

INNOVATION WYRKSHOP

JUDO FIGHTING BOTS

ESTIMATED TIME: 2 HOURS

LEARNING OBJECTIVES

- Learn more about pneumatics systems
- Create your own fighting Judo bot

LEVEL: 2

STANDARDS

- NGSS
 - Defining engineering problems
ETS1.A
 - 3-5 ETS1-1
 - Developing possible solutions
ETS1.B
 - 3-5 ETS1-2
 - Optimizing the design solution
ETS1.C
 - 3-5 ETS1-3
- PBL
 - A challenge or problem question
 - Sustained inquiry
 - Authenticity
 - Student voice and choice
 - Reflection
 - Critique and revision
- STEM
 - Large problem broken down
- ISTE
 - Empowered learner 1.1a
 - Innovative designer 1.4.a, 1.4.c, 1.4.d
 - Creative communicator 1.6.b

MATERIALS NEEDED:



Zip ties



Popsicle
Sticks



Cork



Scissors



Masking
Tape



4 Syringes



12" of
Tubing



Hot Glue
Gun



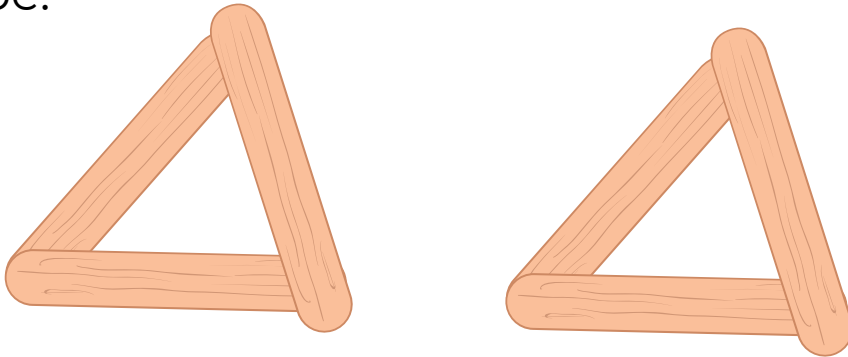
Wooden
Dowel

INTRODUCTION:

Imagine a judo fighting robot like a big friend with air-powered muscles. Instead of our muscles, it uses pneumatics, which are like the tubes in our veins but filled with air. When we send air into these tubes, it makes the robot's arms and legs move just like ours do. It's a cool way to learn about robotics and martial arts, and it's programmed to be safe, so it won't hurt anyone. Just picture a friendly robot ready to teach us all about technology and sports!

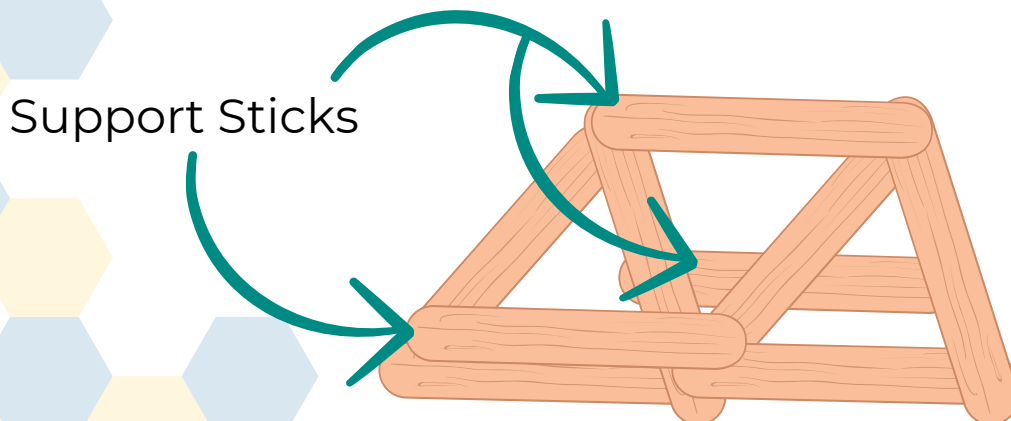
STEP 1:

Make two triangles bases using 3 popsicle sticks and tape.



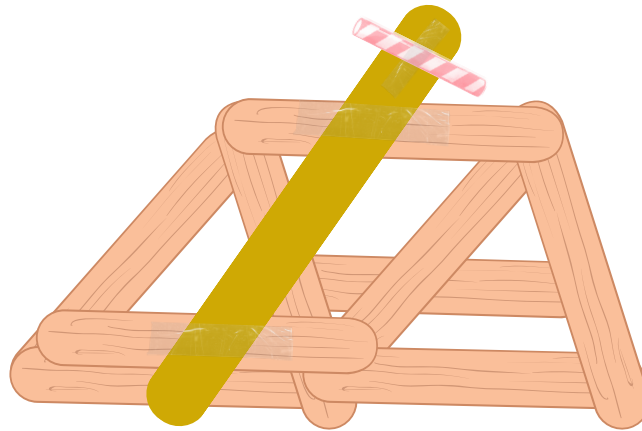
STEP 2:

Attach 3 support sticks between the two triangles.



STEP 3:

Now let's create a hinge point! Grab one jumbo popsicle stick (or tape together two small sticks side by side) and tape them between two support sticks. Then cut a small 1 inch section of a straw and tape horizontally it to the top of the popsicle stick.



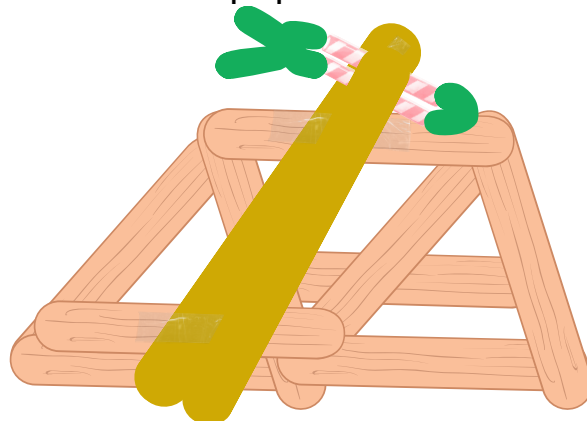
STEP 4:

Take another jumbo popsicle stick and create another hinge point.



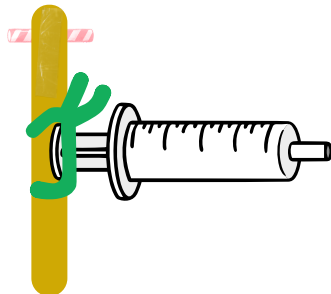
STEP 5:

Attach the two hinge points with a pipe cleaner.



STEP 6:

Now take a syringe that is empty and attach this syringe with a pipe cleaner about 1-1/2 inches below the hinge point on the stick only attached via pipe cleaner.



STEP 7:

Attach the tubing to the syringe and pull the plunger so it is 1/2 full with air and connect it to another syringe that is empty. Secure the tubing with tape.



STEP 8:

Push the air out of the full plunger and into the empty plunger. This should raise the attached popsicle stick!

STEP 9:

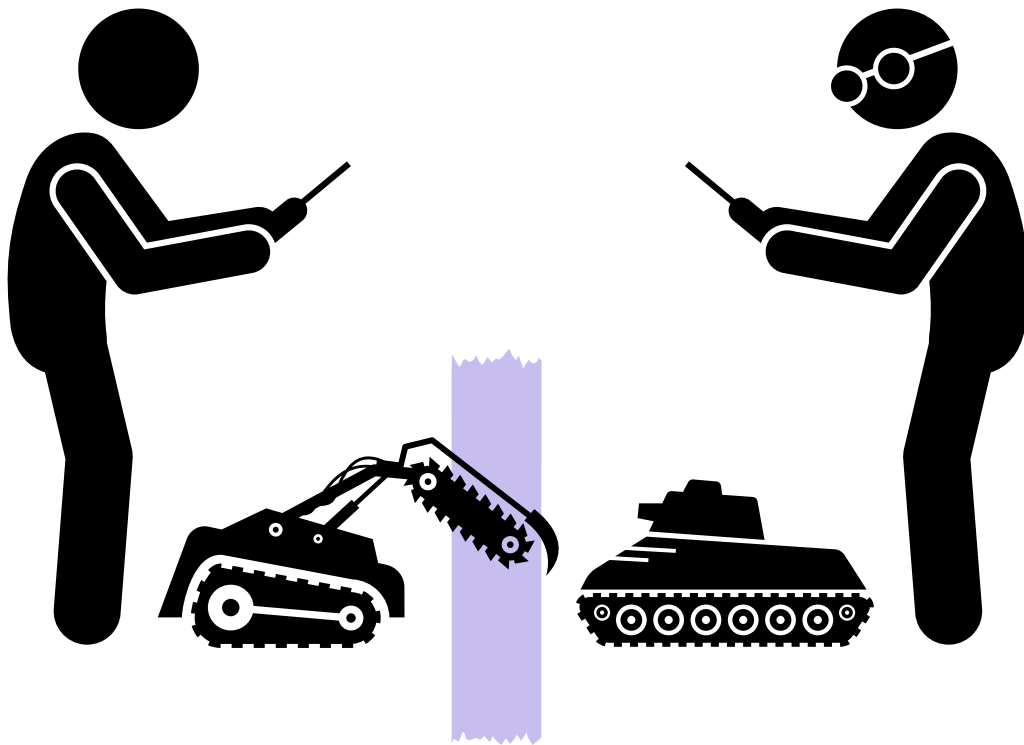
Now take all the skills you just learned and add more to your robot. Do you want wheels, or would extra long levers be an advantage?



STEP 10:

Ready.... Get Set.... Fight!

Are you ready to take on your opponent? Place your robots on opposite sides on a taped line. Make sure your syringes are ready to go! Start a time for 60 seconds and start your battle.



STEP 11:

What did you learn during the fight? Did your robot break or not have enough power? Take some time to fix your robot and improve it, then get back out there!

