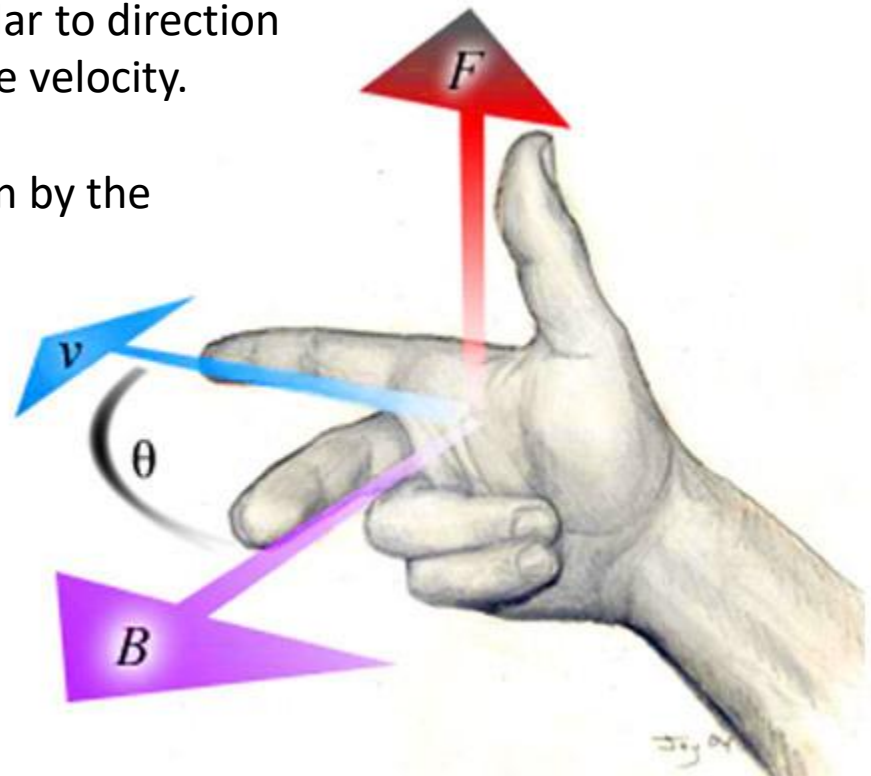


Lorentz Force

Magnetic field \mathbf{B} acts on a charge q moving at velocity \mathbf{v} with the force known as Lorentz force:

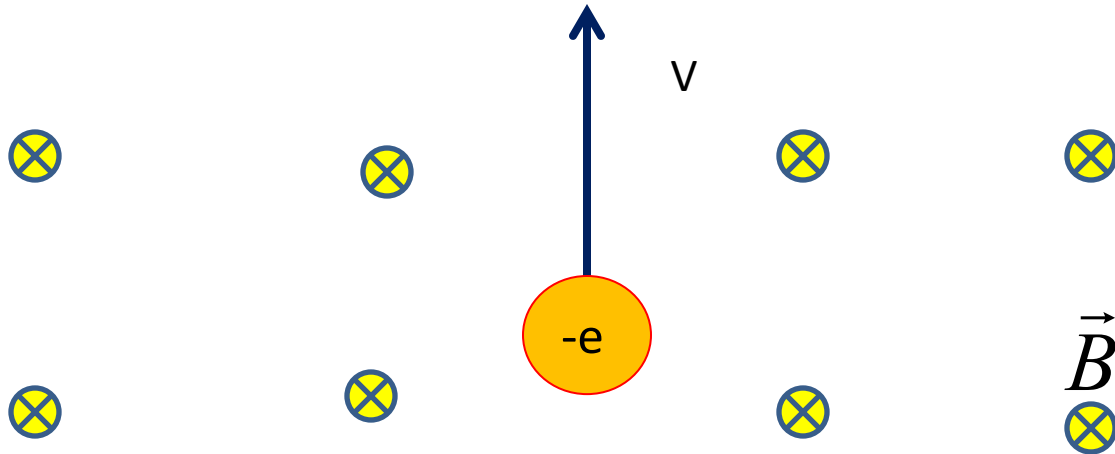
$$\mathbf{F} = q\mathbf{v} \times \mathbf{B}$$

- Lorentz force is always directed perpendicular to direction of motion and to the magnetic field, and to the velocity.
- Direction of force for positive charge is given by the right hand rule:



Homework

Magnetic field B is directed perpendicular to the plane of the figure, pointing away from you (this is shown by 'dart' symbol \otimes). An electron is moving in the plane with original velocity v , as shown:



- Which way the acceleration is originally directed?
- Will the speed decrease/increase/stay the same in presence of magnetic field?
- Sketch the trajectory of the electron, including direction of its motion.
- Find the time after which the electron will return to the starting point.

For doing this part you will need to refresh your memory about centripetal acceleration.