

Exercise 1: Magnet hanging from a spring

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Consider the scenario in figure 1. In this exercise we are going to discuss what happens to the magnet when the current runs through the solenoid.

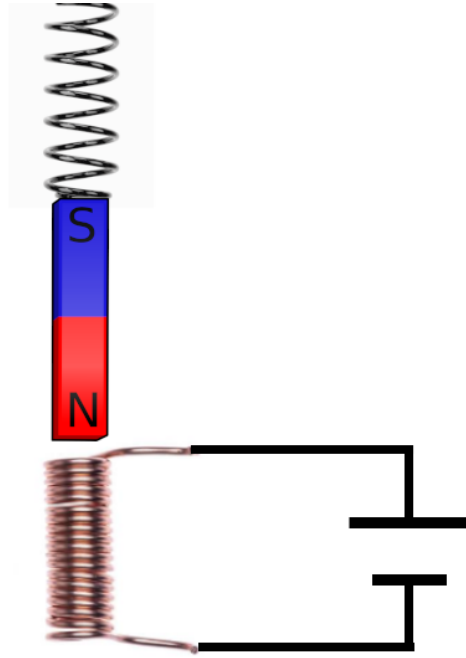


Figure 1: Magnet held by a spring over a solenoid. The solenoid is connected to a battery.

a) Considering the scenario in figure 1, what happens to the magnet when the current is running through the solenoid?

Solution. Using the right hand rule the solenoid will create a north pole above it, repelling the magnet (the magnet is forced upward).

b) Let's say we short the circuit so there is no current going through the solenoid, what happens to the magnet?

Solution. If there is no current through the solenoid there won't be any magnetic force acting on the magnet, therefore it will lower a bit until the gravitational force and the force from the spring are in equilibrium.

c) Describe what happens if the current changes direction, what happens to the magnet then?

Solution. Again using the right hand rule, the solenoid will create a south pole above it, and this time attracting the magnet.

d) Is there any way to make the magnet oscillate up and down?

Solution. Use AC instead of DC.