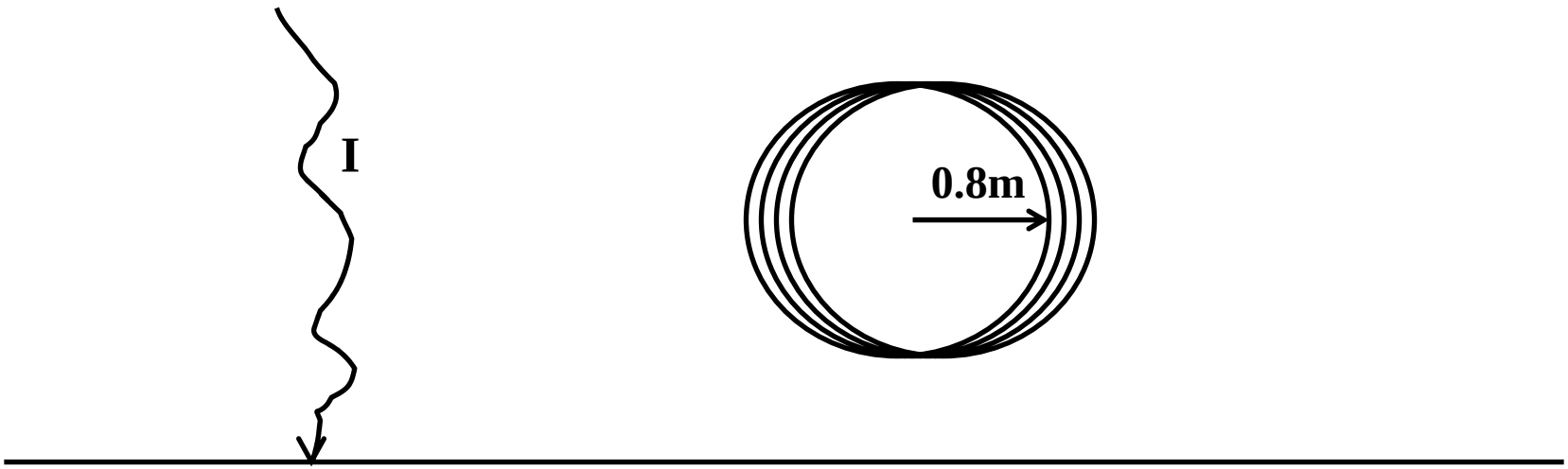
- **A Boeing 737 has a wingspan of approximately 40m (120ft). Suppose that one is flying parallel to the earth where the downward component of the earth's magnetic field is 0.6×10^{-4} T. At what speed would the 737 have to fly in order for there to exist a 1.5V potential difference across its wingtips. Aircraft designers worry about such effects since the wings are full of fuel.**

A Sea Stallion helicopter has blades of length 3.00 m, extending out from a central hub and rotating at 2.00 rev/s. If the vertical component of the Earth's magnetic field is 50.0 μT, what is the emf induced between the blade tip and the center hub?

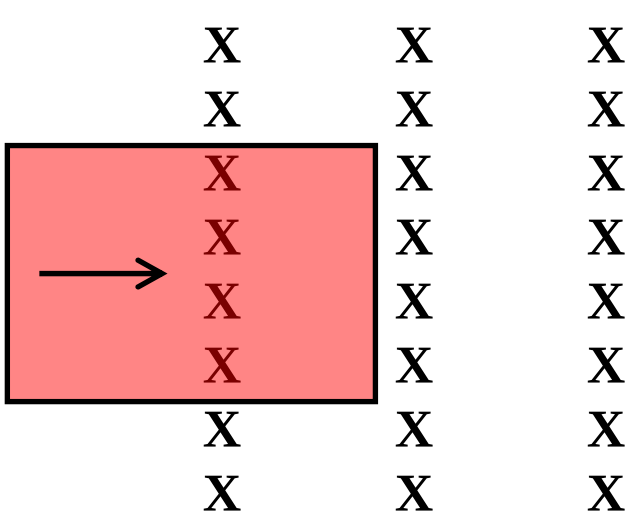
- **A lightning bolt strikes the ground 200m from a 100 turn coil. Let the radius of the coil be 0.8m and if the current carried by the lightning bolt is 6.02×10^6A (and falls to zero in 10.5 μs) what is the induced emf in the coil?**

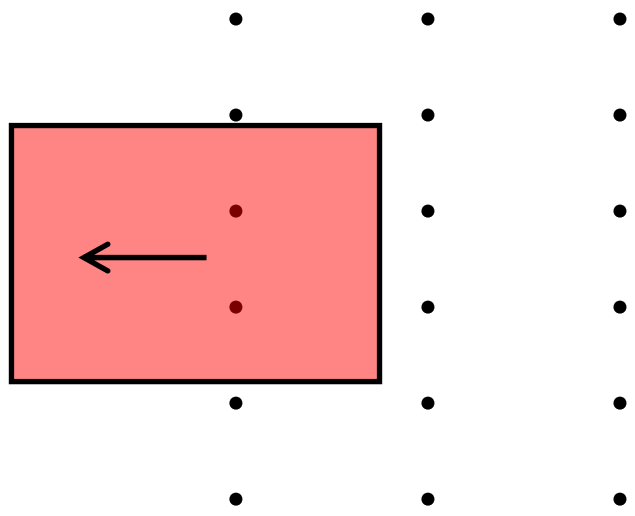
- **Suppose that the wire has a cross sectional area of 7.85×10^{-7} m^2 (diameter of wire is 1mm) and it is made out of copper ($\rho = 1.7 \times 10^{-8}$ Ωm), what is the magnitude and direction of the induced current in the wire?**



- **To monitor breathing in a hospital patient, a thin belt is wrapped around the patient's chest. The belt is a 200 turn coil. When the patient inhales, the area encircled by the belt increases by 39 cm^2. The magnitude of the earth's magnetic field is 50 μT and makes an angle of 28^o with the plane of the coil. What is the induced emf if the patient takes 1.8 s to inhale?**

- **What is the direction of the induced current flow in the following situations?**





- **A 10cm diameter coil lies in a region with a magnetic field perpendicular to its surface. If the magnetic field varies with time according to $B(t) = 0.2 + 0.1t$ for $0 \leq t \leq 100s$, with B measured in Tesla, what is the induced emf during the 100s interval?**

- **How does a vending machine work? In particular, how does it "know" what coins you put?**

- **Induced *emf* measurements can be used to measure the speed of a conducting fluid such as sea water. If a 20 cm inner diameter non-conducting pipe has sea water flowing through it at a flow rate of 10 gallons per minute and a uniform magnetic field of 0.05 T is applied transversely across the pipe, find the induced *emf* across a diameter.**