Name: _____ **Date:** _____

Measuring Magnets

How much can a floating pod carry?

In this hands-on activity, investigate how adding weight will affect the magnets in a model hyperloop.

Observe: Magnets can either attract or repel each other depending on their orientation. Some trains use the repelling force of magnets to keep train cars floating above the tracks.

Ask a Research Question: Does the weight of a hyperloop pod affect how well it floats?

Form Hypotheses Based on This Question: How will adding weights to a model hyperloop pod change how high it floats above the track?

Materials (per group): six small ring magnets • drinking straw/dowel • golf-ball-sized piece of modeling clay • 15 metal washers • ruler • pencil and paper

Procedure:

1. Mold the clay around one end of the straw to form a base. Place the straw on a desk so that it stands upright.
2. Stack four of the ring magnets together. Slide them onto the straw so that they rest on top of the clay base. This stack of magnets represents a hyperloop track.
3. Stick the remaining two magnets together and place them onto the straw so that they float above the track. (If they don't float, flip them over and try again.) The floating magnets are your hyperloop pod.
4. Use the ruler to measure the distance between the top of the track and the bottom of the pod. Record the result in a table.
5. Add a single washer on top of the pod. This represents a passenger. Now measure and record the distance again.
6. Repeat step 5 until you've used all the washers or the pod is no longer floating.

Results:

How high did the pod float with different numbers of washers on top? Display your results in a graph.

Conclusions:

1. How did the weight you added to the hyperloop pod affect how high it floated?
2. Based on your results, how might the number of passengers in a hyperloop pod affect how the pod functions?
3. Say you're an engineer designing a hyperloop system. Why would it be important for you to understand the effect you just tested?