

Lab: FORCE FIELDS

Gravitational Fields

Station 1 - Distance and Gravitational Force

IV = distance

Evidence (observations and data) for the effect of distance on gravitational force

A. Use the gravity simulation (#17 on Blendspace) and make the two objects closer and farther from each other.

B. Use the wooden object with the string and paperclip. Imagine that the magnet is the Sun and the paper clip is the Earth. Rotate the hook until the paperclip is just barely touching the magnet. Turn the hook until the paperclip falls. As you turn it, push on the string/paperclip and make observations about the amount of force present.

Station 2 - Mass and Gravitational Force

IV = mass

Evidence (observations and data) for the effect of mass on gravitational force

A Use the gravity simulation (#17 on Blendspace) and make an object increase and decrease in mass.

B. Use the fabric and wrap it around the hula hoop and hold on. Take one ball and put it on the fabric. This represents an object in space. Then replace that ball with one with more mass. Place both on the material and note what happens – this is a good representation of how objects are attracted due to gravity.



Glue this side into your notebook



Magnetic Fields

Station 1 - Distance and Magnetic Force

<i>IV = distance</i>	<i>Evidence (observations and data) for the effect of distance on the magnetic force</i>
Take two magnets and play around with them, trying various distances. You can try a horseshoe magnet standing up on its curve and then try to make it rock with another magnet. Use the iron filings to observe magnetic fields as well as to explore how distance affects the amount of force.	

Station 2 - Types of Material and Magnetic Force

<i>IV = types of materials</i>	<i>Evidence (observations and data) for the effect of the type of material on the magnetic force</i>
A. Use the Gizmo (#20 on Blendspace) for magnetism. Try different objects and record your observations about the type of material and how it relates to the magnetic force.	
B. Using magnets, explore the effects of different materials with a magnet to see the impact of force based on the type of material	

Electrical Fields

Station 1 - Distance and Electrical Force

<i>(IV = Distance)</i>	<i>Evidence (observations and data) for the effect of distance on electrical force</i>
Balance the wood on the white plastic cap. Use the clear plastic wand and charge it by rubbing it with the silk or fur. Slowly bring it close to the wood while it's balanced and see what happens the closer you get. Try this with the balloon, too. You can also try this with a balloon on your hair and notice the difference in force with more or less distance.	

Station 2 - Charge Strength and Electrical Force

<i>IV = charge strength</i>	<i>Evidence (observations and data) for the effect of charge strength on electrical force</i>
A. Use the PhET simulation (#16 on Blendspace) with the balloon and the sweater/wall. Explore what happens to the amount of force when the balloon has more charge versus when it does not. Try this with a real balloon and a wall and make observations.	

Station 3 - Charge Types and Electrical Force

<i>IV = charge types</i>	<i>Evidence (observations and data) for the effect of charge type on electrical force</i>
Use the balloon and fur and charge the balloon. Place a pop can on its side on the table. Bring the balloon close to the can and notice what happens. What is happening with the charges to make the pop can behave as it does? What would the opposite situation look like if the charges were reversed?	