

### Step 1: Materials and Prep

- 9 craft stick
- 5 jumbo craft stick
- 6 quarter-straw pieces
- 2 eighth-straw pieces
- 1 pipe cleaner
- Plastic syringes, tubing, and adapters
- (or adapters only)
- masking tape

Prep:

- Cut straws into quarters (6 per student)
- Cut straws into eighths (2 per student)
- Cut vinyl tubing into 6" lengths (1 per student)
- Assemble pneumatic systems (recommended for young classes)

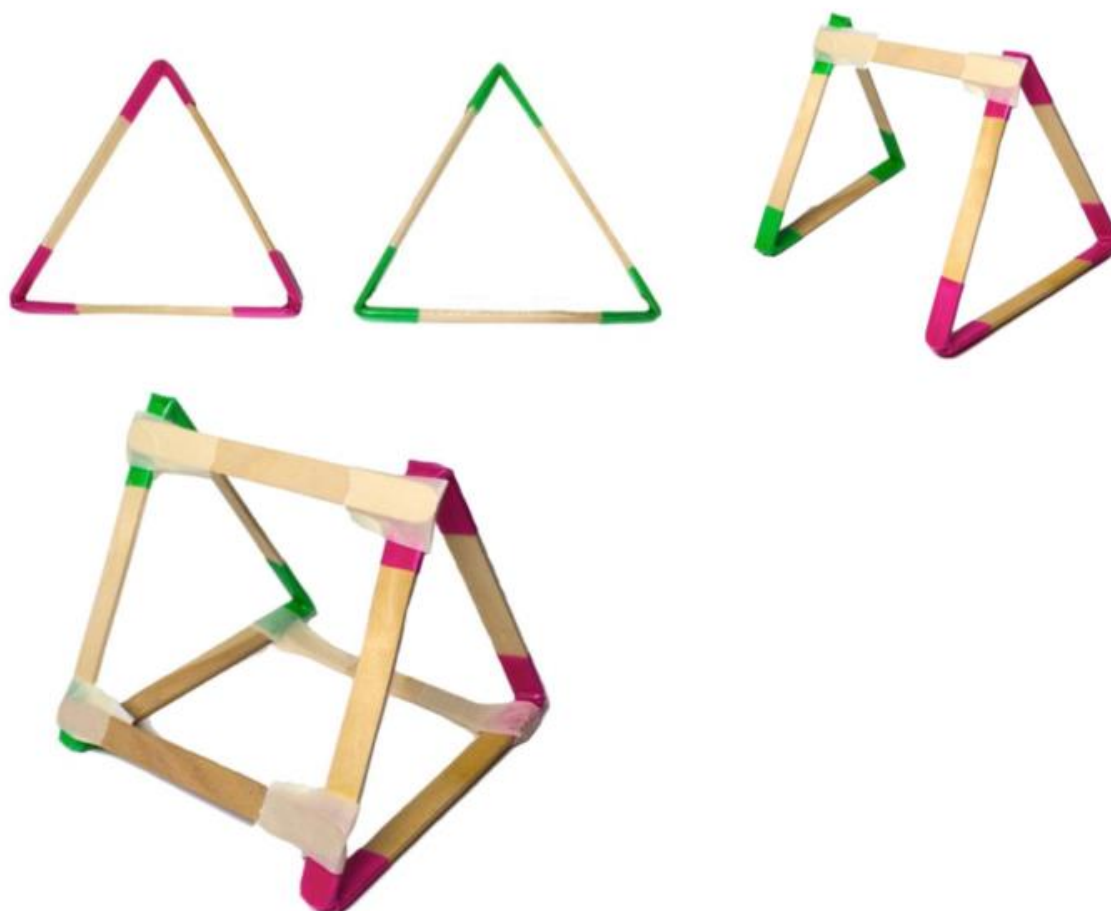
Note: The straws are large milkshake straws.



## Step 2: Assemble the Frame

Create 2 triangles using the stick-and-straw building technique.

Click on the 3rd image and look closely at the tape that is used to connect the triangles together. It is folded all the way around the triangle and stuck to itself. This is an important building technique.

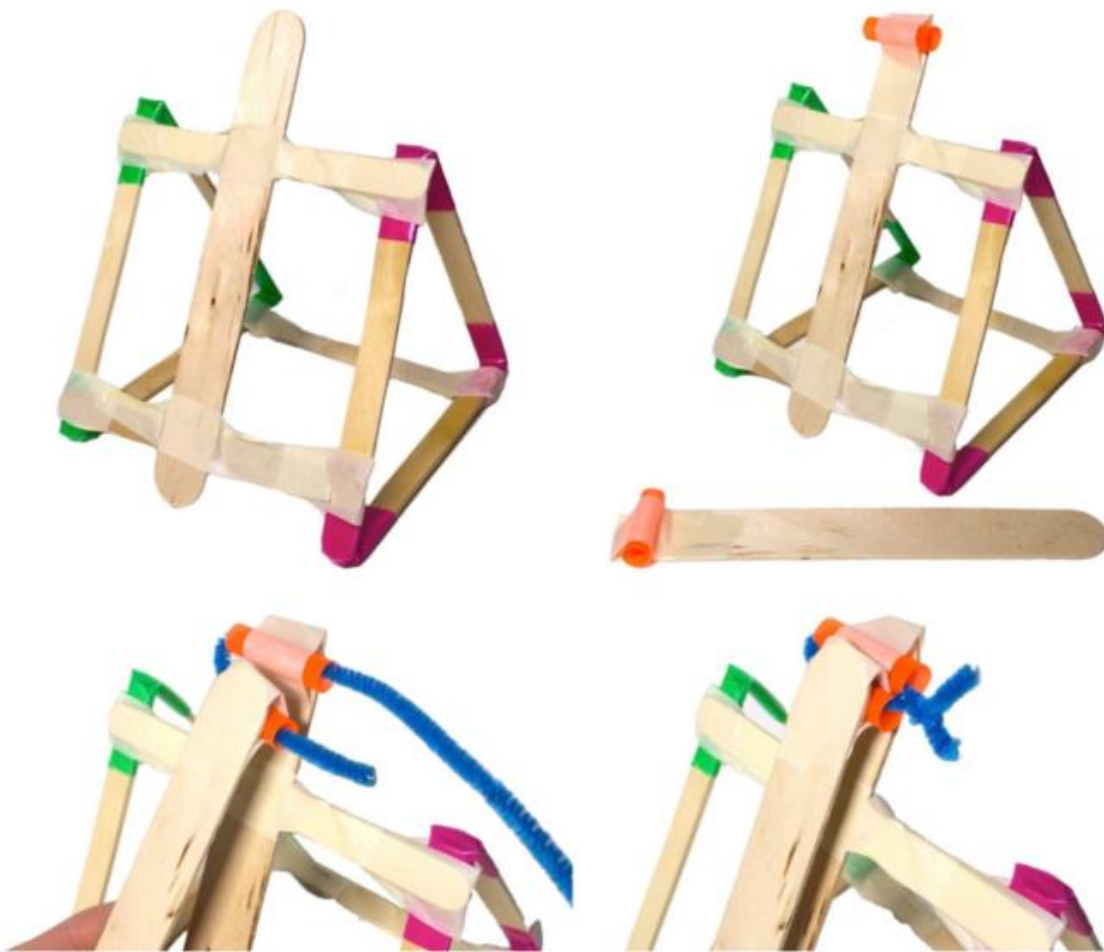


## Step 3: Create the Hinge

Tape a jumbo stick to the side of the frame that has two craft sticks connecting it together. The jumbo stick can be attached to just one stick if students do not have two sticks on one side (in this situation, tape the front and back of the jumbo stick to the single craft stick.)

Be sure to click on the images to see the building steps clearly.

Use a whole pipe cleaner to connect the sticks. Twist tightly and cut off the excess



#### Step 4: Add the Pneumatic System

To create a pneumatic system: Fill up one syringe with air, then connect it to the other empty syringe with vinyl tubing.

Tightly wrap one end of the pipe cleaner around the syringe as shown, then tie it to the machine arm.

Attach the syringe to the frame by taping the spot where the tubing connects to the syringe nozzle.

