

Phenomenon: Magnet in Copper Pipe**Guiding question:**

What causes a magnet to slow down when falling through a copper pipe?



Supporting phenomenon	Link to work	What we did	What we figured out	How does this connect to the phenomenon
The Blocks	Link	Claim = Cause = When put together Evidence = Effect: Red can stand Reasoning = mechanism = Magnet under platform small magnet in red. Always draw what you can see first.	Center of gravity - Push and pull forces - Contact (pushing/pulling) vs non-contact forces (magnetism) Magnetic pull, kept Red upright. Not affected by the green block.	Explored effects of magnetism and forces. Forces, specifically gravity, with the magnet falling through the copper pipe. Discussed applied forces, push/pull/.
The Play	Link	Test magnets through various materials - average speed through each tube over 3 trials listed. 1 Magnet = Aluminum (square) large magnets 0.59 s = PVC (small magnet) 0.33 s = copper 1.96s	More Magnets moved slower. Aluminum had some effect but not as much as the copper. PVC had no effect. None of the materials were magnetic.	We did further testing. Confirms that it is caused by the copper pipe. Confirms that other materials can have a similar effect (if even a significantly less effect).

The Dancer	Link	<p>Created a System Model of the Dancer. Testing: Components moved together (top and bottom of dancer) Saw the components (dissection). Saw a video of the components working - without the hula dancer</p>	<p>Copper wire can conduct electricity - creates an electromagnetic field when electricity flows through the copper wire.</p> <p>Electromagnetic field is able to repel the magnet.</p>	<p>We have learned that copper can conduct electricity and create an electromagnetic field.</p> <p>Copper can convert energy from electrical energy to electromagnetic energy.</p>
The Launcher	Link	<p>Metal spheres on one end of a rod with magnets on each end.</p> <p>2 metal spheres on one end, on the other one metal sphere was placed closer to it. When it hits, a sphere on the other end was launched off the ruler.</p>	<p>Converting potential magnetic energy (magnetic field energy) into kinetic energy.</p> <p>Magnetic field has a decreased effect as you move further away.</p> <p>Visualize magnetic field with metal filings.</p>	<p>Magnetic fields are capable of converting to kinetic energy, resulting in movement.</p>
The Wand	Link	<p>Metal detector</p>	<p>Electrical current making a field, - makes an electrical current. -</p> <p>Magnet can make a field and generate a field - can be anything that conducts electricity. -</p>	<p>Any magnet can generate a magnetic field in anything that can conduct electricity, which generates a magnetic field.</p> <p>These opposing magnetic fields can repel each other, opposing the force of gravity as the magnet drops.</p>

Initial Model

Model Copper

disc shapes
magnet falling and rotating looks to almost "repel" against the sides

Model PVC

Dotted PVC

Model PVC Copper Pipe

PVC pipe
Falls some length
slower
some kind of magnetic field - not sure around pipe - magnet

Use your model

1. The magnet falls slowly because the energy is changing
2. Cause → dropping the magnet thru the tube effect = slows down in copper vs pvc. mechanism (reasoning)
3. How to test?

1. The magnet falls slowly because
like charges are repelling and something to do w/ a magnetic field

2. Cause → mechanism → Effect
Copper pipe something like electrons falls slowly

3. Test it

1. The magnet falls slowly because of
magnetic fields interact

2. Magnetic fields interact with electrons in
copper - causes slow descent

3. Track magnetic fields as it falls - does it
other metals that are good conductors vs those that aren't

Copper is a good conductor

Final Model

The Blocks - [Back to summary table](#)

Show your work below (i.e. text, model images, questions, data etc.)

The Play - [Back to summary table](#)

The Dancer - [Back to summary table](#)

Show your work (i.e. text, model images, questions, data etc.)

The Launch

- [Back to summary table](#)

Show your work (i.e. text, model images, questions, data etc.)

The Wand - [Back to summary table](#)

Show your work (i.e. text, model images, questions, data etc.)