Inclined Plane

Spoken Tutorial Project
https://spoken-tutorial.org
National Mission on Education through ICT
http://sakshat.ac.in

Himanshi Karwanje
IIT Bombay

6 May 2019

Learning Objectives

- **Simulate the motion of a load on an inclined plane**

Learning Objectives

- **Simulate the motion of a load on an inclined plane**
- **Resolve the vector components using basic trigonometry**

Learning Objectives

- **Simulate the motion of a load on an inclined plane**
- **Resolve the vector components using basic trigonometry**
- **Calculate the vector components**

System Requirements

System Requirements

- **Ubuntu Linux OS v 16.04**

System Requirements

- **Ubuntu Linux OS v 16.04**
- **Firefox Web Browser v 62.0.3**

Pre-requisites

Pre-requisites

- **Learner should be familiar with Apps on Physics**

Pre-requisites

- **Learner should be familiar with Apps on Physics**

- **For the pre-requisite tutorials please visit this site https://spoken-tutorial.org**

Inclined Plane

- **An inclined plane, is a flat supporting surface tilted at an angle**

Inclined Plane

- An inclined plane, is a flat supporting surface tilted at an angle
- It has one end higher than the other

Inclined Plane

- An inclined plane, is a flat supporting surface tilted at an angle
- It has one end higher than the other
- It is used for raising or lowering a load

Inclined Plane

- An inclined plane, is a flat supporting surface tilted at an angle
- It has one end higher than the other
- It is used for raising or lowering a load
- Use of an inclined plane provides greater mechanical advantage

Inclined Plane

- An inclined plane, is a flat supporting surface tilted at an angle
- It has one end higher than the other
- It is used for raising or lowering a load
- Use of an inclined plane provides greater mechanical advantage
- Ex: ramps, slides, stairs, waterslides

Link for Apps on Physics

Link for Apps on Physics

https://www.walter-fendt.de/html5/phen

Link for Apps on Physics

https://www.walter-fendt.de/html5/phen
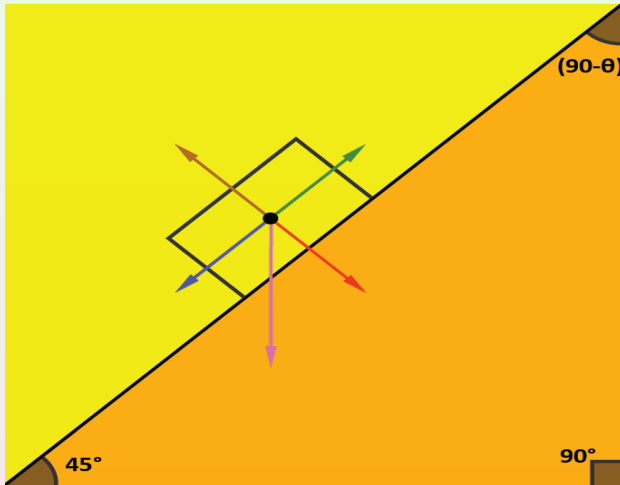
- **Inclined Plane App**

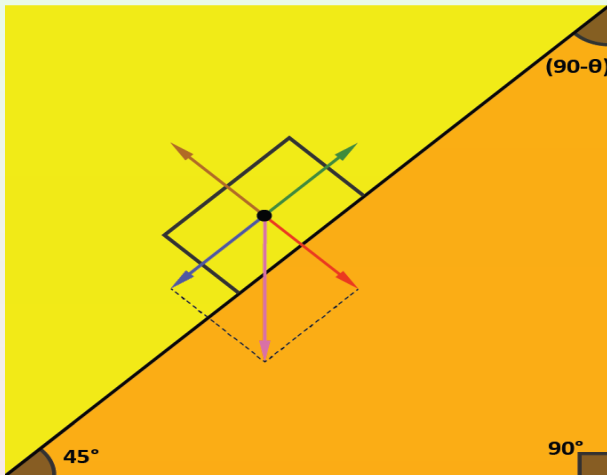# Resolution of Vectors

Resolution of Vectors

Inclined Plane

Resolution of Vectors

Inclined Plane

Resolution of Vectors

Resolution of Vectors

- **Parallel force**
  $$Sin\theta = F \parallel /mg$$
  $$F \parallel = mg\ Sin\theta$$

Resolution of Vectors

- **Parallel force**

  $Sin\theta = F \parallel /mg$

  $F \parallel = mg \, Sin\theta$

- **Perpendicular force**

  $F \perp = mg \, Cos\theta$

Numerical

Numerical

- A mass of 1.02 kg rests on a plane that is inclined at an angle of 30 degrees
- From resolution of vectors find parallel and perpendicular components
- Calculate the necessary force to pull the load

Resolution of Gravity Forces

- $F \parallel = mg \, Sin\theta$
  $= 1.02 \times 9.8 \times Sin30$
  $= 4.99N$

Resolution of Gravity Forces

- $F \parallel = mg \, Sin\theta$
  - $= 1.02 \times 9.8 \times Sin30$
  - $= 4.99N$

- $F \perp = mg \, Cos\theta$
  - $= 1.02 \times 9.8 \times Cos30$
  - $= 8.65N$

Resolution of Gravity Forces

- $F \parallel = mg\,Sin\theta$
  $= 1.02 \times 9.8 \times Sin30$
  $= 4.99N$

- $F \perp = mg\,Cos\theta$
  $= 1.02 \times 9.8 \times Cos30$
  $= 8.65N$

- **Neccesary force $= -F \parallel$**

Assignment

Assignment

- **A load of 0.612 kg rests on a plane that is inclined at an angle of 60 degrees**
- **From resolution of vectors find parallel and perpendicular components**
- **Calculate the necessary force to pull the load**

Summary

- Simulated the motion of a load on an inclined plane
- Resolved the vector components using basic trigonometry
- Calculated the vector components

Acknowledgement

- **These Apps were created by Walter-fendt and his team**

About the Spoken Tutorial Project

- **Watch the video available at https://spoken-tutorial.org /What_is_a_Spoken_Tutorial**
- **It summarises the Spoken Tutorial project**

About the Spoken Tutorial Project

- **Watch the video available at https://spoken-tutorial.org /What_is_a_Spoken_Tutorial**

- **It summarises the Spoken Tutorial project**

- **If you do not have good bandwidth, you can download and watch it**

Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- **Conducts workshops using spoken tutorials**
- **Gives certificates to those who pass an online test**
- **For more details, please write to contact@spoken-tutorial.org**

Forum for specific questions

- **Questions in THIS Spoken Tutorial?**
- **Visit https://forums.spoken-tutorial.org**
- **Choose the minute and second where you have the question**
- **Explain your question briefly**
- **The Spoken Tutorial project will ensure an answer**

You will have to register to ask questions

Acknowledgements

Spoken Tutorial Project is supported by

- **National Mission on Education through ICT (NMEICT)**
- **Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT)**

MHRD, Goverment of India