

Free Body Diagrams

Physics

Drawing forces correctly, and resolving them.

The method that prevents most mechanics errors.

1

Isolate one body

Draw it as a dot or a simple box.

2

Draw every force acting ON it

Weight, normal, tension, friction, applied, drag.

3

Choose axes

Along the motion, or along the slope for an incline.

4

Resolve into components

$mg \sin \theta$ down the slope, $mg \cos \theta$ perpendicular.

5

Apply $\Sigma F = ma$ in each direction

Separately.

ON A SLOPE

Down the slope: $mg \sin \theta$

Into the slope: $mg \cos \theta$

Normal reaction equals $mg \cos \theta$, not mg

The normal reaction on a slope is $mg \cos \theta$. Using mg is the single commonest error in inclined-plane problems.