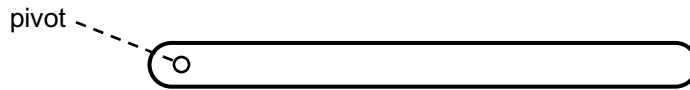


Lever and torque (moment of the force)

Lever

A **lever** is a rod mounted to rotate about an axis (pivot).

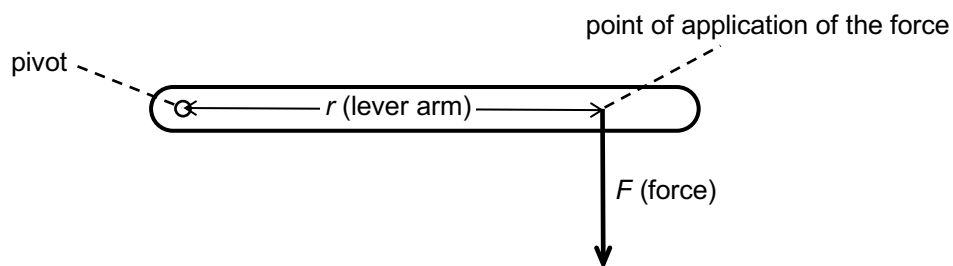


Moment of the force (torque)

A force acting on a lever exerts a **torque (moment of the force)**, creating a turning effect. The rod will start to rotate.

Symbol: M

Unit: $\text{N}\cdot\text{m}$



Definition:

Torque (moment of the force) = Force x Lever arm

$$M = F \cdot r$$

for a force perpendicular to the lever

Force F [N]: Applied force

Lever arm r [m]: Distance between the axis of rotation and the point of application of the force (provided the force's line of action is perpendicular to the lever arm).

In the case of an oblique angle between the line of force and the lever there are two options:

- Moment of the force (torque) = Force x component of lever arm perpendicular to the force
- Moment of the force (torque) = Component of force perpendicular to the lever x lever arm

Equilibrium:

A lever is at **equilibrium** (or in balance) if the sum of clockwise torques is equal to the sum of counter-clockwise torques.