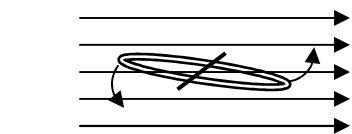
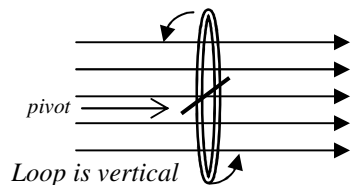


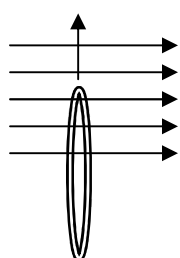
## 2011-12 PreAP Magnetism 6

Let's talk more about breaking magnetic field lines (previous HW, just before Q3). Also, look at the generator discussion at the bottom of the "Induction" notes.

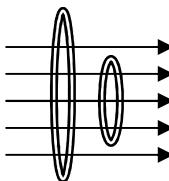


1. A loop is rotated counter-clockwise (CCW) about a diameter in a magnetic field.
  - A. \* When the loop is vertical, is it breaking any magnetic field lines?
  - B. So is there any  $I_{\text{induced}}$  when the loop is vertical?  
  
 Or, by the right-hand rule, the top of the vertical loop is moving parallel to  $B$ , so there can't be a RHR force ( $q$  and  $B$  can't be parallel).
  - C. When the loop is horizontal, is it breaking any magnetic field lines?
  - D. Is there any  $I_{\text{induced}}$  when the loop is horizontal?
  - E. Using either Lenz's Law or the RHR, determine the direction of  $I_{\text{induced}}$  in the horizontal loop, as viewed from above.

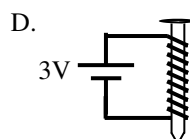
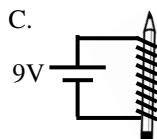
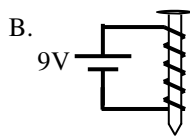
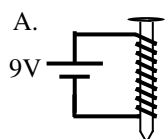
Use Lenz's Law or the RHR to figure out the direction of  $I$  induced in these next two examples.



2. A. As the loop moves into the magnetic field, is  $B$  increasing or decreasing in the loop?  
 So  $I_{\text{induced}}$  must oppose the change by making a north to the left.  
 B. As seen from the left, which direction must  $I_{\text{induced}}$  be flowing in the loop?



3. A. As the loop shrinks, does  $B$  (the magnetic field) inside the loop increase or decrease?  
 B. So the  $I_{\text{induced}}$  opposes the change, making a magnetic field point left or right?  
 C. As seen from the left, give the direction of the induced current in the loop.

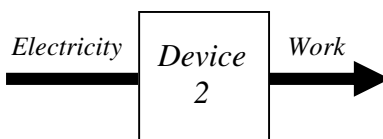
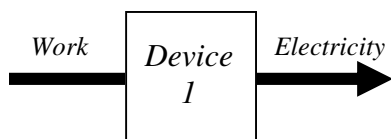


4. Which of the four electromagnets will be the strongest? (You should be able to figure this out.)

A generator generates" electricity by wires being turned thru magnetic fields (or vice versa). Generators take mechanical energy from wind, moving steam (as in power plants), or a belt in your car and turn it into electrical energy. If hooked up in reverse (electricity in) a generator becomes a motor, which takes electrical energy and turns it into motion. A generator can be a motor. A motor can be a generator. Both contain magnets and wires.

5. Motor, Generator, or Both?
 

A. ___ Creates electricity.	F. ___ Can make electricity.
B. ___ Has loops of wire in it.	G. ___ Used in a hydroelectric dam.
C. ___ Creates motion.	H. ___ Opens the windows in a car.
D. ___ Is turned by a force.	I. ___ Turns when electricity is applied .
E. ___ Device 1 (below).	J. ___ Device 2 (below).



1A) No