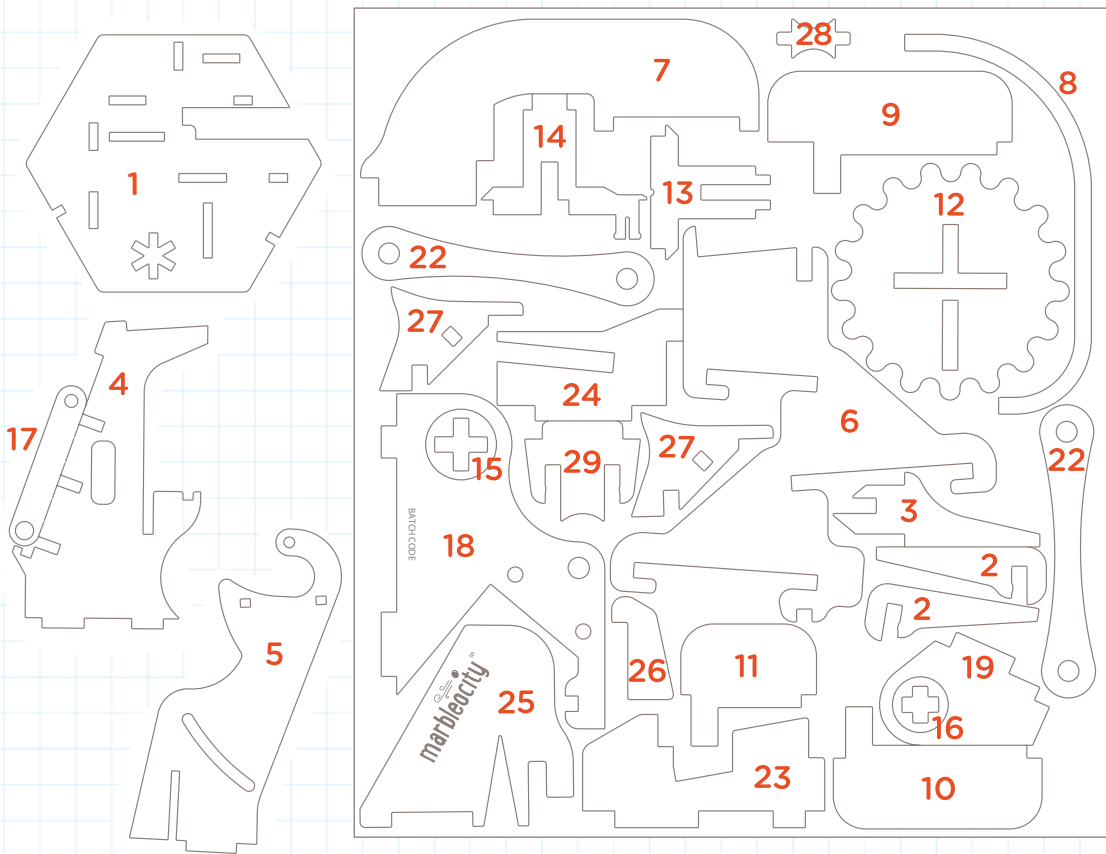
Marbleocity is a natural wood product! Sometimes a hidden knot can slip past our quality control gurus. If you need a replacement part contact us at [Tinkineer.com](http://Tinkineer.com). Please have your batch code handy. Your batch code is etched onto the bottom of upright part #18. See example at 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.



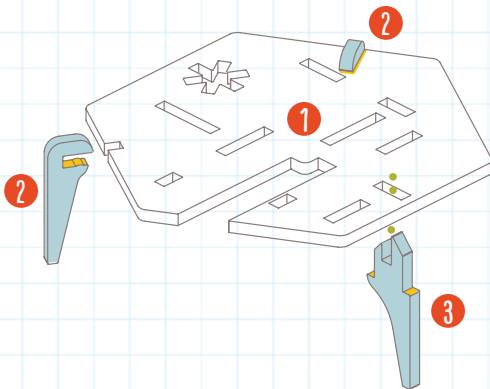
NOTE: Parts are not drawn to scale.

## 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 odd leg installs from the bottom, rather than the side.



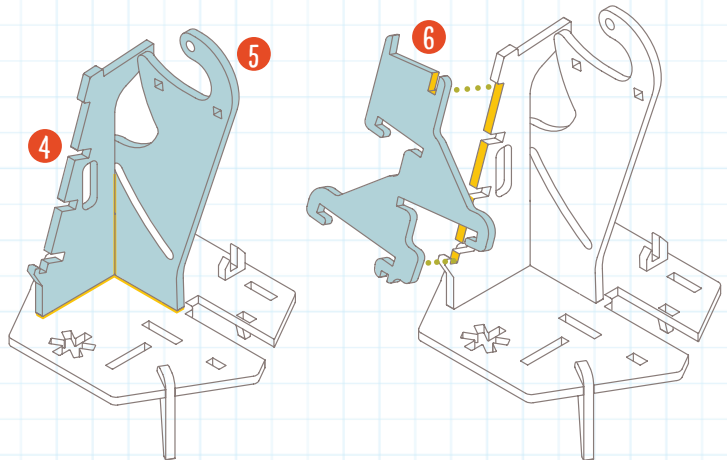
For the first few steps, we'll show you exactly where to add glue, highlighted in yellow.

## STEP 2

### SUPPORT BRACKETS

Interlock brackets [4] and [5]. Apply glue and then lower the new assembly down into the matching slots on the platform.

Next, attach the cascade plate [6] as shown.

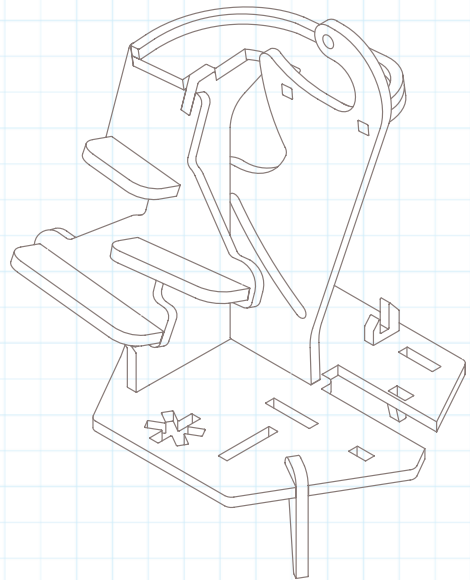
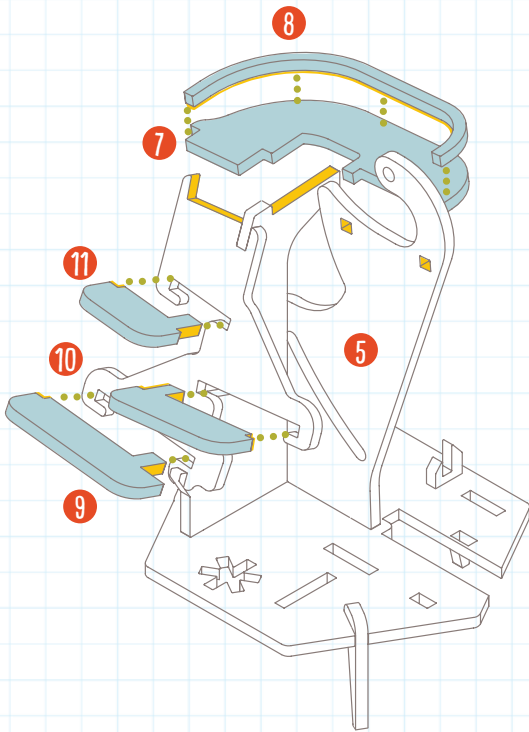


## STEP 3

### RAMPS

Glue the top ramp [7] into place. Maneuver its pegs into the holes on bracket [5] and ensure other mating surfaces are flush. Now lower the top ramp rail [8] into place, ensuring its outer edge is flush with the ramp on which it sits.

Next, install the cascade ramps [9 - 11] as shown, working from bottom to top.



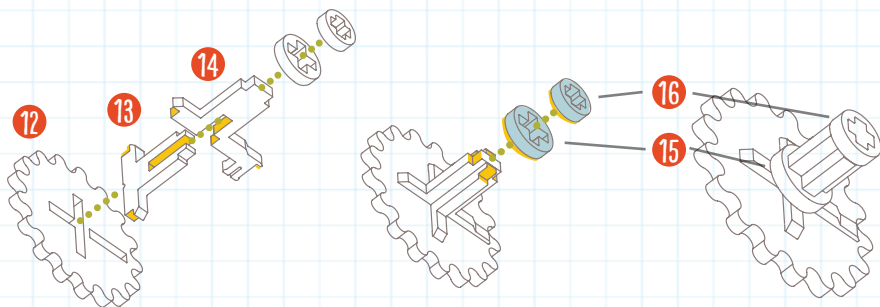
{COMPLETE!}

## STEP 4

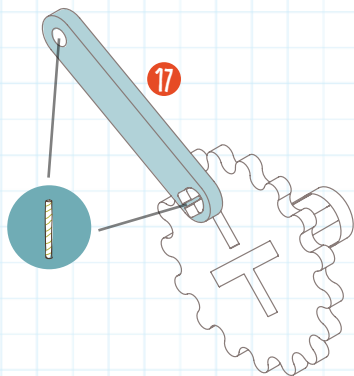
### DRIVE GEAR ASSEMBLY

Interlock shaft halves [13, 14] and then glue the resulting assembly to the drive gear [12]. Trial fit the shaft to the drive gear first, noting the glue points.

Next, glue inner bearing [15] and then outer bearing [16] into place as shown. Ensure all parts on your final assembly are flush and tight. Remove any excess glue from bearing surfaces.



{COMPLETE!}



## STEP 5

### INSTALL CRANK ARM

Use the edge of your wax stick to lubricate the inside of the holes on crank arm [17]. Now snap the larger hole over the pin on your crank arm assembly (NO GLUE!).

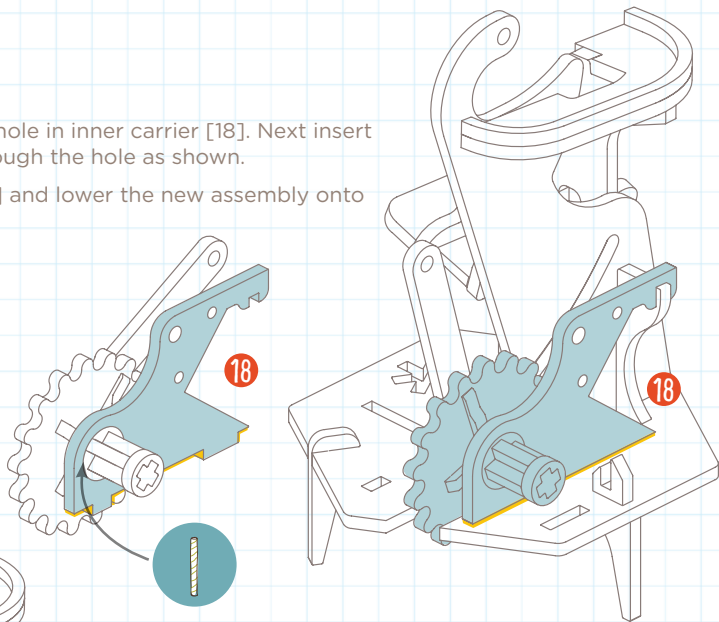


## STEP 6

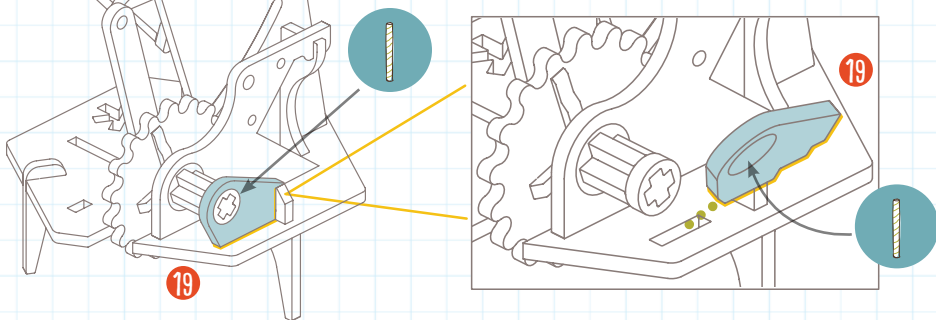
### INSTALL DRIVETRAIN

Apply lubricating wax to the hole in inner carrier [18]. Next insert your drive gear assembly through the hole as shown.

Apply glue to the tabs on [18] and lower the new assembly onto the platform as shown.



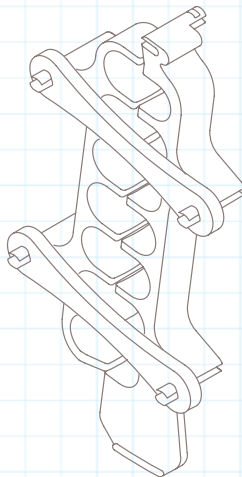
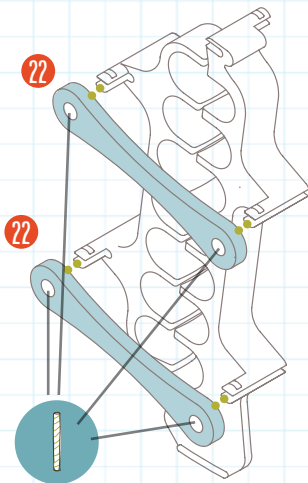
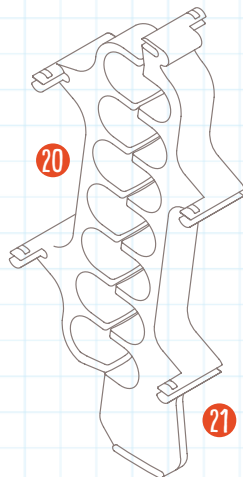
Finally, install outer bearing carrier [19] to the platform. You will have to tilt the gear assembly shaft upward in order to make the connection.



## STEP 7

### ASSEMBLE 4-BAR LINKAGE

Apply wax to the holes in links [22 x2] and on the surfaces of the receiving pegs on the orange lift mechanism sides [20, 21]. Now, snap the links onto the orange lift mechanism sides as shown in the diagram.



**{COMPLETE!}**

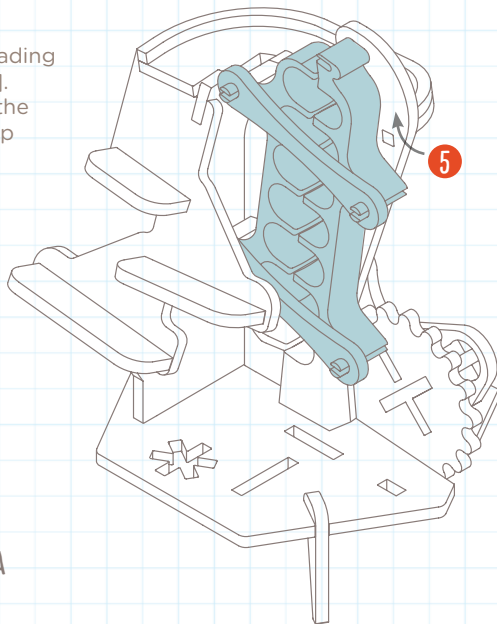
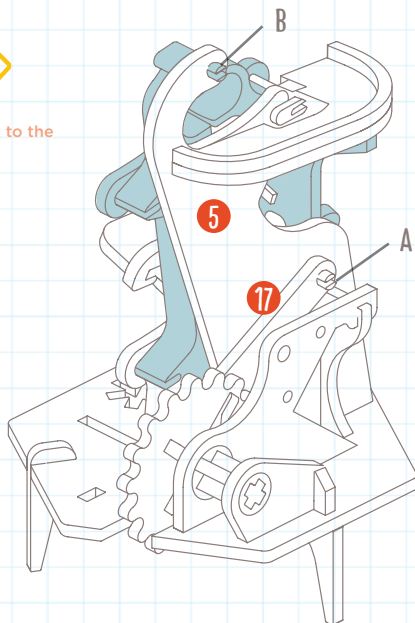
## STEP 8

### INSTALL 4-BAR LINKAGE

Install your completed 4-Bar assembly to the model. Gently begin to position the 4-Bar assembly by threading plastic pin A through the slot in the main bracket [5]. Next, snap the loose end of the crank arm [17] over the pin which is now visible on the gear side. Finally, snap plastic pin B into its hole at the top of the model.



Apply a little wax to the plastic pins.

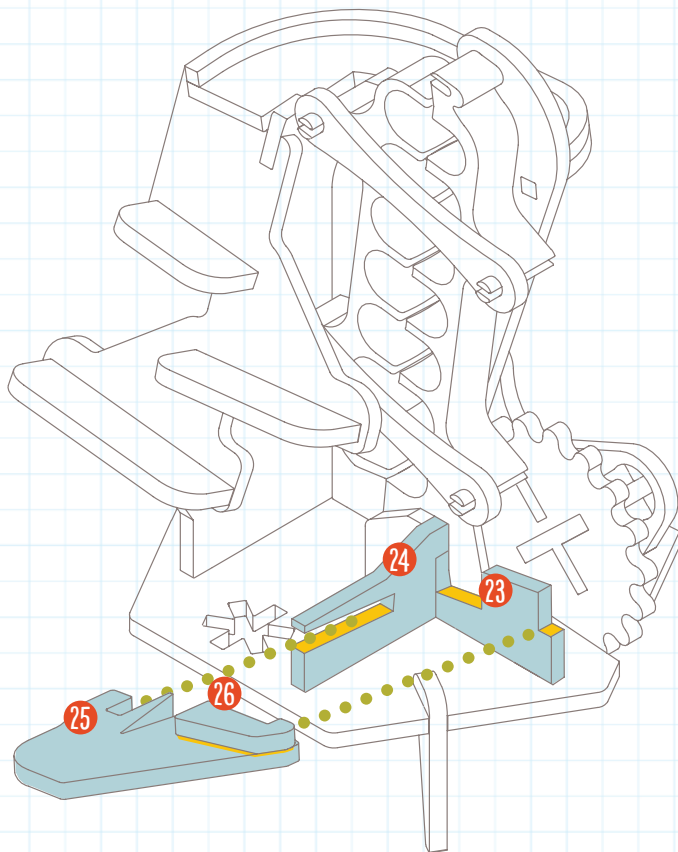


Congrats! You've installed the lift assembly! Make sure it is seated flush to the front face of the support and check its operation by rotating the gear slowly with your finger.

## STEP 9

### INSTALL FEEDER RAMP

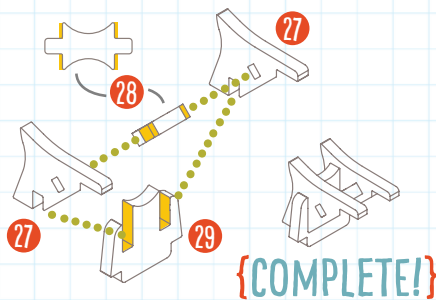
Glue the feeder ramp supports [23], followed by [24] into place on your base. Slide the guide [25] into place, applying glue. Finally, add the rail [26] shown already installed to the guide, in the diagram below.



## STEP 10

### ASSEMBLE DIVERTER

Assemble your diverter gate as shown below. First connect diverter sides [27 x 2] to cross-brace [28]. Allow to dry. Drop that assembly into diverter base [29].

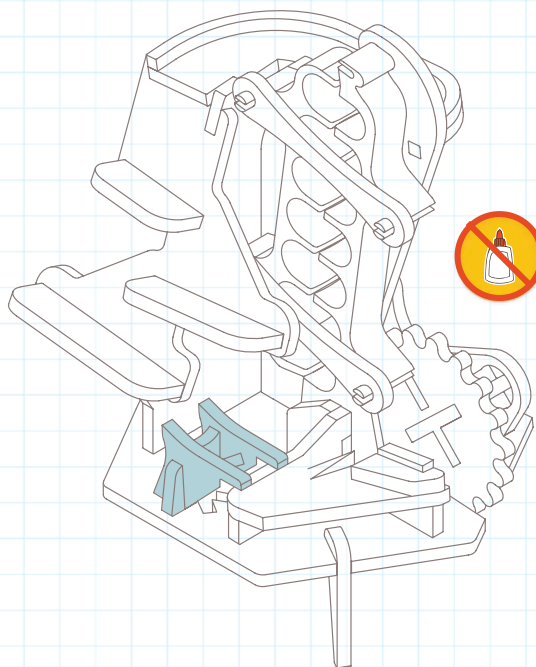


## STEP 11

### LET'S ROLL!

Complete your model by placing your diverter as shown, but don't glue it! The diverter can be rotated later, when you interconnect Triple Play models.

Congrats! You're done! Let's give it a whirl. Drop a few marbles into the feeder ramp at the bottom of the lift. Use your thumb to gently rotate the large gear clockwise (as you face the front of your model). Your 4-Bar mechanism swings into action, elegantly rolling the marbles upward until they are ejected for a fun ride back down the cascade ramps!



## POWER UP!

### [OPTIONAL] ADD A MOTOR!

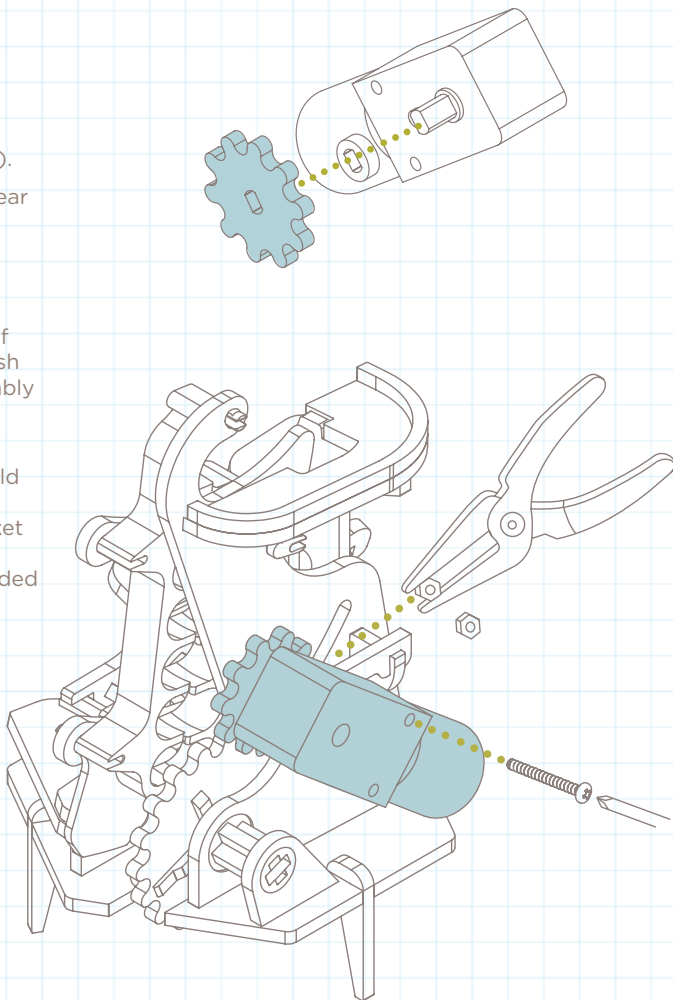
Individual Triple Play models can be operated by hand but for even more fun, add a motor kit (sold seperately).

First, attach the small bearing and gear directly to your motor – bearing first topped by the gear.

Position your gear over the outer bearing bracket [19] and align the motor with the hole on the top left of the inner bracket [18]. Then slide/push downward to move the motor assembly into place.

Screw the motor into place with the help of a pliers. Use your pliers to hold the nut in place between your Inner bracket [18] and larger upright bracket [5]. Use a screwdriver to secure the motor in place with the screws provided in your motor kit.

Connect to battery box to complete assembly.

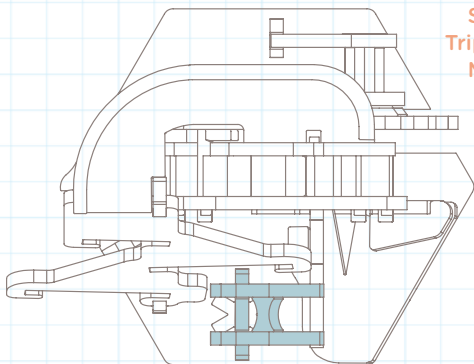


# CONNECT!

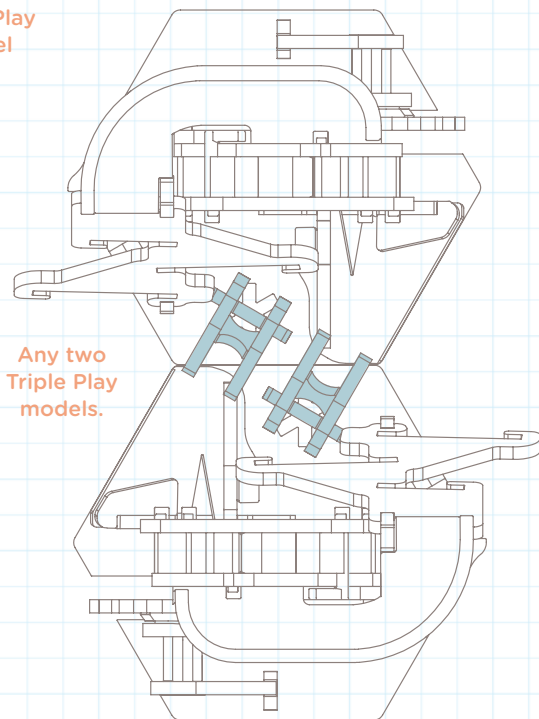
## CONNECTING MODELS!

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

Below, and on the next page, we'll show you how you can connect two or three models ...



Single  
Triple Play  
Model

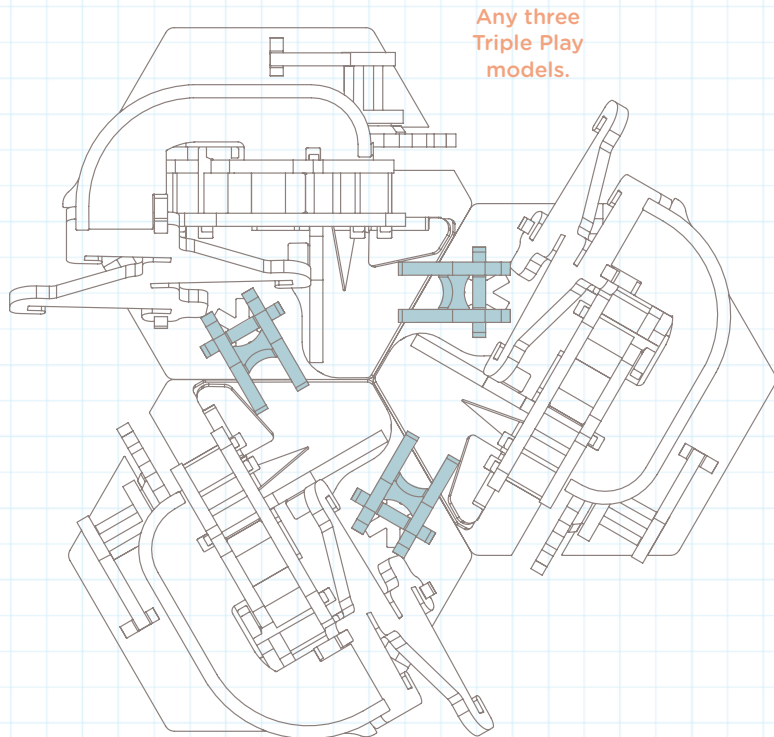


Any two  
Triple Play  
models.



## CONNECTING MODELS (CONTINUED)!

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 to arrange your models adjacent to one another and position the diverter on each model accordingly.





# WHERE TO GO FROM HERE?

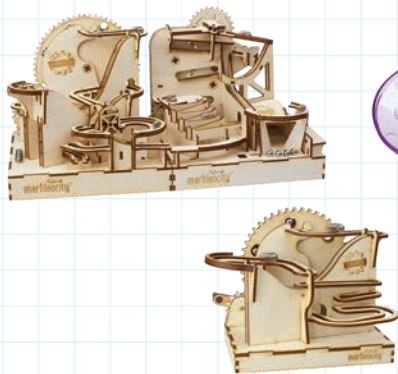
## CONGRATULATIONS!

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!

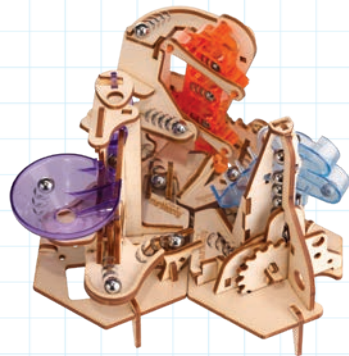
We'd love to see your 4-Bar Link. Did you decorate your model? Where did you put it?

Share your photos and comments on our Tinkineer Facebook page and Instagram feed. Tag us @tinkineer. Or contact us directly [Tinkineer.com](http://Tinkineer.com).



## MAKE MORE!

Good news — there are more Marbleocity kits available! Check out additional Triple Play models like Archimedes Screw or Chaos Mountain. Maybe you'd like to try a kit from our "Mini" series, like the Mini Skate Park pictured here. For the intermediate maker, there are larger models like the Dragon Coaster that 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 large Marbleocity kits are designed to interact together such that marbles pass between those models. So cool!

VISIT [TINKINEER.COM/PRODUCTS](http://TINKINEER.COM/PRODUCTS) TO LEARN MORE. WE'LL SEE YOU THERE!

IS A TINKINEER



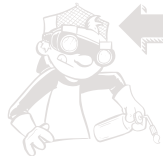
LEARNING IS THE BEST!

GLUE IT, MAKE IT.



IS A TINK

MAKERS HAVE MORE FUN



PSST

HE'S A TOTAL SMARTY PANTS



ADVENTURE AWAITS! {LET'S EXPLORE}

MAKERS HAVE MORE FUN



EVERYONE IS A TINKINEER



LEARNING IS THE BEST!

GLUE IT, MAKE IT.



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



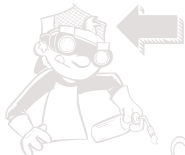
PSST

HE'S A TOTAL SMARTY PANTS



ADVENTURE AWAITS! {LET'S EXPLORE}

MAKERS HAVE MORE FUN



EVERYONE IS A TINKINEER



LEARNING IS THE BEST!

GLUE IT, MAKE IT.



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



EVER IS A TINK

MAKERS HAVE MORE FUN



PSST

HE'S A TOTAL SMARTY PANTS



ADVENTURE AWAITS!

MAKERS HAVE MORE FUN



**⚠ WARNING:**  
**CHOKING HAZARD.**

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

MA4B100BB

**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](mailto:playmonster@playmonster.com) • 1-800-524-4263.  
For more fun, visit [playmonster.com](http://playmonster.com)

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