

## Science: Levitating Ball!

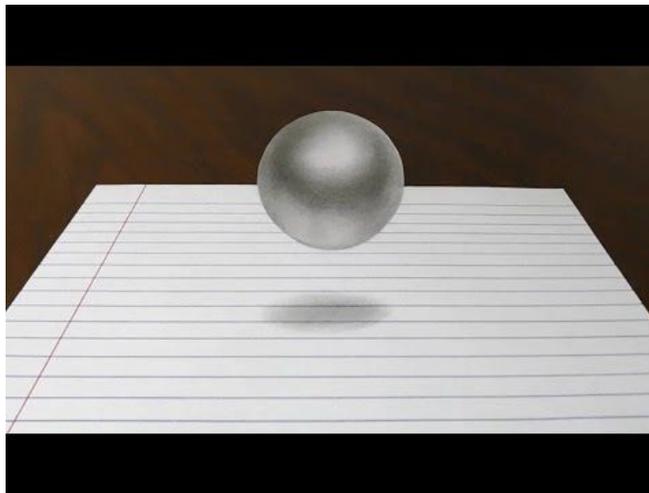
**Ages: 7 - 10**

Hello everyone. This is Bill from the Okanagan Regional Library System. Welcome to the fun and inventive world of making STEAM projects in your own home. Each week, I will share a fun and interesting project that you can make using materials commonly found in your own home.

Even though we can't be together right now, we can still learn how to make exciting projects each week!

This week's project: How to Make a Levitating Ball.

### Levitating Ball



Levitation is when something is lifted into the air with no visible means of support. Stage magicians pretend they are making things levitate, claiming they are using mysterious powers. In reality, it isn't magic. Usually a string is holding up the object. You can make a ping-pong ball levitate with no strings attached and without touching it. It looks like magic, but it's science! The ball is held up by forces working against each other.

To make the ping-pong ball levitate, you need to create a jet of air. In this activity, you do that by blowing into a cardstock tube attached to a piece of drinking straw. For the strongest jet of air, you need to make sure there are not leaks in the tube or straw.

### Materials Needed:

- Felt-tip pen
- Double sided tape
- Paper Straw
- 14 cm x 22 cm coloured card stock
- Ping Pong Ball
- Scissors
- Ruler
- Coloured Tape
- Adhesive putty
- Coloured Tape



**Time:** 30 minutes

### Steps:

1. Place a piece of double-sided tape across one of the short sides of the 14 cm x 22 cm coloured cardstock. Remove the tape's protective strip.



2. Starting at the short edge without the tape on it, roll the cardstock around the felt-tip pen to create a tube. Press the tape down firmly once you reach the end. Remove the pen.



3. Stick down the edge of the cardstock with some coloured tape, then wrap more coloured tape around one end of the tube.



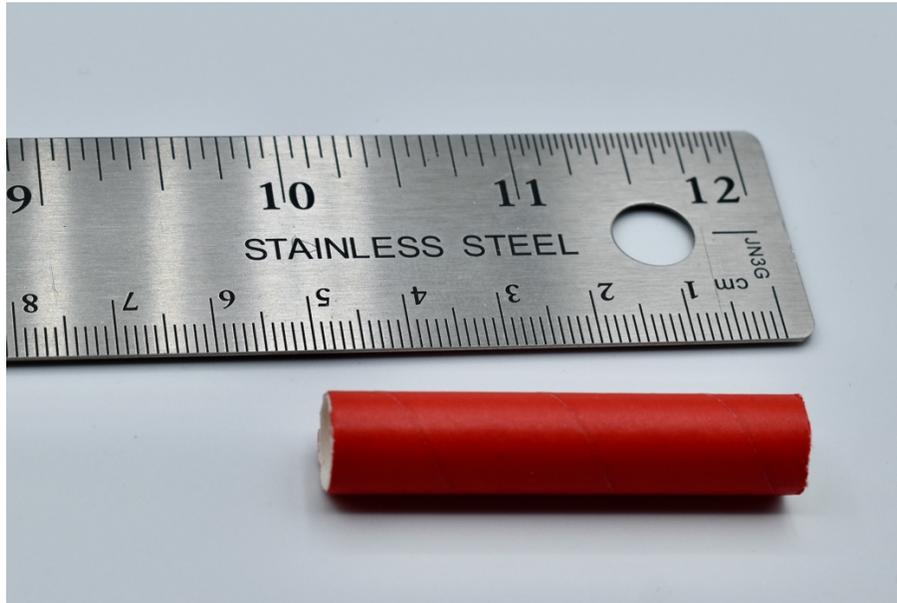
4. Now close off the other end completely with some more coloured tape. This will ensure that no air can escape when you blow into the other end.



5. Make a small hole through the coloured tape and the cardstock near the closed end of the tube. Gently make the hole a bit bigger with the point of the scissors.



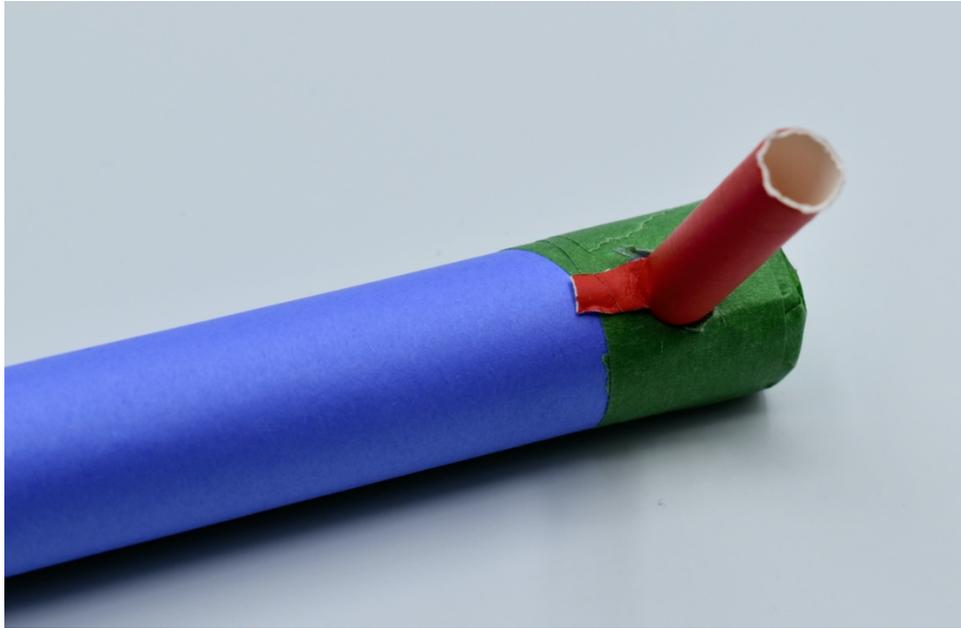
6. Cut a piece of drinking straw that is about 5 cm long.



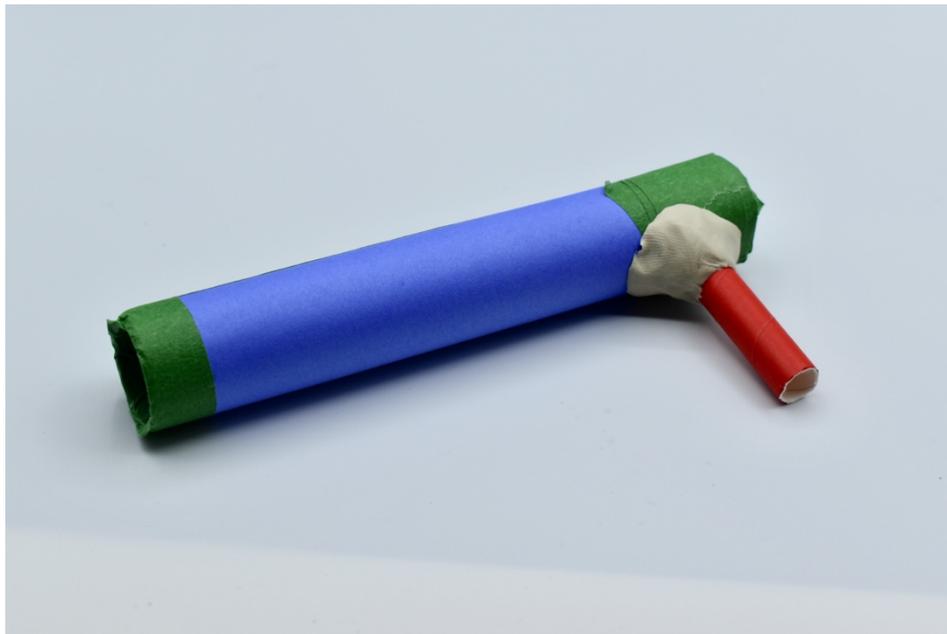
7. Carefully make two cuts about 1 cm long on either side of one end of the straw. Fold up the piece of straw, between the two cuts, to make a flap.



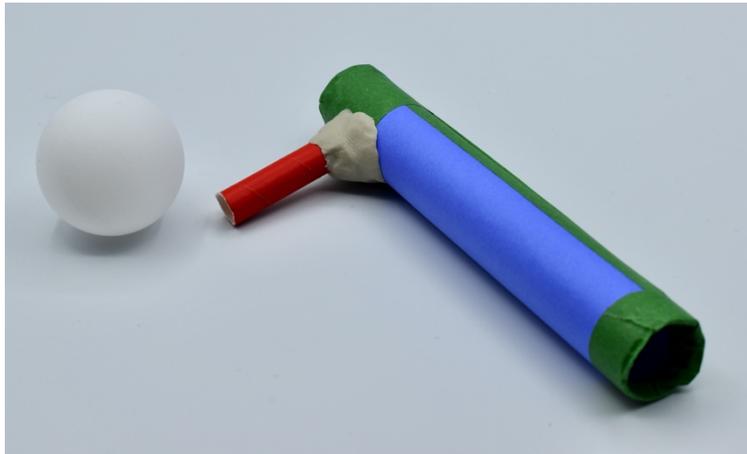
8. Push the cut end of the straw into the hole of the tube, with the flap facing the open end.



9. Use coloured tape to secure the flap to the tube, then wrap adhesive putty around the base of the straw where it meets the cardstock tube to block any leaks. Don't press so hard that you close off the airway.



10. Your levitation tube is complete. Hold the ping pong ball above the straw, blow into the open end of the cardstock tube, and let go of the ball. Can you make the ball levitate?



## The Science behind your Levitating Ball

When you blow through the tube, the stream of air pushes the ball, lifting it. Even if you tilt the tube slightly, the ball won't drop. This is because air flowing past a smoothly curved object (such as your ball) will curve to flow over its surface and so bend sideways as it leaves. The ball has effectively pushed the airflow sideways, and this results in a "reaction force" that pushes back against the ball. The reaction force stops the ball from falling.

## STEAM

This activity includes everything you need for a comprehensive STEAM project.

**Science:** Understanding the effects of air pressure on an object.

**Technology:** Understanding how to control air pressure.

**Engineering and Art:** Construction of the Levitation Tube.

**Math:** Measuring and cutting out the parts needed to construct the Levitation tube.