

# Free body diagram Concepts

# What is Free Body diagram

- A free body diagram is a sketch of the body of interest and the forces acting on the body.
- With the help of free body diagram you can precisely define the body(or object under consideration) to which you are applying mechanical equations and the forces that are needed to be considered.

# Free Body diagram Features

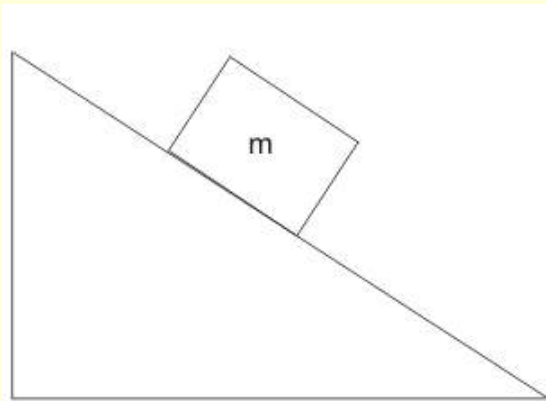
- Free body diagram is the picture of body on which you would like to apply the balance of forces and such a diagram is isolated from its environment which means that we do not draw the things near the body or object under consideration
- The forces and moments are shown in a free body diagram at the point where they are applied.
- Free body diagrams shows all external forces acting on the body and they do not show any internal forces.
- Free body diagrams shows nothing about the motion of the system.

# How to draw it

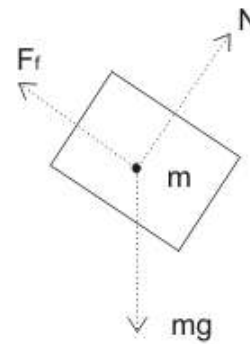
- First create a mental picture of the body for which you want to write Force balance equation.
- Draw rough sketch of your system showing it to be isolated from its environment.
- Place a dot in the center of the object and at this point all the forces are assumed to be acting upon. This is for force balance equation. If we are calculating moment, we need to draw the forces at the point where they are applied
- For every force acting on that body , draw a vector which shows size and direction of the force. each vector should start at the dot.
- Label each vector based on the type of force and remember not to include numbers and calculations.

# example

- Free body diagram for a block on the ramp



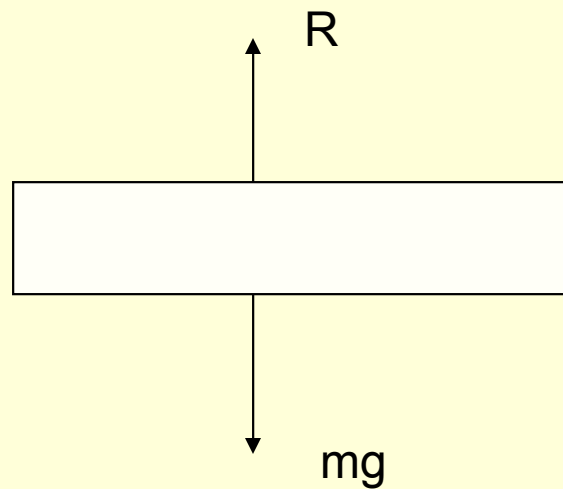
(a) A block on the ramp



(b) free body diagram of block

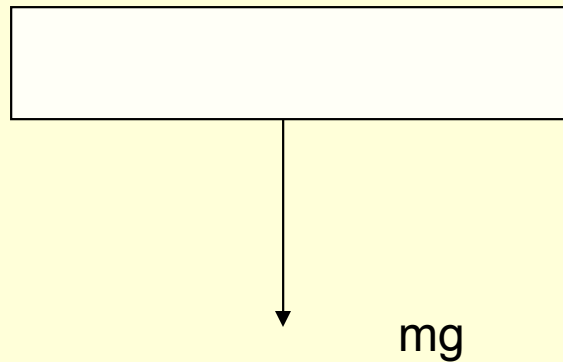
# Example

- Free body diagram for a book at rest on a table.



# Example

- Free body diagram for an object in projectile motion



# Example

- Free body diagram for a object slowing down with friction on a horizontal floor

