

Student Directions: Introduction to magnets using *Faraday's Electromagnet Lab 1*  
<http://phet.colorado.edu>

Learning Goals: *Students will be able to*

1. Predict the direction of the magnet field for different locations around a bar magnet and electromagnet.
2. Compare and contrast bar magnets and electromagnets
3. Identify the characteristics of electromagnets that are variable and what effects each variable has on the magnetic field's strength and direction.
4. Relate magnetic field strength to distance quantitatively and qualitatively
5. Compare and contrast the fields of gravity and magnets qualitatively

1. Investigate *Faraday's Electromagnet Lab* paying attention to what you can change and what tools you can use to make measurements. We will be using the *Bar Magnet* and *Electromagnet* tabs for this activity and the other tabs later.

2. Read the first four learning goals and design experiments using the simulation that would help you learn these specific things. You do not have to write the procedures, but be prepared to explain to the instructor or another student your designs. Write a document that gives evidence that you can meet the learning goals. (*Include illustrations drawn by hand.*)

3. Pretend you and your lab partner are designers for the PhET simulations and want to make a simulation for students to investigate gravity fields. Think about what you know about gravity and what kinds of experiments a student might want to do to learn about gravity. You may have to refresh your memory by using the text. Draw a design, by hand, for a gravity simulation. Explain why you included each component and explain at least one experiment that a student could do.

4. Assume the 5<sup>th</sup> learning goal is a test question. Talk about what you would include to get full credit. Then have **each** person write his own paragraph on separate papers.

5. To check your writing, each person will meet with a person from a **different** group. Read each others paragraphs and talk about your reasoning. Type **one** new paragraph that you both agree is well done and print 2 copies so you can each have one to turn in with the other parts of the lab.