

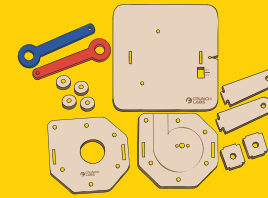
NEW VIDEO UNLOCKED

BUILD ALONG & LEARN WITH MARK ROBER

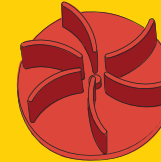


[CRUNCHLABS.COM/WIND](https://crunchlabs.com/wind)

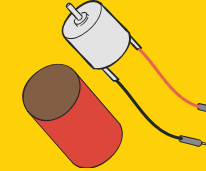
PARTS



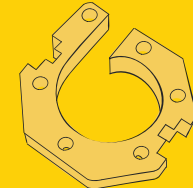
wood pieces



impeller



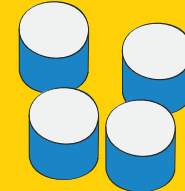
tube and motor



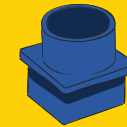
foam spacer



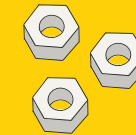
standoffs



foam feet



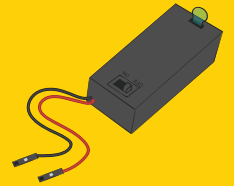
nozzle



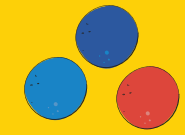
hex nuts



bolts



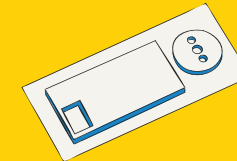
battery pack



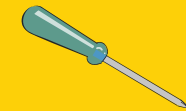
foam balls



o-rings



adhesive foam



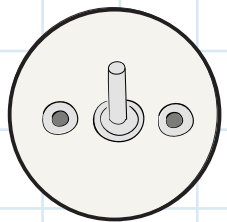
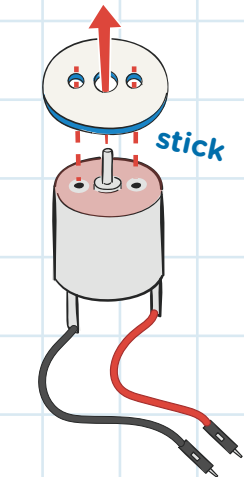
screw driver



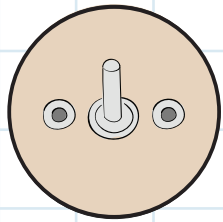
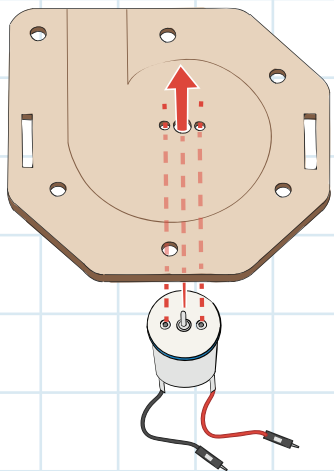
steel bolts

BUILD

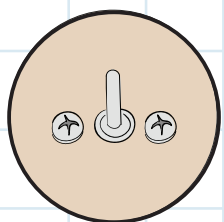
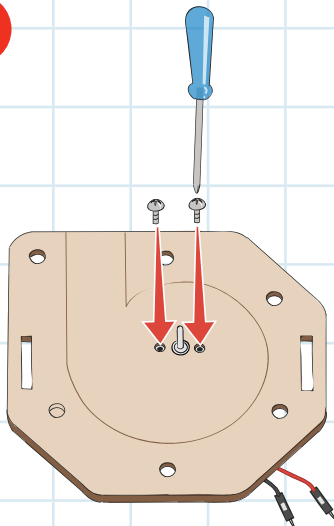
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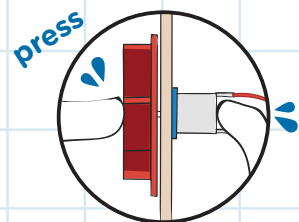
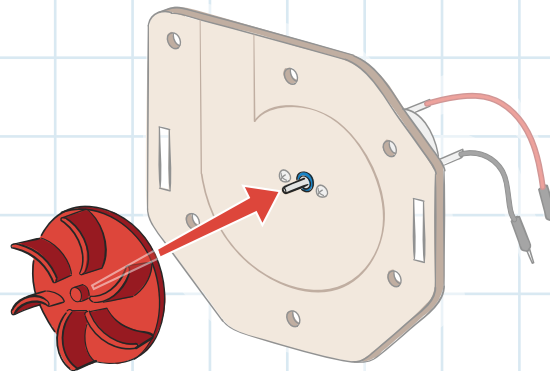
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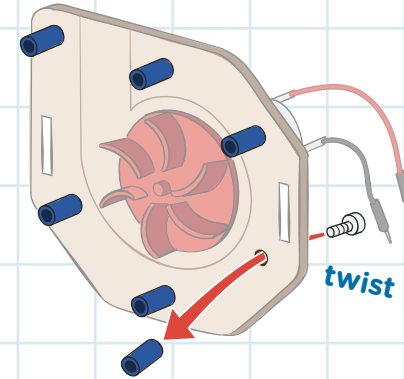
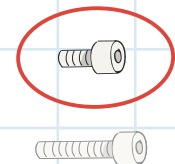
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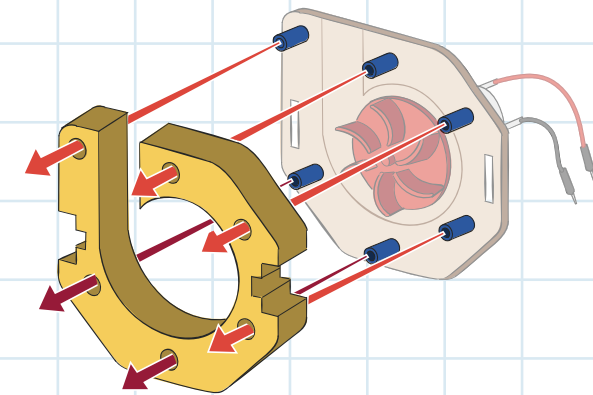
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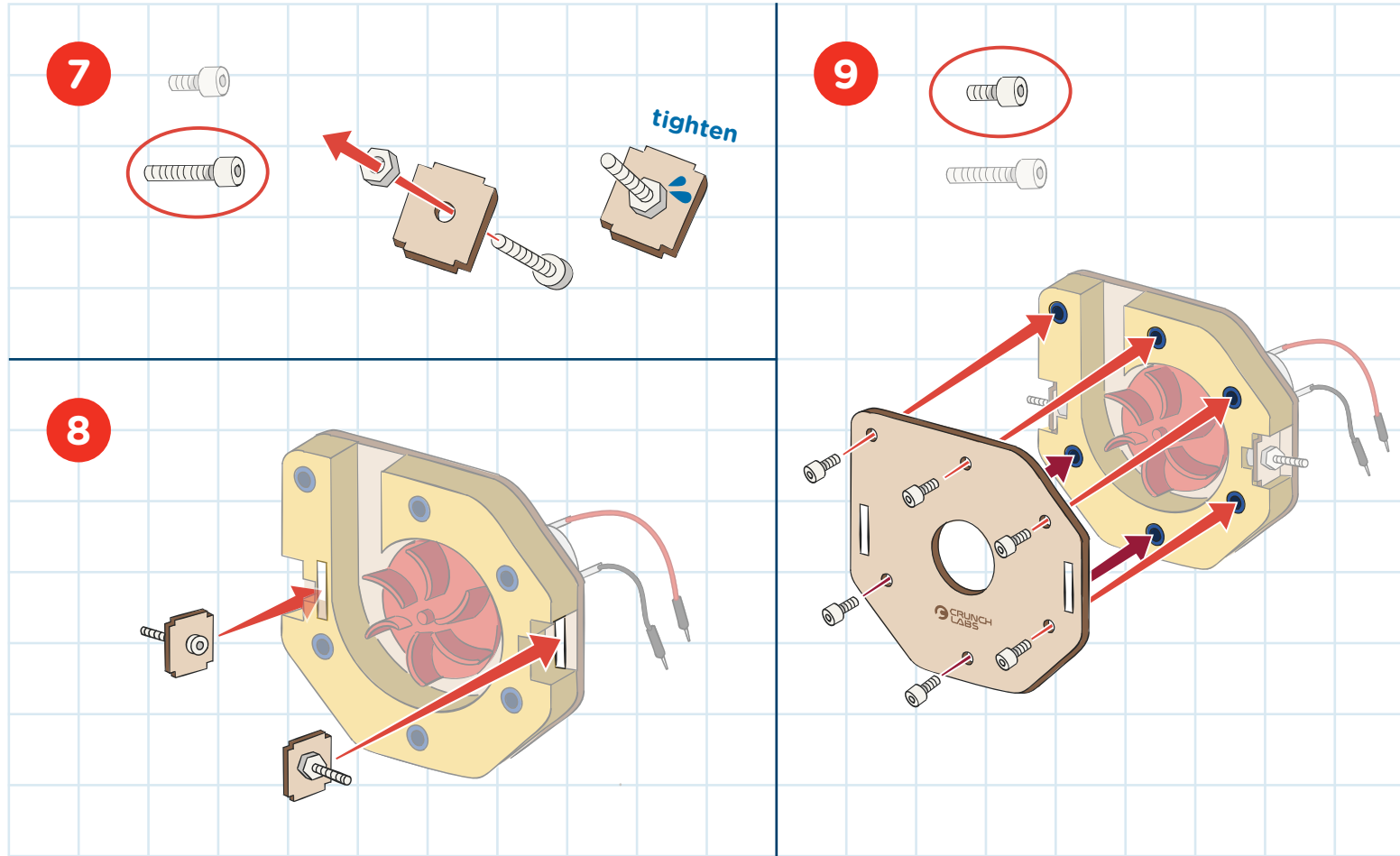
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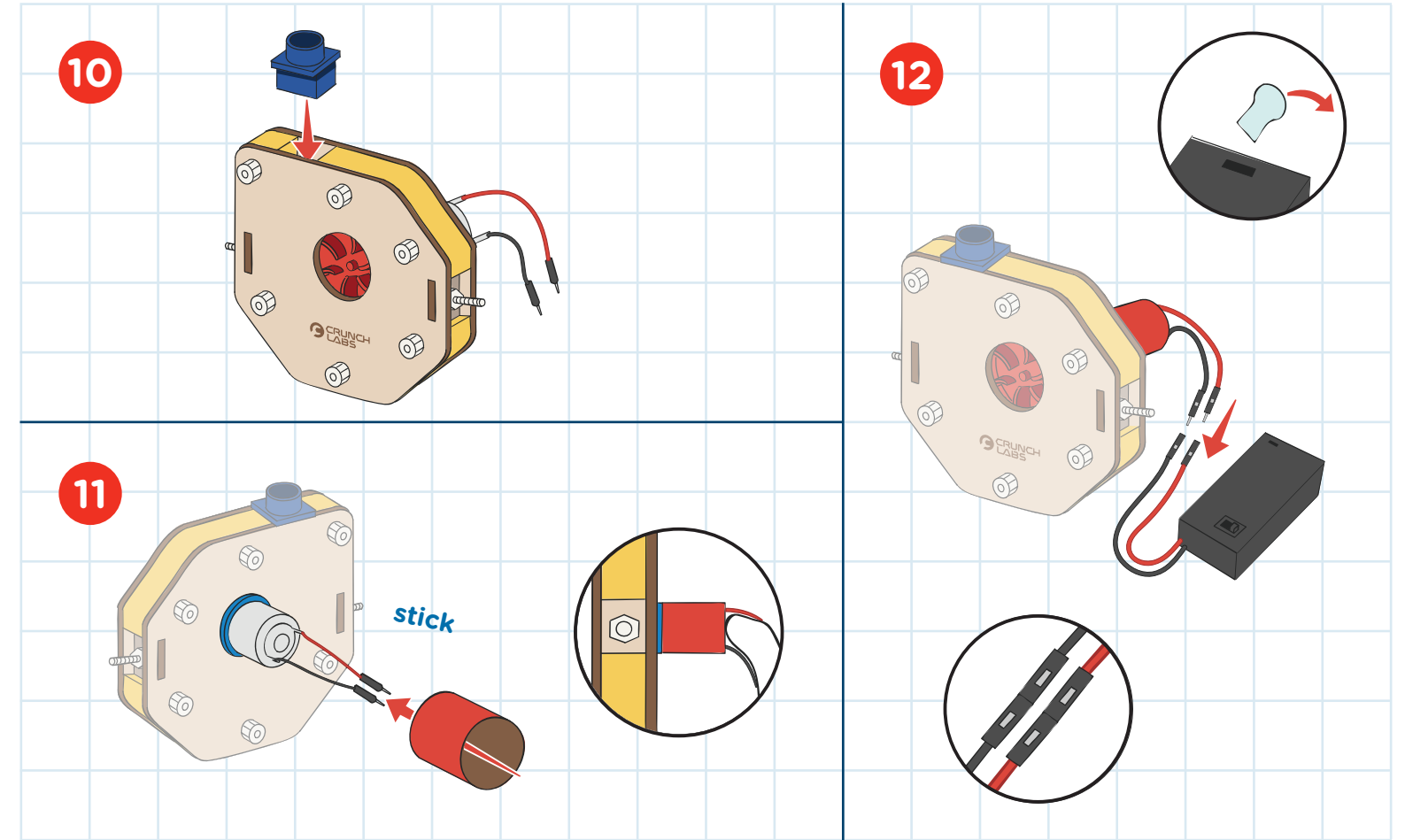
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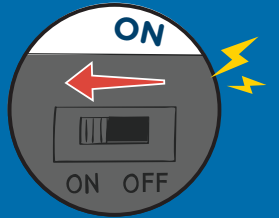
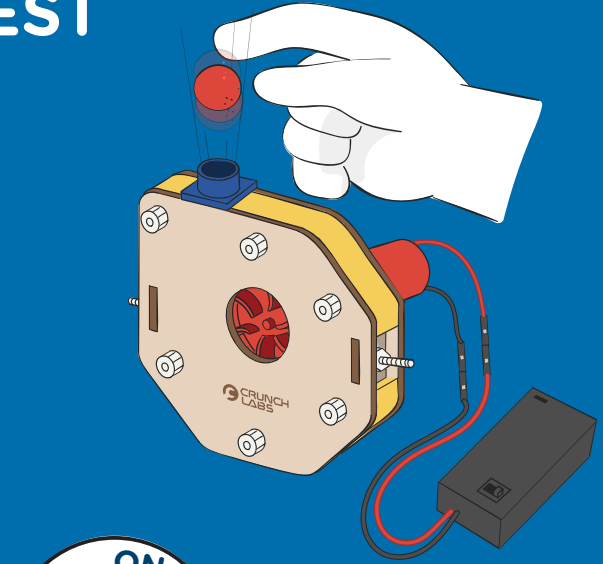
BUILD



BUILD

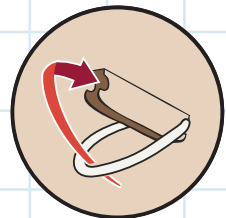
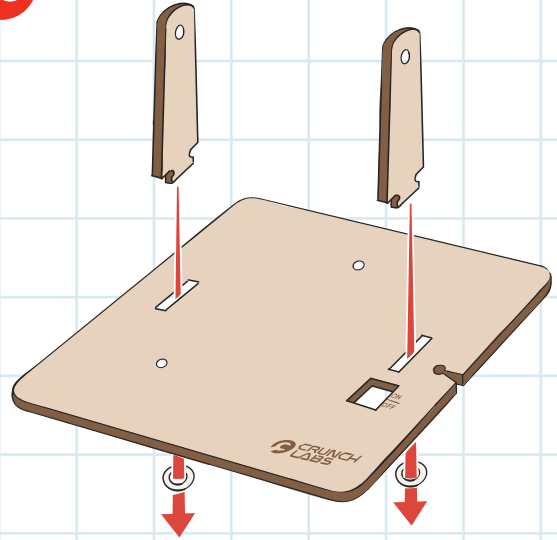


TEST

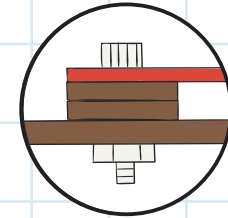
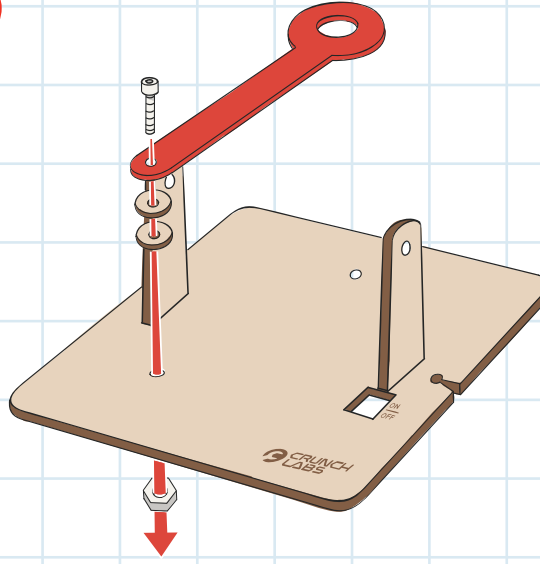


Having trouble? Watch the video at crunchlabs.com/wind

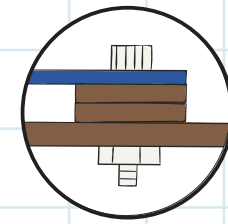
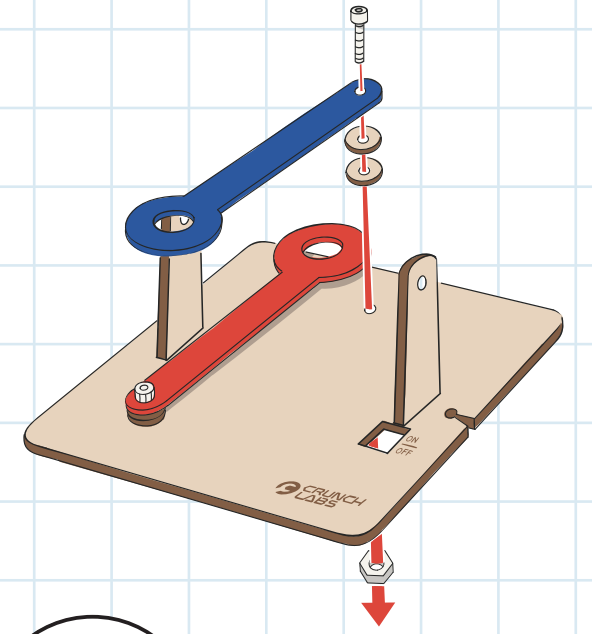
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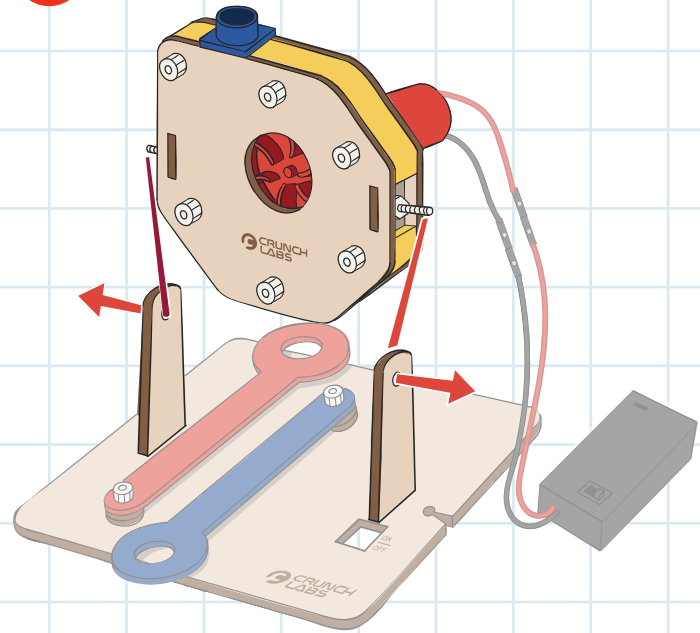


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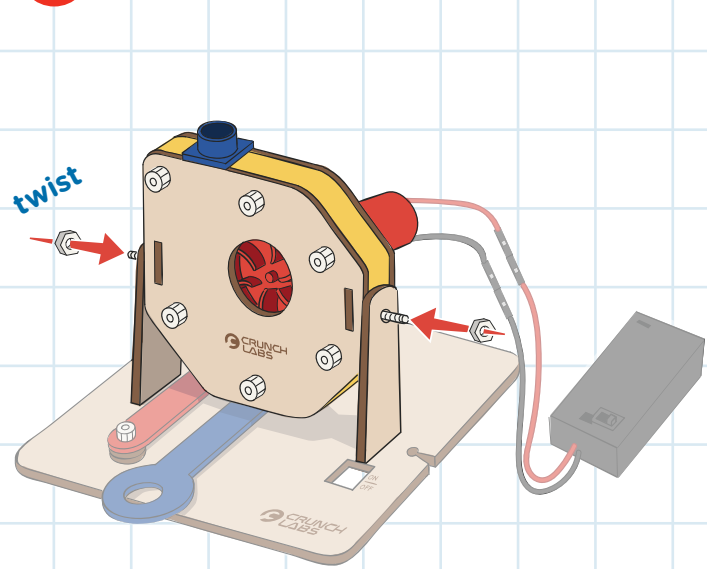


BUILD

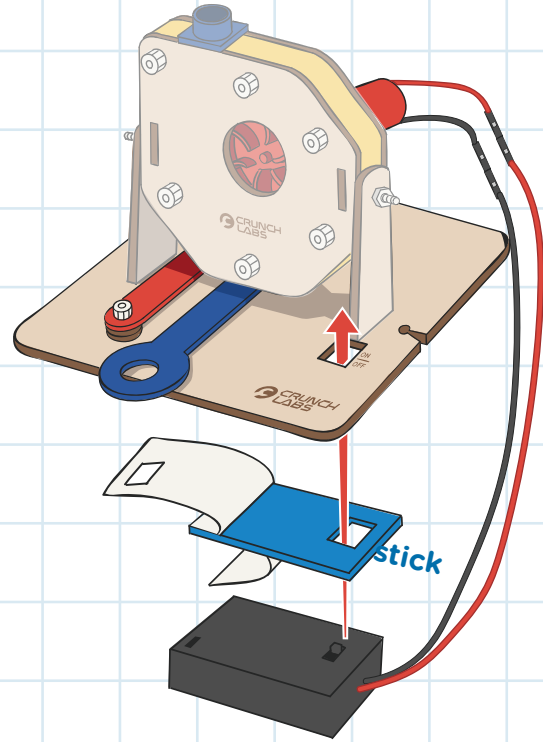
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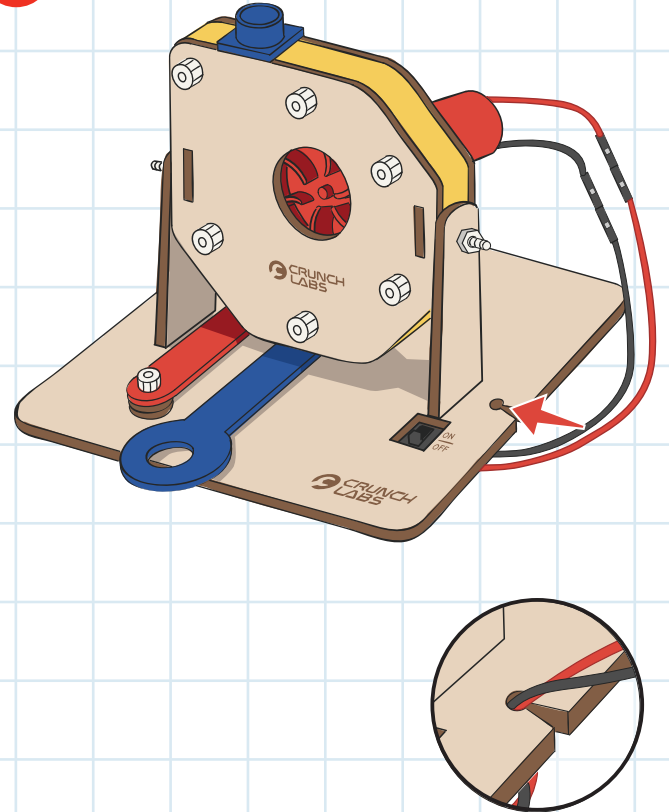
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18

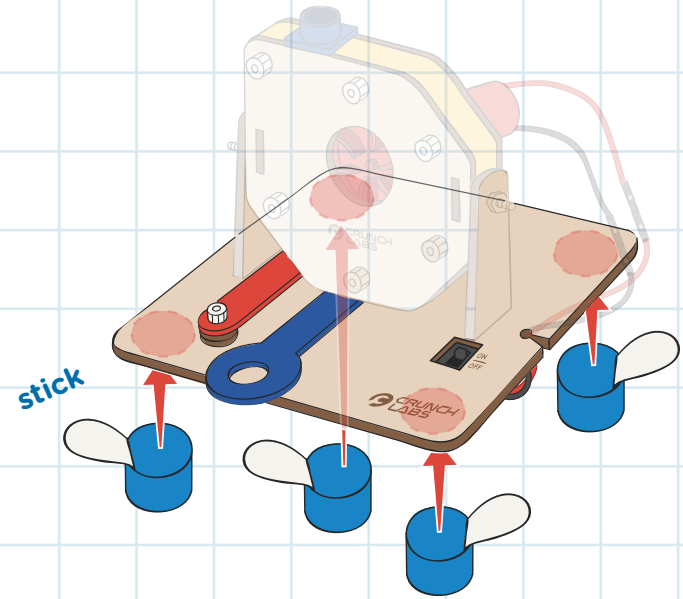


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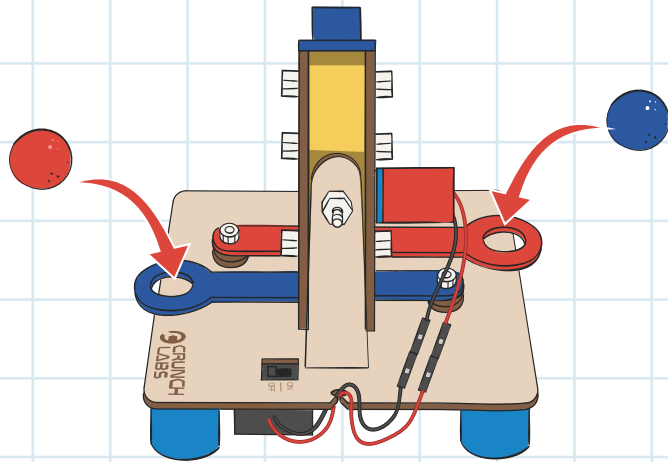


BUILD

20

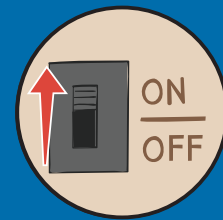
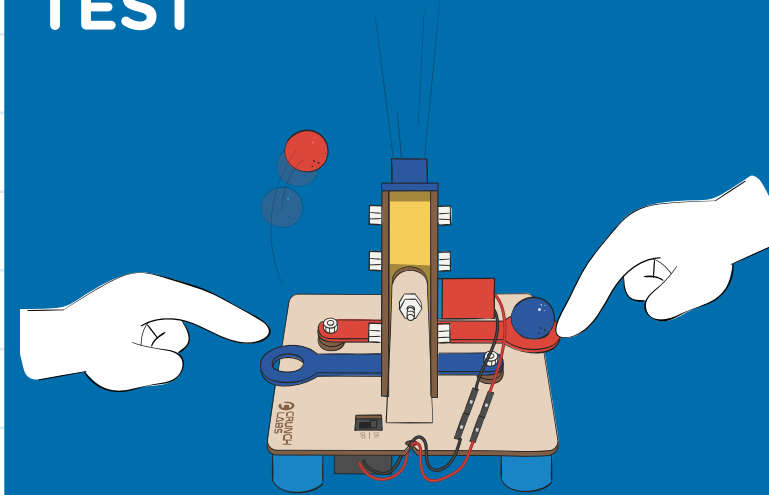


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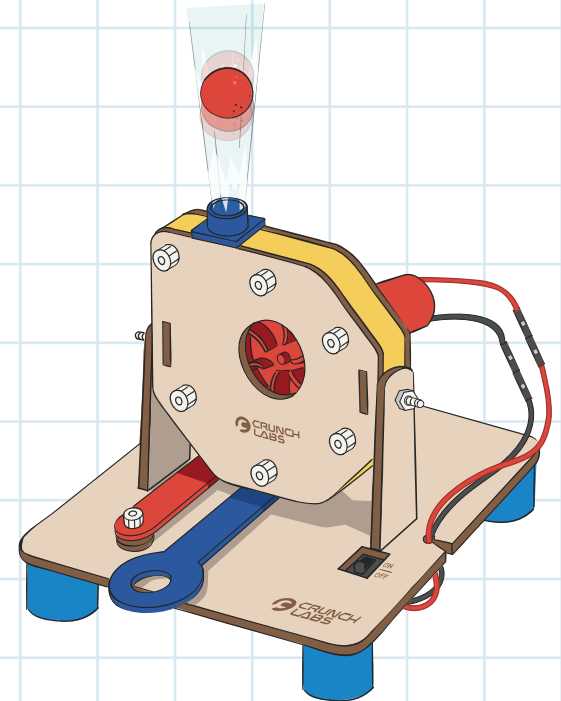
BUILD

TEST

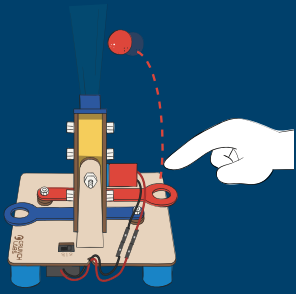


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BUILT!

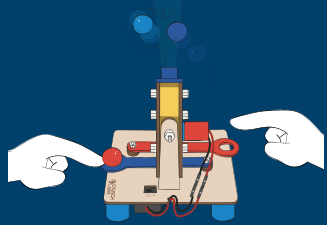


PLAY



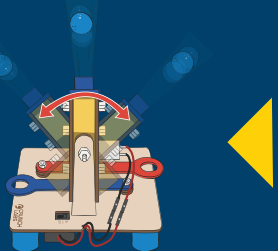
FREE THROW

Use the catapult to launch a ball up into the air column. Find the best trajectory for the ball by experimenting with different finger pressures.



KNOCK OUT

Find a friend to play with. Use both catapults at once and compete for the top! You can knock their ball out with a direct hit, or you can land underneath them and push them out from the bottom.



FLOATING MAGIC

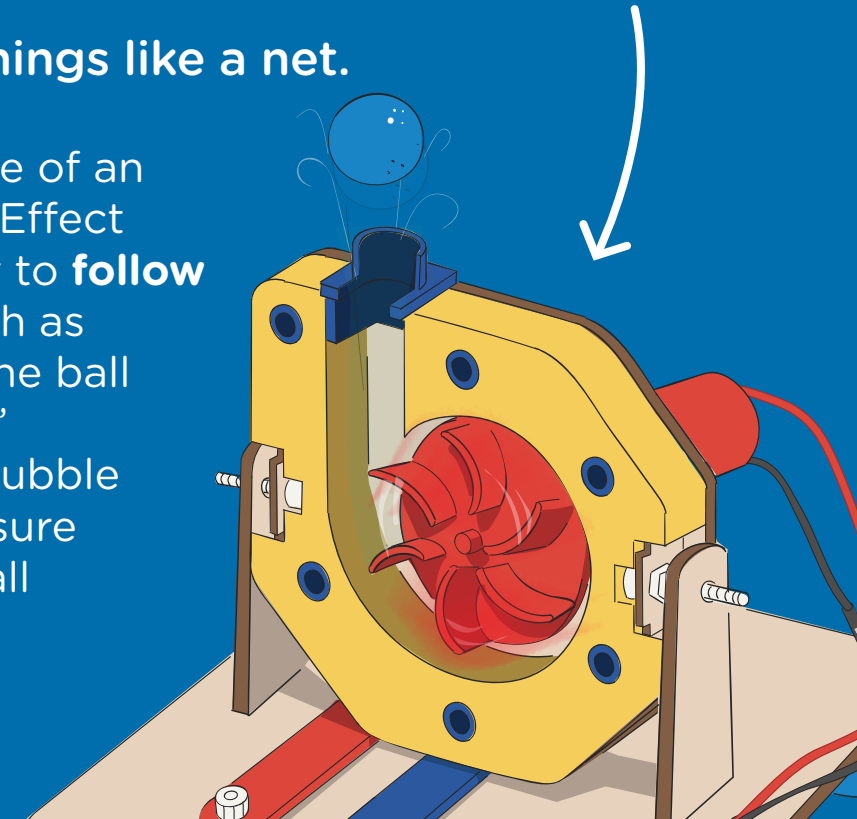
Power up the fan and place a ball in the air column. Next, slowly start to angle the machine sideways. See how far you can tilt the fan without dropping the ball.

THINK

The **Coanda Effect** is the tendency of air to follow the curvature of an object

Basically, air can wrap around things like a net.

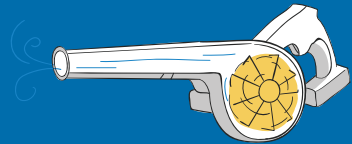
Your Air Ball game takes advantage of an effect in physics called the Coanda Effect which describes the tendency of air to **follow the curved surface** of an object such as the styrofoam ball in your box. As the ball enters the airstream, the air “wraps” around the ball **suspending it** in a bubble of air pressure. That bubble of pressure acts like a magnet and keeps the ball centered in the air stream.



THINK

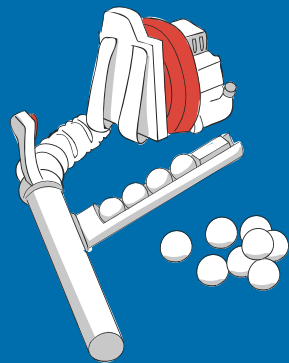
Find centrifugal fans in other machines!

A fan is a mechanism that uses rotating blades to move fluids. Most fans, like ceiling fans, use propellers which move air straight through the blades. Centrifugal fans, like the one in your build, use **impellers** which **spin air outwards from the center** of the blades.



LEAF BLOWER

A leaf blower is a common house hold item that uses a centrifugal fan. The impeller is shrouded in a case which pulls air in through the side and directs a powerful stream out through the front.



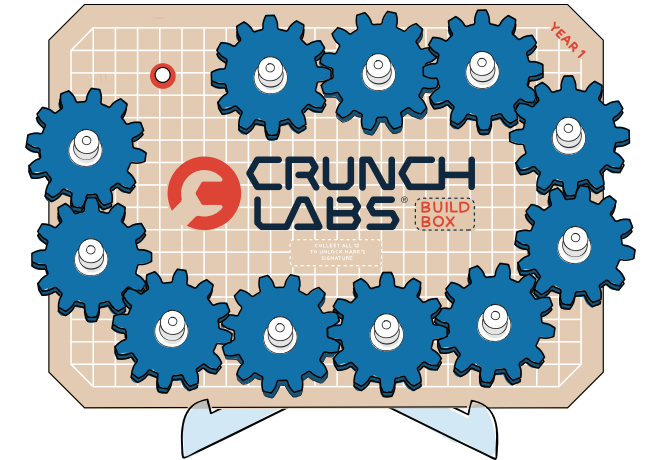
SNOW BALL MACHINE

Mark once converted a leaf blower into a snowball machine gun. The snowballs were fed through a magazine tube into the barrel. The leaf blower used its **centrifugal fan** to throw snowballs at a super human rate!

THINK

CONGRATULATIONS!

You earned a gear badge for Coanda Effect



Don't forget to add your gear badge to your gear train!

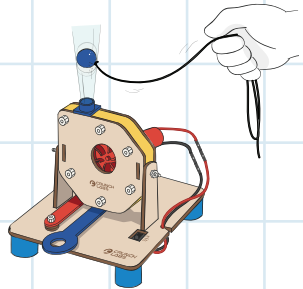
CRUNCH

It's crunch time! Use your engineering superpowers to keep building.



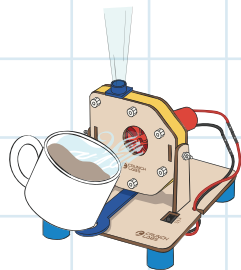
FLOATING ART

Use a marker to decorate your ball. Try drawing a picture, or writing a word. You may need to add a small weight, like a staple, to keep the ball upright when it's floating.



WALK THE DOG

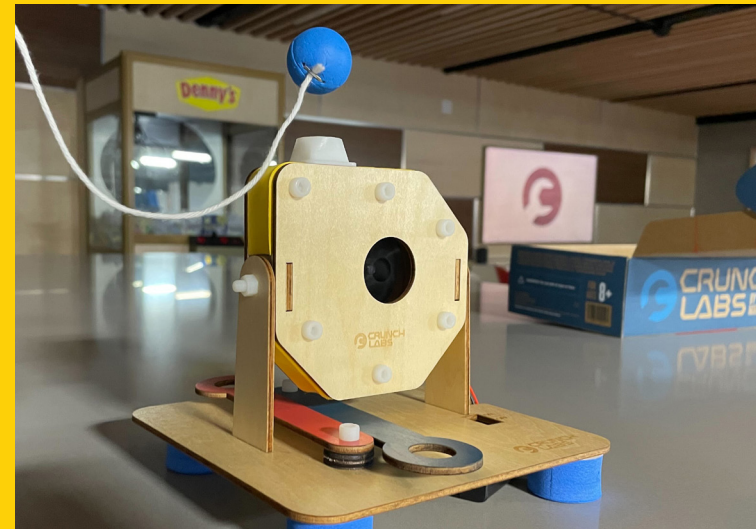
Use a staple and a piece of thread to make a leash for the ball. The leash will let you control the ball while it's levitating.



FOG MACHINE

Use a cup of hot water to expose the path that the air takes through the fan when it is running. This is the same strategy that engineers use inside a wind tunnel.

SHOW OFF YOUR BUILD



Share your funniest moments & coolest mods!
#crunchlabs @crunchlabs    



WARNING: Improper assembly can short circuit batteries. Do not aim at eyes or face.

BATTERY SAFETY

Remove exhausted batteries. Do not mix old & new batteries. Do not mix alkaline, standard (carbon-zinc), or rechargeable batteries. Do not recharge non-rechargeable batteries. If using rechargeable batteries, remove them from the toy before charging. Rechargeable batteries should be charged under adult supervision. Do not short-circuit supply terminals. Do not connect this toy to a power supply greater than two AA batteries. **How to remove batteries:** 1. Remove screw and lid from battery pack. 2. Remove batteries. **How to insert batteries:** 1. Remove screw and lid from battery pack. 2. Insert two new batteries into the battery pack with correct polarity (+ and -). 3. Replace lid and secure the screw on the battery pack.

SWEEPSTAKES

Each CrunchLabs build box contains the chance to WIN a trip to visit CrunchLabs with Mark Rober! Sadly, you are not a prize winner this time. Check inside your next build box for another chance to win.

Trip includes roundtrip transportation and two (2) night's hotel accommodations for a family of four (4). Approximate value: \$4,500. NO PURCHASE NECESSARY. Open to legal U.S. residents, 18 years of age or older. Void where prohibited. For complete Official Rules, including promotion end date and information on how to obtain a free game ticket, visit www.crunchlabs.com/win.

This toy is intended for use by children over the age of eight years. These instructions contain important information, do not throw away.