



COSI connects

ACTIVITY: Reducing Friction – Build a Hovercraft!

Virgin Hyperloop is working to overcome friction to create one of the fastest transportation systems the world has ever seen! Watch the video to learn a little bit about friction. Then try your hand at overcoming friction in this activity by creating your own miniature hovercraft!

▶ VIDEO

Watch the video [Hyperloop Friction](#).

📋 MATERIALS

- old CD or circular piece of cardboard or cardstock, approximately 5" diameter
- plastic bottle top – you can use a sport bottle top or a plastic top with a small hole poked or drilled into the surface
- hot glue or other strong glue
- balloon
- optional: twist tie
- optional: play dough

📄 INSTRUCTIONS

Prepare your materials:

- If you do not have a CD, cut a circle about 5" in diameter out of cardboard or cardstock. Cut or punch a small hole in the middle so that it looks similar to a CD.
- If your plastic bottle top doesn't have a hole in it, use a drill or awl to carefully poke a hole into it.

Assemble your hovercraft:

1. Hot glue the plastic bottle top around the opening in the middle of the CD. Make sure that it is airtight! Allow to dry. This is the base of your hovercraft.
2. Place the base on a clean, flat surface such as a table. Try gently pushing the base on the table. How far does it move?
3. Blow up your balloon. Twist the bottom once or twice so that the air doesn't come out, and pull the neck of the balloon to wrap it around plastic bottle top on the top of your base. If it does not fit tightly, use a twist tie to tightly attach the balloon onto the bottle top.
4. When you are ready, untwist the balloon and let go so that the air can come out! Your construction should hover over the surface of the table!
5. Gently push the hovercraft while the balloon is releasing air. What happens?
6. To try again, just blow up the balloon again and start at Step 3!



Interactive Questions:

- You pushed your base twice: once in Step 2 and once in Step 5. How did it move differently? Why?

Extension:

Can you build a better hovercraft? Try different materials or shapes on the base. Perhaps a bottle top with a larger or smaller hole will make a difference. Design the best hovercraft!

What's going on?

Friction is a force that opposes motion when two surfaces are in contact. When an object is sliding across a surface, *kinetic friction* is what slows it down and eventually causes it to stop. When you first pushed the base (Step 2), it probably didn't move very far. Very quickly, kinetic friction slowed it down and stopped it. Yet in Step 5, it probably moved much further. In this case, the balloon caused there to be a thin layer of air between the base and the table. This makes the base hover above the table and reduces the friction between the table and the base, allowing it to glide across the surface.

If you have ever played air hockey, you have seen this in practice! The tiny holes in the board push air upward so that there is always a thin layer of air between the puck and the table.

Ohio Learning Standards:

2.PS.1: Forces change the motion of an object.

5.PS.1: The amount of change in movement of an object is based on the mass of the object and the amount of force exerted.

8.PS.2: Forces can act to change the motion of objects.

P.F.4: Friction force (static and kinetic)



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Additional Resources:

Check out more Resources from Virgin Hyperloop at [Hyperloop at Home](#).

If you have questions or comments on the activity, reach out to the [COSI Department of Science Content](#).