Free Body Diagram

FISIKA DASAR 1

Problem Solving Tool: Free-Body Checklist

Other force?

Summary

Overview

Problem Solving Tool: Free-Body Checklist

- Draw a clear diagram of (each) object
- Think carefully about all of the forces on (each) object
- Think carefully about the angles of the force
- Chose an axis, put it on your drawing
- Calculate components:

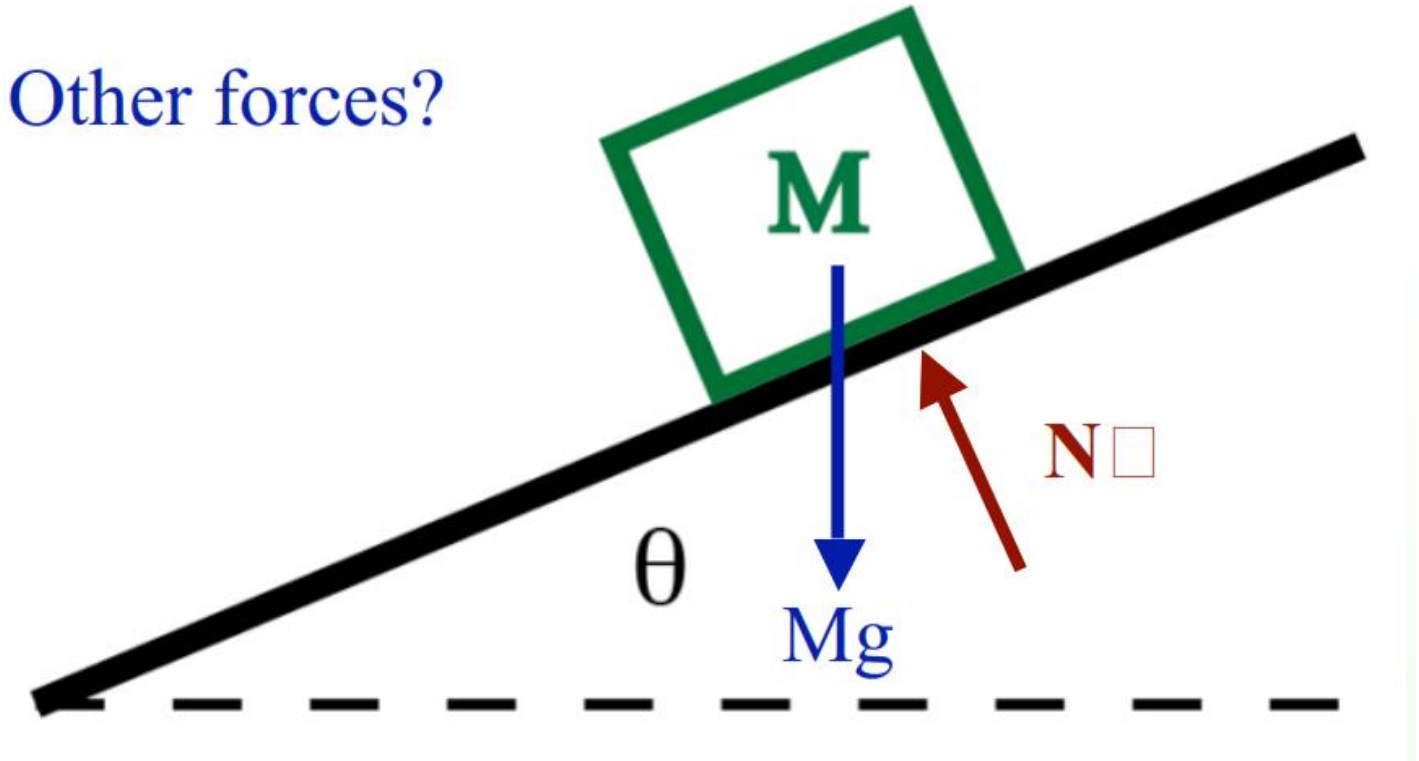
$$\sum F_x = 0 \quad \sum F_y = 0 \quad \left\{ \sum F_z = 0 \right\}$$

- Solve….

Adopted from MIT Course

Note: *We will generalize this for moving objects later on.*

Other force?



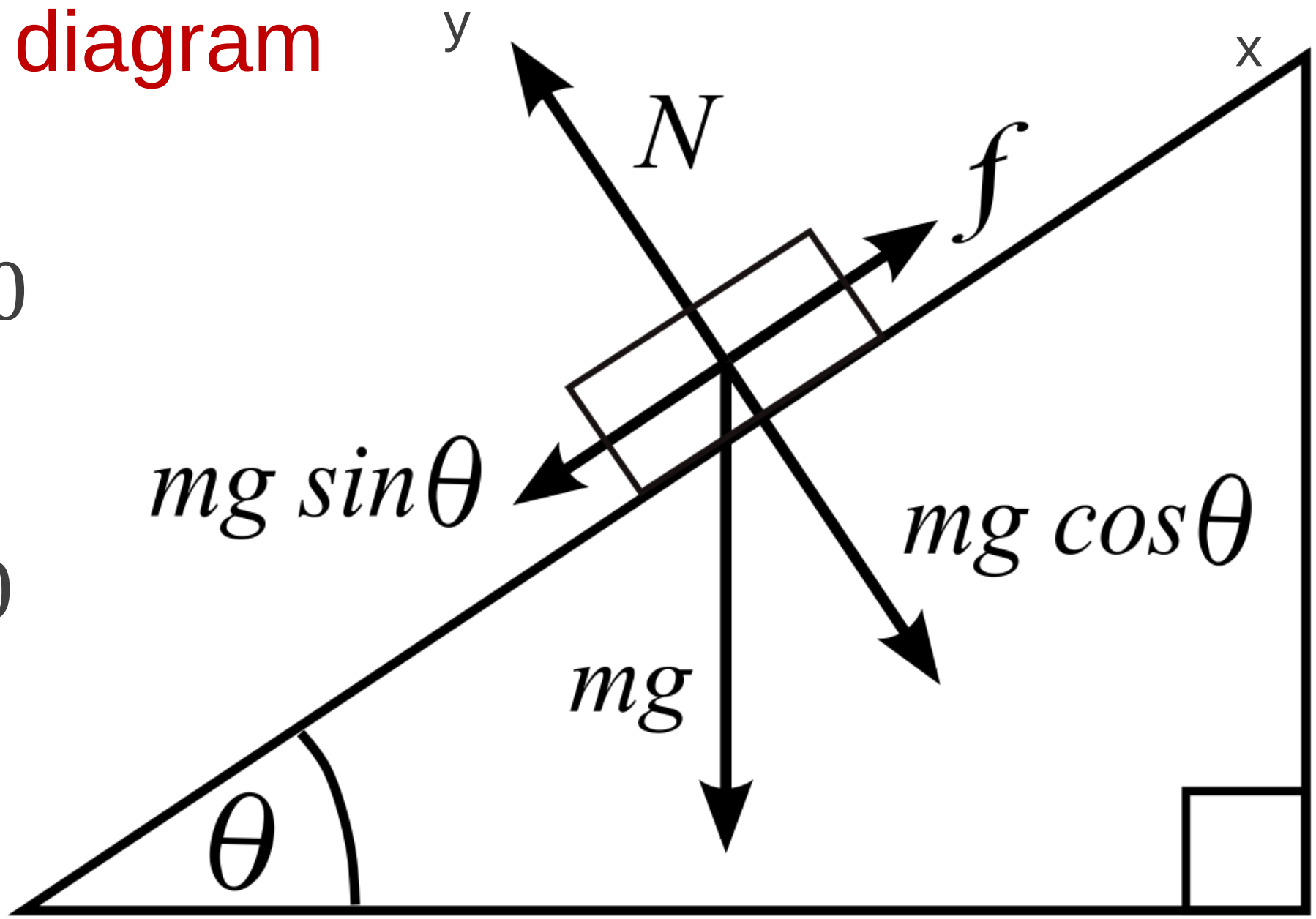
One of the most common mistakes is forgetting that N can vary depending on the physical situation.

Adopted from MIT Course

Free body diagram

$$\sum F_x = 0$$

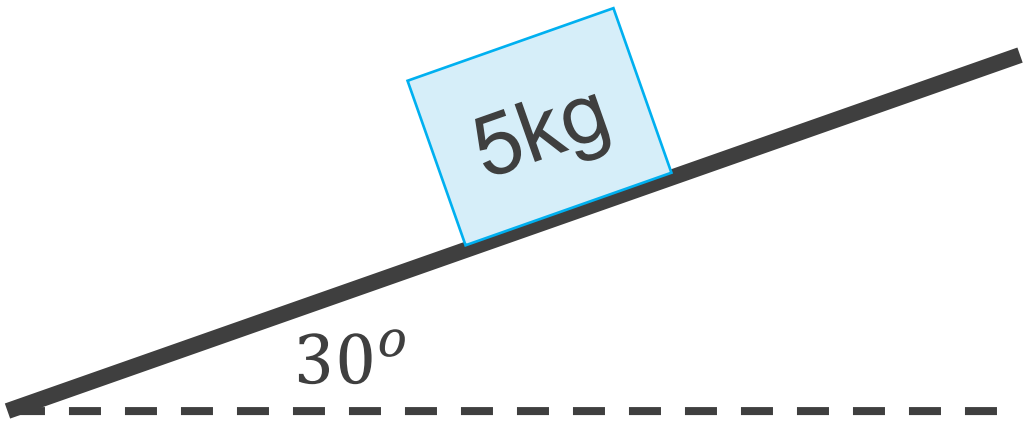
$$\sum F_y = 0$$



Example

Example 1

If $g = 10m/s^2$, *Calculate N!*



Solution:

$$\sum F_y = 0$$

$$N - wcos\theta = 0$$

$$N - 5.10cos30^o = 0$$

$$N - 50.\frac{1}{2}\sqrt{3} = 0$$

$$\boldsymbol{N = 25\sqrt{3}}$$

SUMMARY

1. Practice the free-body and component checklists and the guidelines for setting up static equilibrium problems. Don’t try to remember special cases, each problem is different!

2. Some forces (for example, the normal force) rarely be given but, instead, will usually be found using sums of forces. It s very dangerous to try to “guess” or “memorize’ their values.

Adopted from MIT Course

THANK YOU