Lesson Title:	**Faraday's Electromagnetic PhET**
AP Objective(s):	Students should understand the concept of magnetic flux, so they can calculate the flux of a uniform magnetic field through a loop of arbitrary orientation. Students should understand Faraday's law and Lenz's law, so they can: (1) Recognize situations in which changing flux through a loop will cause an induced *emf* or current in the loop. (2) Calculate the magnitude and direction of the induced *emf* and current in a loop of wire or a conducting bar under the following conditions: a) The magnitude of a related quantity such as magnetic field or area of the loop is changing at a constant rate.

AGENDA	KEY POINTS
1. PhET Lab	Induced current can be induced in two separate ways: a conductor can be physically moved through a magnetic field or the conductor can be stationary and the magnetic field can be moved. The induced voltage is called the ***emf***. The symbol for *emf* is $\mathcal{E}$. • ***Emf*** *is induced by a change in a quantity called the* ***magnetic flux***

Time	**Learning Activity**
60	Students will complete a PhET lab on induction where they explore a bar magnet, pickup coil and generator. Guiding Questions 1. How does a compass needle work? 2. What general rules can you deduce about the motion of the magnet and induced current? Hint: Use the field strength meter. Does constant field strength in the coil induce a current? 3. What general rule can you deduce about changing the strength of the magnet and the induced Voltage? 4. How are magnetic fields similar/different from electric fields? 5. What general rule can you deduce about how the number of loops in the pickup coil and the induced Voltage? 6. What general rule can you deduce about how the area of the loop in the pickup coil and the induced voltage? 7. What would happen if you put a moving magnet near a pickup coil? Where does the energy come from? Where does it go?