



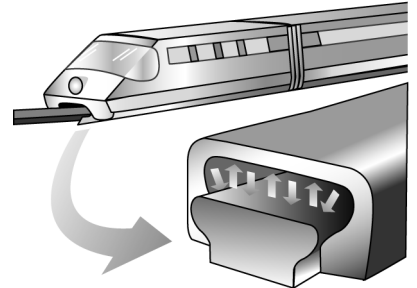
17.2 Model Maglev Train Project

READ



Magnetically levitating (Maglev) trains use electromagnetic force to lift the train above the tracks. This system greatly reduces wear because there are few moving parts that carry heavy loads. It's also more fuel efficient, since the energy needed to overcome friction is greatly reduced. Although maglev technology is still in its experimental stages, many engineers believe it will become the standard for mass transit systems over the next 100 years.

This project will give you an opportunity to create a model maglev train. You can even experiment with different means of providing power to your train.

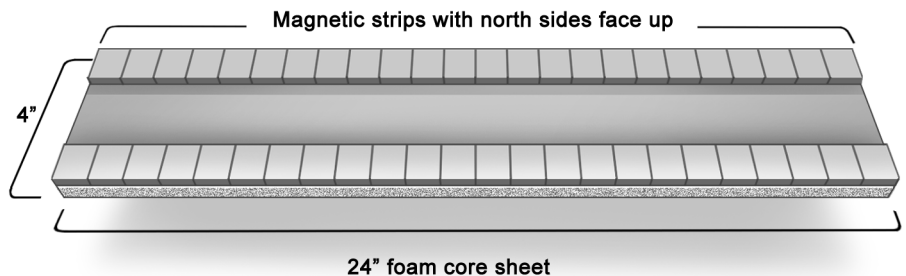
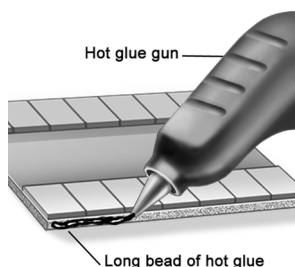


Materials

- 52 one-inch square magnets with north and south poles on the faces, rather than ends (found at hobby shops)
- One strip of 1/4-inch thick foam core, 24 inches long by 4 inches wide
- Two strips of 1/4-inch thick foam core, 24 inches long by 2.5 inches wide
- One strip of 1/4-inch thick foam core, 6 inches long by 3.75 inches wide
- Hot melt glue and glue gun
- Masking tape

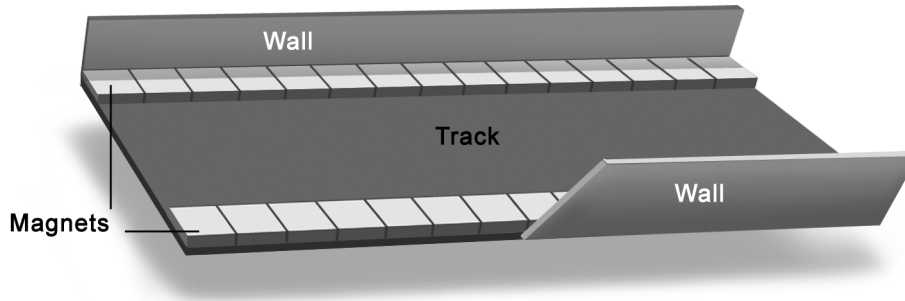
Directions

1. Cut a strip of masking tape 24 inches long. Press a line of 24 magnets onto the tape, north sides up.
2. Hold an additional magnet north side down and run it along the strip to make sure that the entire “track” will repel the magnet. Flip over any magnets that attract your test magnet.
3. Glue the magnet strip along one long side of the 24-by-4-inch foam core rectangle.
4. Repeat steps 1-2, then glue the second magnet strip along the opposite side to create the other track.
5. Place a bead of hot glue along the cut edge and attach one 24-by-2.5 inch foam core rectangle to form a short wall.

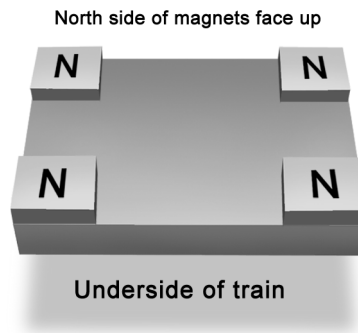




- Repeat step 5 to form the opposite wall. This keeps the train from sliding sideways off the track.



- To create your train, glue the south side of a magnet to each corner of the small foam core rectangle.



- Turn the train over so that the north side of its magnets face the tracks. Place your train above the track and watch what happens!

Extensions:

- Experiment with various means to propel your train along the tracks. Consider using balloons, rubber bands and toy propellers, small motors (available at hobby stores) or even jet propulsion using vinegar and baking soda as fuel.
- Build a longer, more permanent track using plywood shelving. Use clear, flexible plastic for the front wall so that you can see the train floating above the track.
- Find out how much weight your train can carry. Are some propulsion systems able to carry more weight than others? Why?
- Have a design contest to see who can build the fastest train, or the train that can carry the most weight from one end of the track to the other.