

Forces on Single Charged Particles You use $F = ILB(\sin \theta)$ to determine the force on a current-carrying wire in a magnetic field. $F = qvB(\sin \theta)$ Recall that charge is measured in coulombs (C), velocity in meters per second (m/s), and magnetic field strength in teslas (T). In this case, q is the charge of the electron and t is the time it takes for the electron to move the distance L . To find the time required for a particle with speed v to travel distance L you would use the equation of motion, $x = vt$, or, in this case, $t = \frac{L}{v}$. As a result, you can replace the equation for the current, $I = \frac{q}{t}$, by $I = \frac{qv}{L}$. Force of a Magnetic Field on a Moving Charged Particle The amount of force from a magnetic field on a particle equals the product of the particle's charge, its speed, the magnetic field strength, and the sine of the angle between the particle's velocity and the magnetic field. For a particle moving at right angles to a magnetic field, $\sin \theta = 1$, so $F = qvB$. Get It