3D Printed Lego Tape

Created by Ruiz Brothers
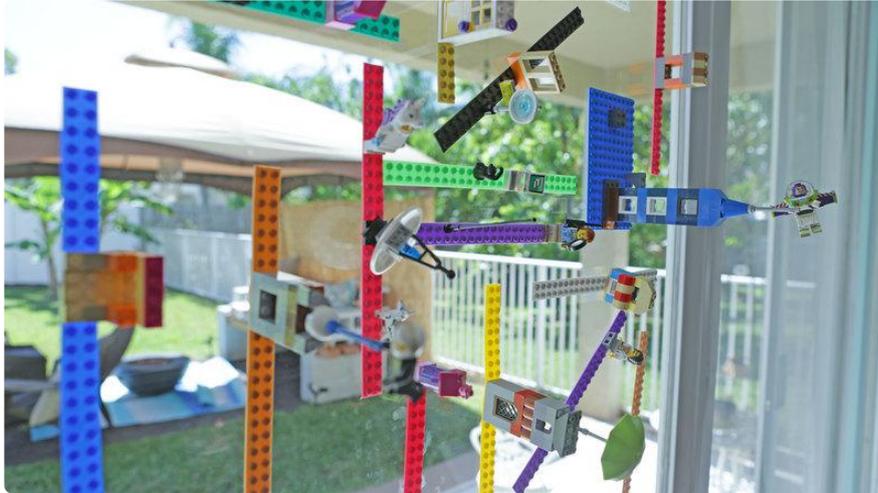

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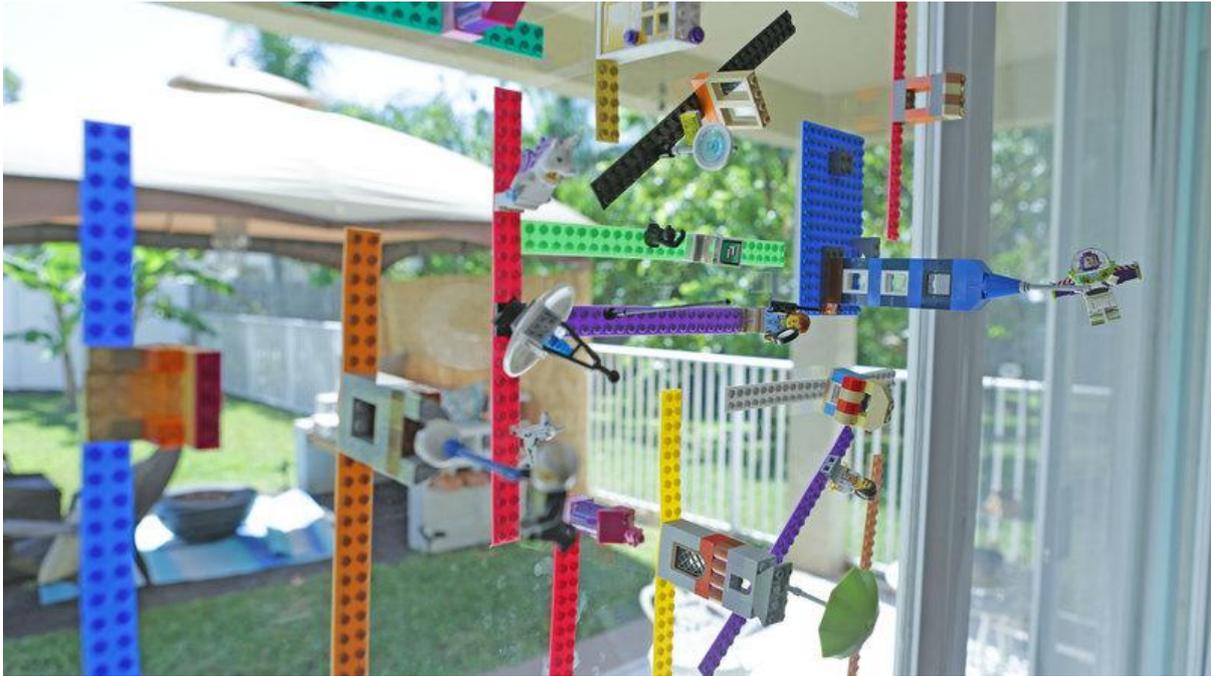
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Overview

Flexible LEGO Strips

In this guide, we'll show you how you can 3D print flexible lego strips. These strips are 3D printed with a rubber like material that allow it to cling to glass surfaces without any adhesives! The bottom of these strips are able adhere to glass using suction, so this allows you to build lego projects with lots of different bricks so you can make pretty cool scenes.

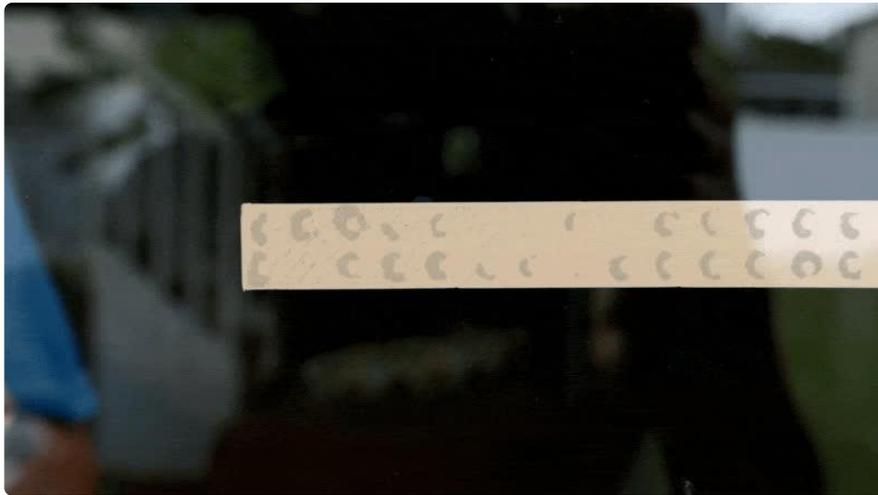## Classic Ninjaflex Filament

We used NinjaFlex 85A (), which is a flexible filament that features soft rubber characteristics.

The strips have a tight tolerance so they have a pretty solid connection to LEGO bricks.

Even small 1 by 1 bricks connect nicely and are able to stay connected even when the strip is curved and flexed.

How Does It Work?

The secret to making NinjaFlex cling to glass surfaces is to use a heated glass bed! The bottom of the strips are glossy and smooth. The heated glass bed fuses the layers together which creates an a glossy surface. When the surface is pressed up against a glass surface, it creates an air tight suction that can hold a fair amount of weight.

Prerequisite Guides

We recommend walking through the following tutorial to get familiar with the components used in this project.

- How to Print with NinjaFlex ()

Parts

You'll need the following parts to build this project.

- NinjaFlex (85A) (NinjaFlex cheetah/semiflex will not cling)
 - We have [many colors for this material ()](#)
- Glass Heated Bed

Tools & Supplies

You'll also need the following tools and supplise to complete this project.

- [3D Printer ()](#) with heated glass bed
- [Ninjaflex Filament ()](#)
- [Tweezers (http://adafru.it/3096)](#)

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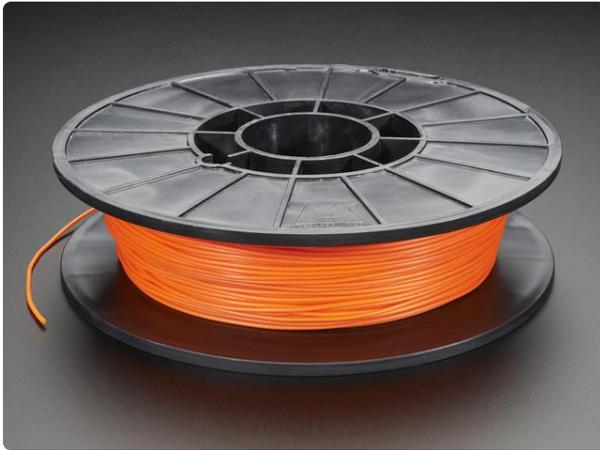
NinjaFlex Filament - 1.75mm - Liquid Hot Lava - 0.5 Kg

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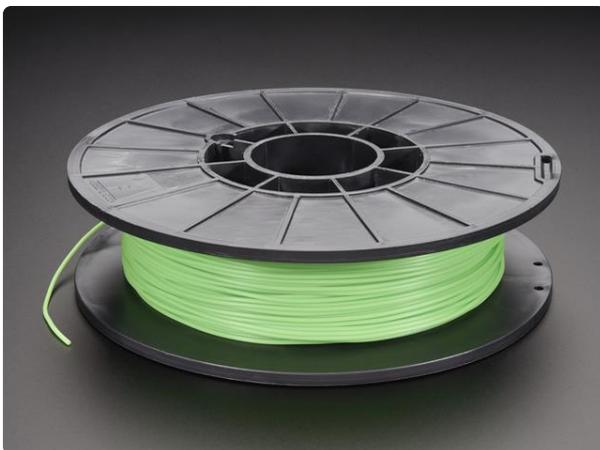
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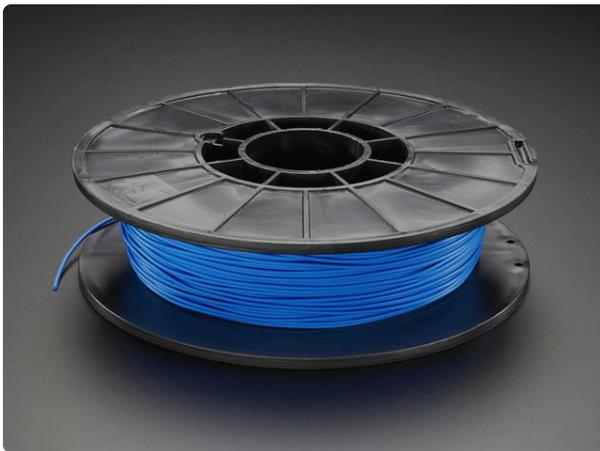
NinjaFlex - 1.75mm Diameter - Sky Blue - 0.50 Kg

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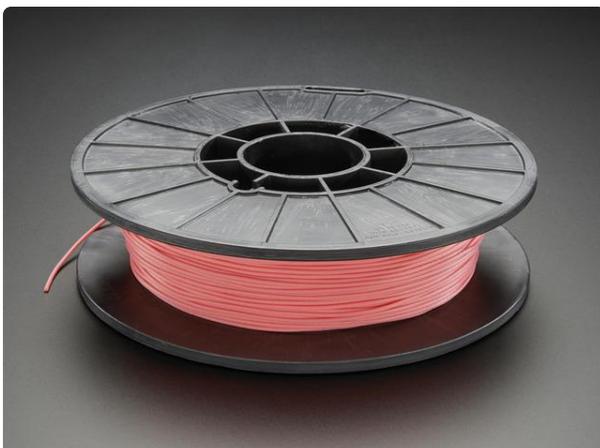
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NinjaFlex - 1.75mm Diameter - Green Grass - 0.50 Kg

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NinjaFlex - 1.75mm Diameter - Flamingo Pink - 0.50 Kg

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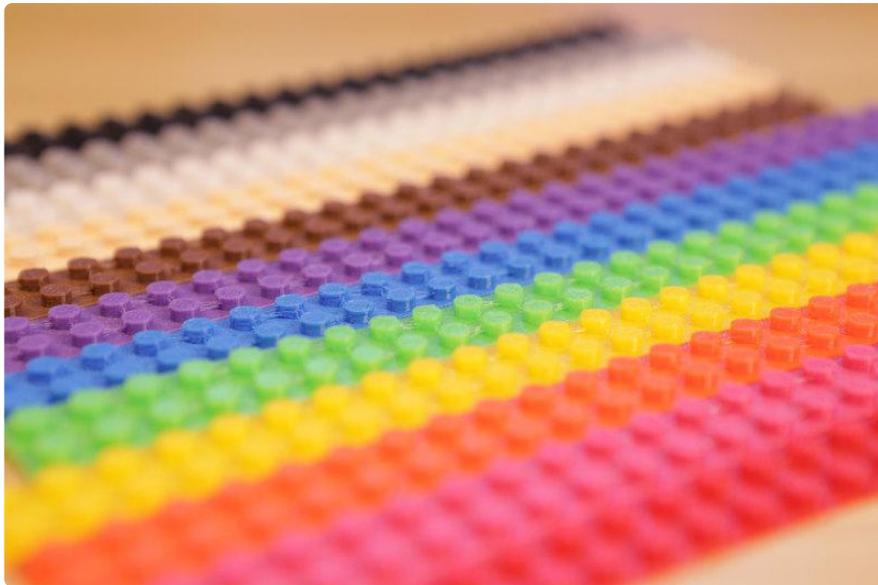
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3D Printing

Download and 3D Print

You can 3D print the parts using NinjaFlex (85A) filament () on desktop FDM style 3D printers with a compatible extruder. The 3D printed strips can be downloaded using the link below. If you don't have a 3D printer, the files are free to download so can send them to a 3D printing service ().

We do not recommend using SemiFlex or Cheetah, only the classic Ninjaflex works. The material has a grippy properties that allow it to cling onto glass surfaces. SemiFlex and Cheetah both have rigid/slippery properties that won't allow it to cling to glass.

A Glass Heated Bed is required to make the strips cling to glass panels like windows!

The parts were 3D printed using the BCN3D Sigma and Type A Machines Series 1 Pro ().

Download files from Thingiverse

Download files from Youmagine

Download files from Pinshape

Edit Design

The design is modeled in Autodesk Fusion 360 and open to edit. You can update the size or shape of the strips by changing sketch dimensions. You can modify the sketches or adjust features in the parametric timeline. The cylindrical connectors bits are driven using a pattern, so you can add or remove as many as you like!

Edit Strip Design

Edit Square Design

Slice Settings

Depending on your 3D printer, you may need to adjust the slice settings. We tested the enclosure on a Type A Machines Series Pro 1. The parts are oriented to print "as is".

- Nozzle: 0.4mm
- Extrusion Multiplier: 1.0
- Extrusion Width: 0.4mm
- Layer Height: 0.2mm
- Infill: 0%
- Nozzle Temperature: 230c
- Heated Glass Bed: 60c
- Print Speed: 30mm/s
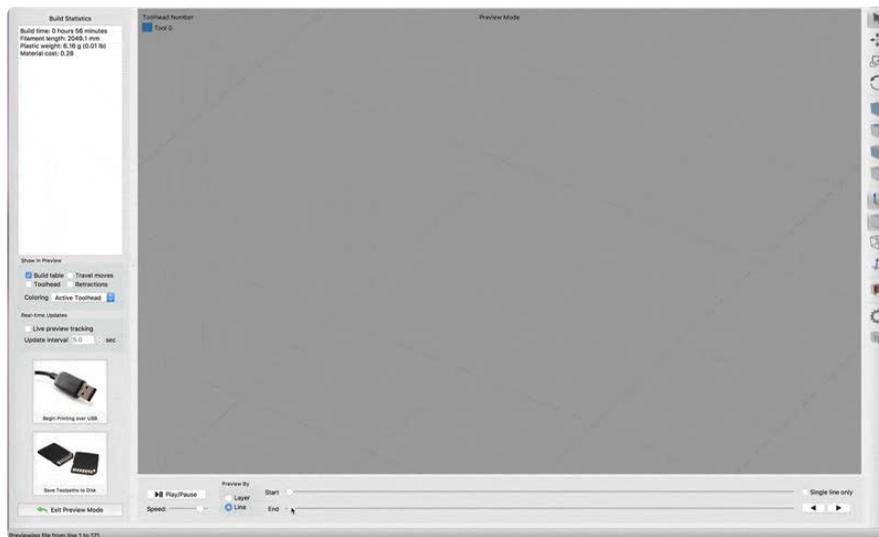
Perfect First Layer
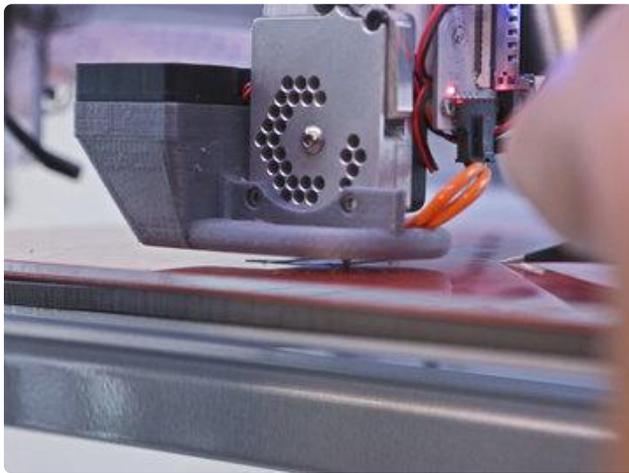
Heat the bed to around 60 c and make sure that it's absolutely leveled across the entire bed. In order to properly 3D print with Ninjaflex, you may need to disable retraction settings. It's really important to have a perfect first layer, so make sure there isn't any excess material.
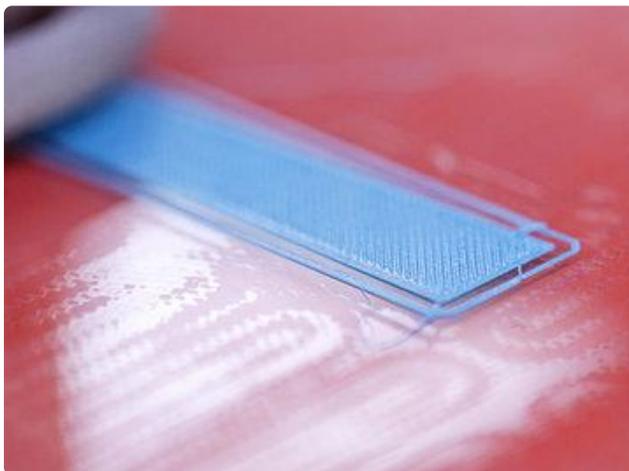

While leveling the bed we need to find the sweet spot so that the first layer isn't not too squished or too loose. If the bed's too close to the nozzle, the material may buckle. If it's too high the bottom won't have an even surface.

Printing with a direct drive extruder is idle, but there are bowden type 3D printers that can handle flexible filament like the Sigma from BCN3D.
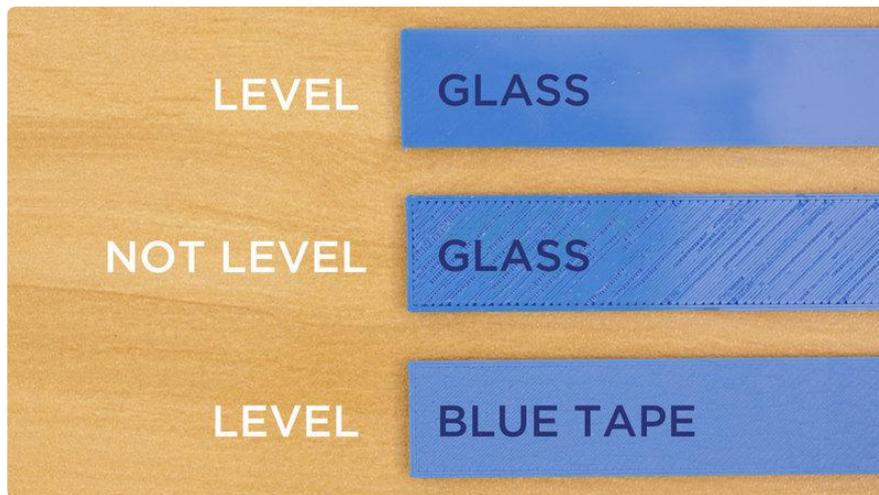
Level Surfaces

The top we have a correctly leveled part. In the middle we have a strip that wasn't properly leveled, so it won't have proper suction. And for comparison, the bottom strip was printed on blue painters tape. This gives it a rough matted texture will just doesn't adhere to glass, so you really do need a glass bed to make the suction work.
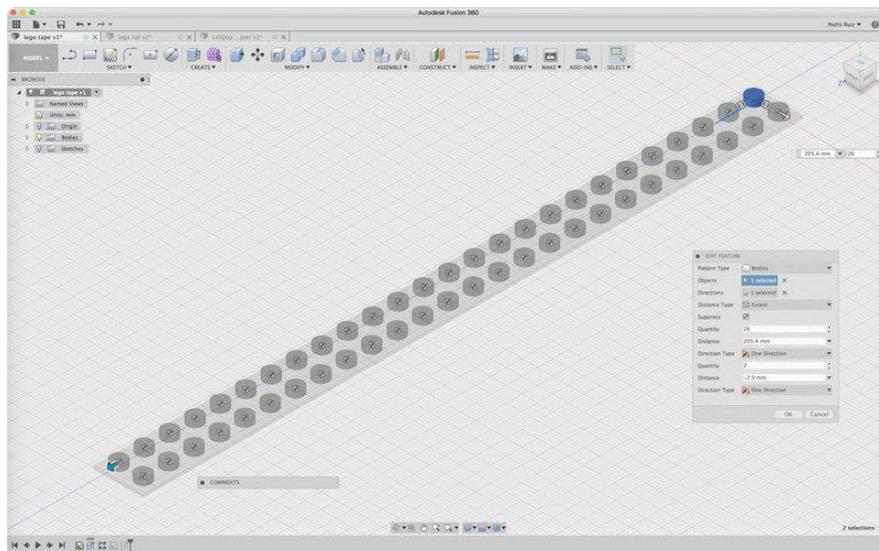
Made with Patterns

You can easily adjust the length of the strips and square parts by editing the pattern features found the design timeline. You can also adjust the sketches that make up the design to create a custom strip.

Use

How To Cling Strips

First, you'll want to clean both surfaces using either glass cleaning solutions or alcohol. Make sure to press evenly across the strip to ensure suction is evenly distributed across the entire strip.

One of the the coolest things about this project is how we are able to use material properties to create objects that can stick without the use of any adhesives. You can 3d print any shape or even cut the strips to fit.

NinjaFlex is soft enough that we can actually cut and sew it to clothes like hats or even shoes!
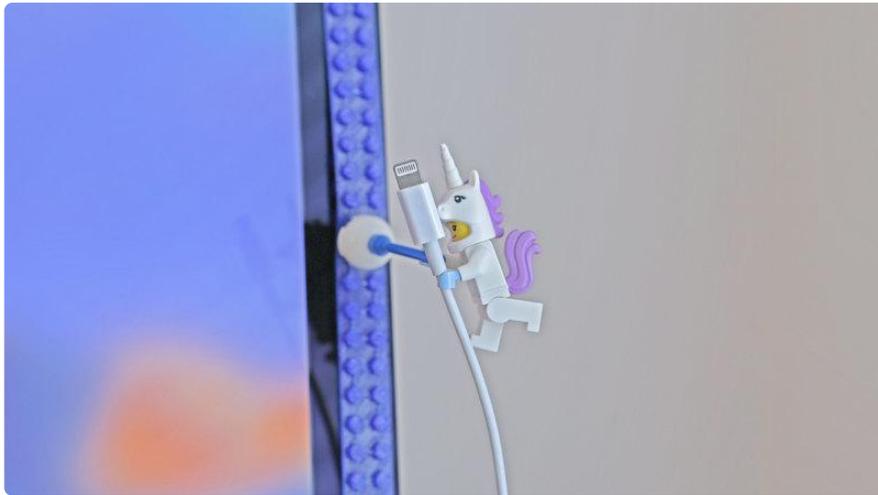
How Much Weight Can It Hold?

We tested the strips and square sheets to see how much weight they can hold. We were able to fit about 38 bricks per strip. The largest building we were able to hold were 30 grams and 7 inches tall (about 27 bricks). It's important to consider weight distribution, so that your LEGO bricks don't cause the strip to peel off the glass surface. Try to evenly distribute the weight of the bricks so they stay on the glass surface. And remember, gravity is working against them :-)

We were even able to stick the strips to the edge of the screen on our iMac! A pretty cool idea is to use a minifig to hold a USB charging cable, they fit nicely in the little claw.

Cleaning

After a while we'll need to clean the our surfaces from any oils that will build up. We used window cleaner for glass surfaces and rubbing alcohol for the bottom of the strips.
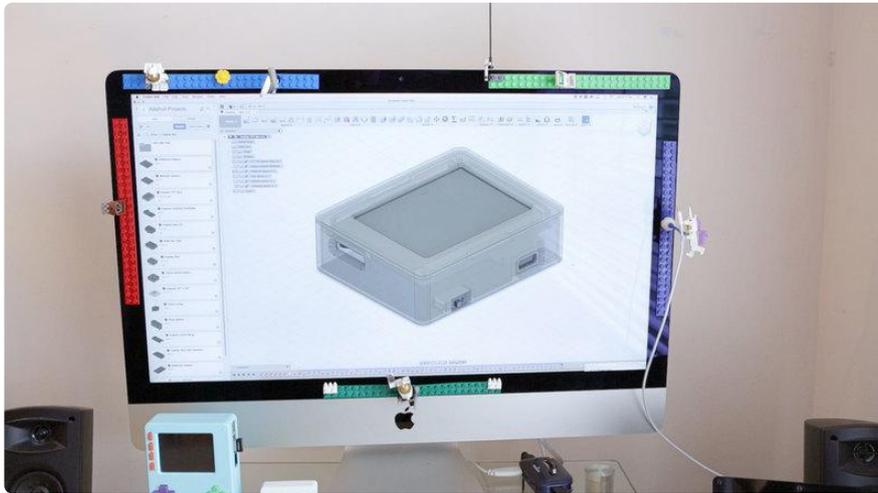
More Project Ideas!

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