How to Make Hydraulic Powered Robotic Arm from Cardboard

What do I need?
In fact it's not that much, and most of the bits and pieces you may have at home. All you need is cardboard, eight syringes with rubber piston, an old battery, four pipes and popsicle sticks, and don't forget two paper clips or something similar.

To cut out the pieces you need a scissors and some (hot and cold) glue to fix it again. Finally, you'll need water as hydraulic fluid. To spice things up a little you can add different food coloring for each piston. The guy in the video also used a power drill, toothpicks and zip ties.

Getting started
Well, it might be a good idea to start with the video below. Ignore the can of coke if you don't like it, you can use whatever empty can or small box you like.

Everyone may like it but feel too lazy for such a DIY project, so we'll tell you, you may stop reading here. We'll only provide more and more and more details on how to build a replicate of this do-it-yourself hydraulic arm … Anybody else, please keep reading.

Unfortunately, we cannot provide actual measurement, but we will do our best. Also if you like it big or even bigger, just double the numbers (and use larger syringes).

When building continues…
Other than in the video I would start with the two large pieces of cardboard for the base, which are approximately 8 by 8 inch. Simply glue one on top of the other and drill a hole in the middle to fit the battery.
Then you need the arm. Therefore you have to cut the base, the lower arm, the upper arm and the hook. For the base you need two pieces about 6” long, 3” wide at the bottom and 1” at the top. In addition, you need a single piece of 3” by 3” for the bottom to glue the other on top, but for now just let the glue set in the corner and cut the other parts.

The lower arm is even easier to do, just get two pieces of about 8” in length, 1” wide and you’re ready. The upper arm is very similar, but a bit longer. Going for 10” will be fine.

After this you need the hook, but to explain this, words are not very suited. Instead pause the video at 3:02 and copy his sketch. You’ll need more parts for the hook: a triangular piece of about 3” by 3”, two paper clips and the claws itself. Once again please refer to the video (3:30 to 3:40).

You will also need five pairs of popsicle sticks with two or three layers of cardboard in between in the middle bit. One to turn the arm and four for the ‘remote control.’

**Gluing it together**

Once again we will refer to the video above, but hey, nobody said it’s gonna be quick or easy … Before you switch back to the video, here are some tips.

Start with the upper arm, because this is the narrowest part, yet the syringes have to fit between both sides. From there on, work your way down to the bottom and add the hook last. When you ruin something on the way, you don’t need to rebuild that bit…

Hopefully you haven’t glued all the parts together yet, only the separate pieces themselves… Because now comes the part you may need a third hand. Fixing the parts together making a working hydraulic arm needs a bit patience and a lot of toothpicks. Also get the cold glue bottle ready!

Every joint of the hydraulic arm is a toothpick, fixed with two little bits of cardboard glue to its ends. Be careful when you put the parts of the arm together and don’t break anything. Otherwise you have to redo that part.

In the process of joining all the parts together, please don’t forget the syringes. (You may watch the video again and again until you get it right, I’ve done the same…)

**Powering up your hydraulic arm**

When everything is in place you just need to add the hydraulic fluid. In real excavators this would be top grade hydraulic oil, but we will use water instead. If you like you can prepare four different jars with water and add some food coloring as in the video.

Then carefully fill up the four unused syringes and connect them with the others with the pipes like he did in the video. When this is done you can make a first test.

To make things a little more comfortable, you may build a remote control. Yet again you need two big pieces of cardboard as base and zip ties to fix the syringes. Using the four leftover pairs of popsicle sticks you can build levers as the guy in the video.

Large flat container was used to hold water to fill the hydraulic arms.