

WEIGHT

A body of mass 2.00 kg is at the surface of the Earth where the gravitational field strength is 9.81 N kg^{-1} .

a) What is the body's weight? 19.6 N

b) If its weight on the surface of the moon is 3.30 N, what is the strength of the Moon's gravity at its surface?

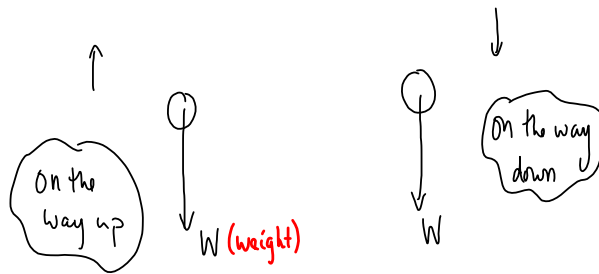
$$\vec{W} = m\vec{g}$$

$$1.65 \text{ N kg}^{-1}$$

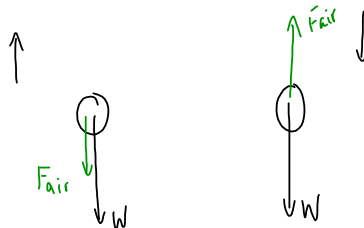
$$W = mg \leftarrow 9.81 \text{ N kg}^{-1}$$

Free-Body Diagrams (FBDs)

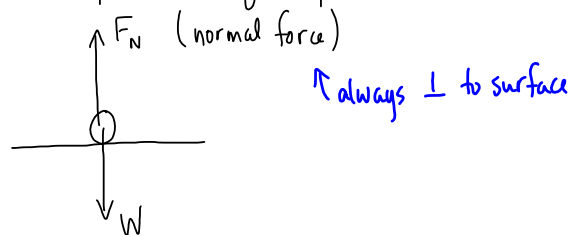
Consider throwing a ball up in the air. Draw a FBD for the ball on the way up and on the way back down. (no air resistance)



If there were air resistance:



Consider that you are sitting in your chair:

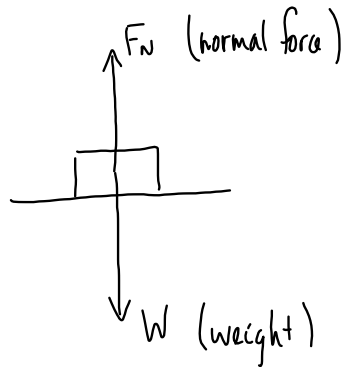


When you draw a FBD:

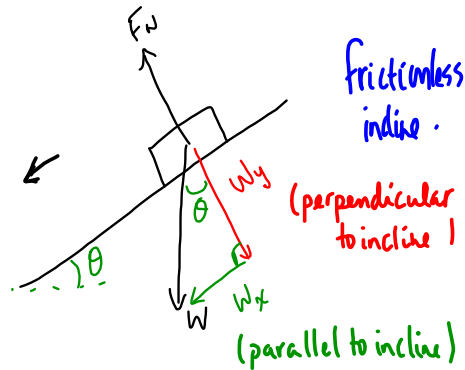
- identify the forces acting on the body
- represent each force with an arrow pointing in the direction of the force
- draw arrows so that they start at the centre of the body (i.e. all tails in the centre)
- make arrows proportional to size of force
- label forces

The "normal" force ^{means \perp}

It is a force that is perpendicular to the surface. It is the force of the surface pushing on an object.



F_N is equal in magnitude to W



$F_N < W$

Draw a FBD for:

- ① apple on horizontal ground
- ② a trolley being pulled along against friction on a horizontal surface.
- ③ a book at rest on an inclined plane
- ④ a bob on a pendulum at the extent of its swing.

