



miami children's museum  
play • learn • imagine • create



## Aprille Ericsson-Jackson Bottle Rockets



Aprille Ericsson-Jackson is an aerospace engineer at NASA who created several instruments used during flights into space! She is also the first Black woman to receive PhD's in Mechanical Engineering from two institutions, Howard University and NASA GSFC3. She is an advocate for girls and, in particular, girls of color and their access to STEM education. Just like Aprille helps rockets fly into space, we'll try to launch our own bottle rockets in this activity.

# 1



### Gather materials:

- Empty Plastic Water Bottle
- Permanent Markers
- Bike Pump
- Inflating Needle
- Tape
- Cork
- Scissors
- Water
- Scrap Cardboard (optional)

# 2



Decorate your water bottle with permanent markers. This will be your rocket, and you can make it as colorful as you like! Add cardboard to make it more like a rocket if you like also.

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3



Create your launch pad. Grab your bike pump and attach the inflating needle to the end of the pump.

4



Make sure your cork fits into the plastic water bottle. It should not fall into the bottle but act as a stopper in the mouth of the bottle.

5



Once you know the cork fits, remove it from the bottle and carefully cut your cork in half.

6



Pierce your inflating needle into the center of your cork so that the tip sticks out of the opposite end.



7



Secure your cork and inflating needle securely to the bike pump with tape.

8



Set up your bike pump on a flat surface outside with lots of space. Test to make sure your pump will stay in place with the inflating needle and cork pointed straight up towards the sky.

9



If not, use a small wooden block, rock, step, or anything outside to help keep the cork and inflating needle propped up. Secure these items to your pump, but still make sure the pump is not secured to the floor just yet.

10



Add water to your plastic water bottle rocket about 1/5 of the way.



11



Place the cork attached to your pump inside your water bottle, making sure no water is leaking out.

12



Secure your pump to the floor if needed, again making sure your bottle rocket is pointing towards the sky.

13



Keeping your foot on the base of your pump to keep it stable, use the handles to pump air into your water bottle.

14



Keep pumping until your bottle shoots off into the sky!

**NOTE:**

You may get wet! You can keep launching your bottle rocket by adding more water and making sure your cork and inflating needle are in place.



## WHAT'S HAPPENING:

Every action has an equal and opposite reaction. What does that mean? When rocket fuel burns, and fire shoots out of the bottom of a rocket, the fire's energy pushes downward (equal reaction). This energy then makes the rocket push upward into the sky (opposite reaction)! As you pump air into your water bottle rocket, you create increasing pressure. The pressure causes the water to push out of the bottom of your water bottle, like the rocket's fire. The energy from the water then pushes your water bottle up into the air!

