ODM EDUCATIONAL GROUP
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FORCE

SUBJECT-PHYSICS

CHAPTER NO- 3

Force as push and pull

PERIOD-1

Website: www.odmegroup.org
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LEARNING OBJECTIVE

- Students will be able to
- Clarify their doubts and form a correct concept of force.
- Understand that forces are due to an interaction like push or pull
- Understand the concept of force as a stretch and force as a squeeze.
- Relate and apply their knowledge about force in real life situations.

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WARM UP

- **The teacher will introduce the topic by showing a video.**
- https://youtu.be/IJWEtCRWGvI

FORCE

- Explain force by showing a video.

https://youtu.be/B6mi1-YoRT4

https://youtu.be/9tg3csrFVJw

FORCE AS PUSH AND PULL

- Explain force as push by giving some real life examples.
- Show a video for better understanding of concept
- https://youtu.be/qQi667U_Mig

A car being pushed by a man

(a) : Who is pushing whom?

(b) : Who is pulling whom ?

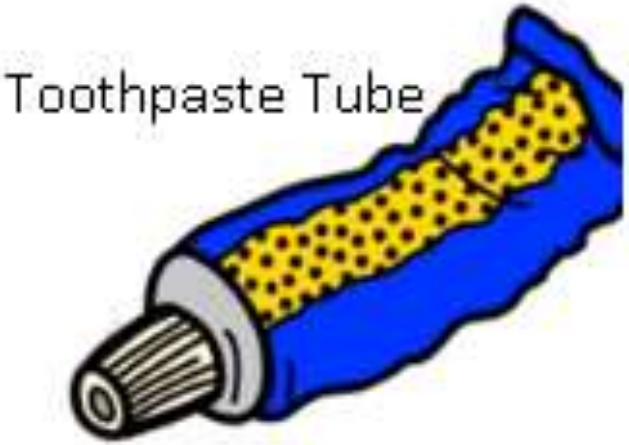
(c) : Who is pulling whom?

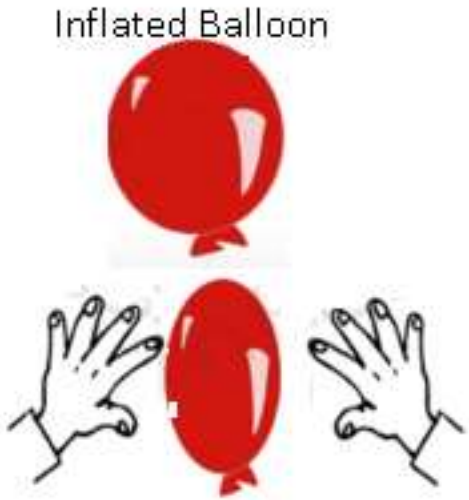
Try to identify action involved in each case as a push and/or a pull and record your observations.

S.No	Description of the situation
1	Moving a book placed on a table
2	Opening or shutting a door
3	Drawing a bucket of water from a well
4	A football player taking a penalty kick
5	A cricket ball hit by a batsman
6	Moving a loaded cart
8	Opening a drawer

FORCE AS STRECH AND SQUEEZE

- Explain force as stretch by demonstrating an activity with the help of a spring.
- Explain force as squeeze by demonstrating an activity with the help of a toothpaste tube or an inflated balloon





HOME ASSIGNMENT

- Exercise- B 1,2
- Q. Define force
- Q. Give an example of force as push and pull
- Q. Explain force as stretch with the help of an example.

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FORCE

SUBJECT-PHYSICS

CHAPTER NO- 3

Effects of a force

PERIOD-2

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LEARNING OBJECTIVE

- Students will be able to
- Familiarize with the effects of force
- Describe the different effects of force with appropriate examples
- Relate different effects of force in real life situations.

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WARM UP ACTIVITY

- Recapitulate the previous topic by asking the following questions.
- Define force.
- Give an example of force as push and pull
- Explain force as stretch with the help of an example.

Effects of force

force can

- move a body originally at rest
- stop a moving body
- make a moving body to move faster
- slow down a moving body
- change the direction of motion of a moving body
- change the shape or size of the body

- show the following videos for better understanding of the concept
- https://youtu.be/B6mi1-YoRT4
- https://youtu.be/9tg3csrFVJw

EFFECTS OF FORCE

i) Force can make an object to move from rest.

ii) Force can stop a moving object.

iii) Force can change the speed of an object if it is moving.

iv) Force can change the direction of a motion of an object.

v) Force can change the shape of an object.

Force may cause one or more of these effects.

HOME ASSIGNMENT

- Exercise- B 3,4
- Describe the different effects of force with appropriate examples
- Explain along with examples that a force can
- change the direction of motion of a moving body
- change the shape or size of the body

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FORCE

SUBJECT-PHYSICS

CHAPTER NO- 3

Kinds of forces, force of friction

PERIOD-3

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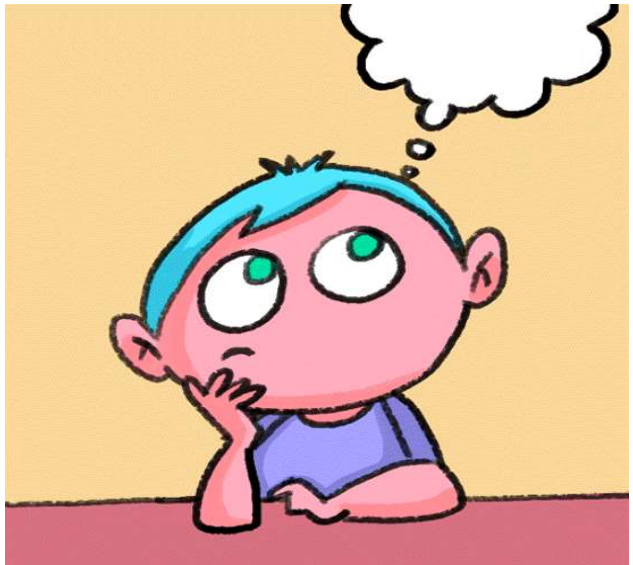
LEARNING OBJECTIVE

- Students will be able to
- familiarize with the different kinds of forces
- Describe the different kinds of forces with appropriate examples
- Relate different kinds of forces in real life situations.
- Sensitize about the force of friction



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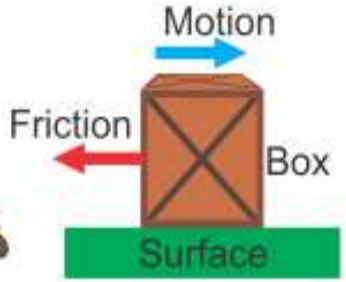
WARM UP QUESTIONS

- Recapitulation of the previous topic by asking the following questions.
- Describe the different effects of force with appropriate examples
- Explain along with examples that a force can
- change the direction of motion of a moving body
- change the shape or size of the body

Kinds of forces

Contact forces

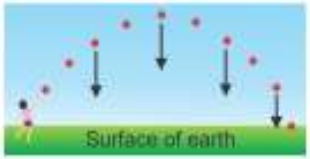
Forces experienced by bodies when they are in physical contact with each other.

- **Muscular**
  - 
  - Force due to the action of muscles.
- **Frictional**
  - 

  - Force acting opposite to the direction of motion.

Non -Contact forces

Forces experienced by bodies even if they are not in physical contact with each other.

- **Magnetic**
  - 
  - Force exerted by a magnet.
- **Electrostatic**
  - 
  - Force exerted by a charged body on another charged body.
- **Gravitational**
  - 

  - Attractive force exerting between two objects.

- examples of **contact** forces by the help of a video
- https://youtu.be/nk35aGqJ-F8

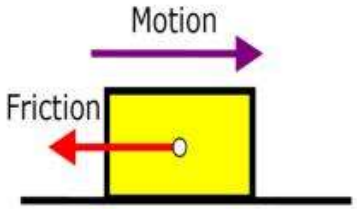
- examples of **non contact** forces by the help of videos
- https://youtu.be/SybIX2nEn1E
- https://youtu.be/eTuiLNYz7JM

Force of friction

- The force required to initiate or to maintain relative motion against friction

Frictional Forces

Friction is a type of force that *opposes* the motion of objects.



There are two types of frictional forces:

- Kinetic- the force of resistance on an object that causes the object to stop moving.
- Static- the force of resistance on an object that prevents motion.

- Explain force of friction by the help of a video
- https://youtu.be/n2gQs1mcZHA
- Real life examples of friction
- https://youtu.be/V2P6CuHVWvI

HOME ASSIGNMENT

- Exercise- B 5,6,7
- Q. Explain the classification of force on the basis of its application
- Q. What do you mean by contact forces? Give some examples
- Q. List the types of non contact forces.
- Q. Explain electrostatic force.

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FORCE

SUBJECT-PHYSICS

CHAPTER NO- 3

Effects of friction

PERIOD-4

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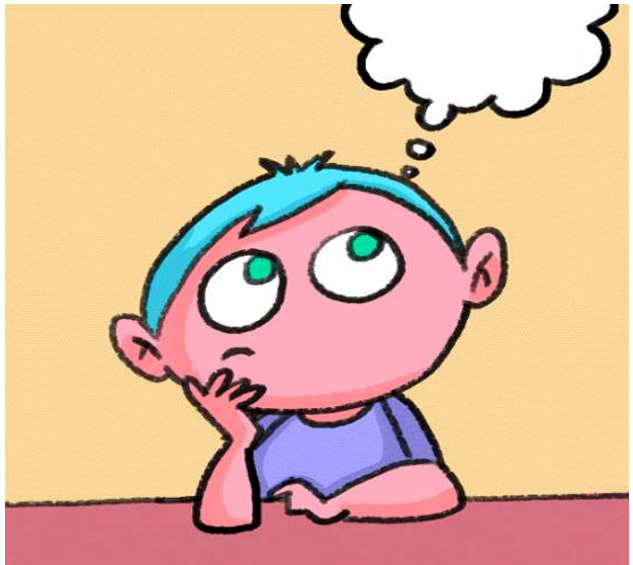
LEARNING OBJECTIVE

- Students will be able to
- familiarize with the effects of friction
- Describe the different effects of friction with appropriate examples
- Relate the effects of friction in real life situations.



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WARM UP QUESTIONS

- Recapitulate the previous topic by asking the following questions.
- Q. Explain the classification of force on the basis of its application
- Q. What do you mean by contact forces? Give some examples
- Q. List the types of non contact forces.
- Q. Define electrostatic force.

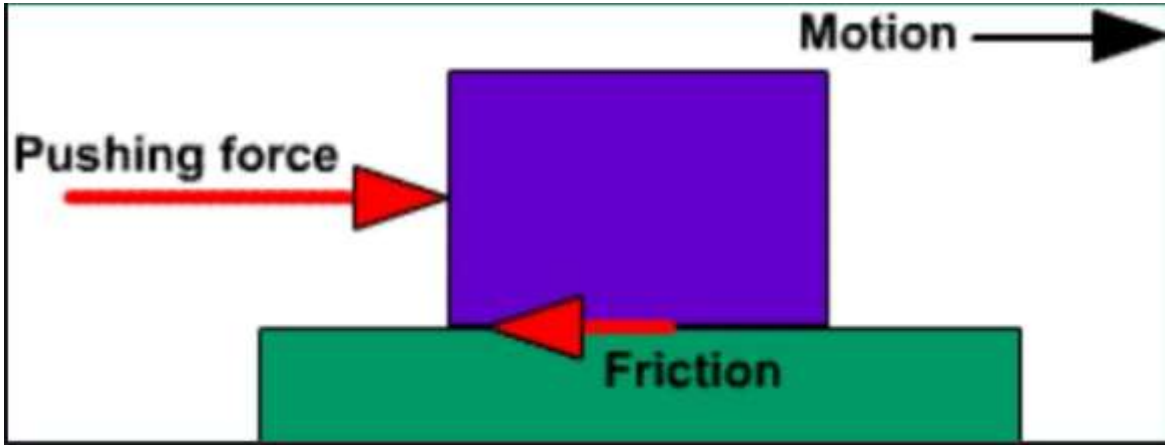
Effects of friction

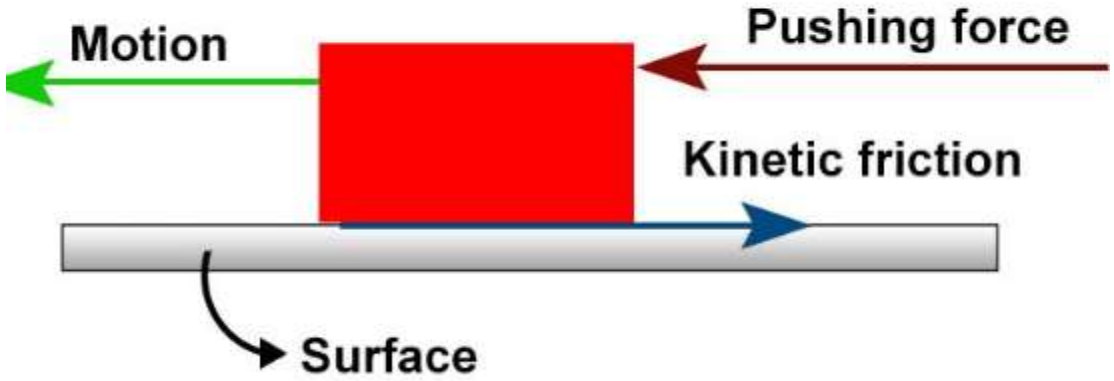
1. Friction opposes motion-

Friction is a force that ***opposes motion*** between two touching surfaces.

- A force that opposes motion between two surfaces that are in contact.
- Causes a moving object, such as a ball, to slow down and stop.
- Occurs because the surface of any object is rough

2. Friction acts in a direction opposite to the direction of motion





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3. Friction produces heat

Friction and Heat

- Try rubbing your hands together at a quick pace.. You should feel heat!
- Friction between surfaces produces heat

- Friction causes the molecules on the surface of your hands to move faster.
- As the molecules move faster, the temperature of the object increases.

Friction produces sparks between a match head and a rough surface. The heat from friction eventually lights the match.

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4. **Friction causes wear and tear**

Effects of Friction

- Friction causes wear and tear
  - Moving parts of the machine under friction are frequently replaced due to wear and tear

FACTORS AFFECTING FORCE OF FRICTION

1. **smoothness of the surface-** Friction is more in rough surfaces and less between smooth surfaces
2. **Nature of medium in which the body moves** -

Solid-solid > solid- liquid> solid –gas

3. **Weight of the moving body-**

Greater the weight more is the force of friction.

- Explain the concept by showing a video
- https://youtu.be/RVoATG4OhUw

HOME ASSIGNMENT

Exercise- B 13,14

Q. List the effects of friction

Q. Explain with example how friction opposes motion

Q. 'Friction always acts in a direction opposite to the direction of motion'. Justify the statement by giving an example.

Q. How can you prove friction produces heat? Give an example.

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FORCE

SUBJECT-PHYSICS

CHAPTER NO- 3

Kinds of friction, disadvantages of friction

PERIOD-5

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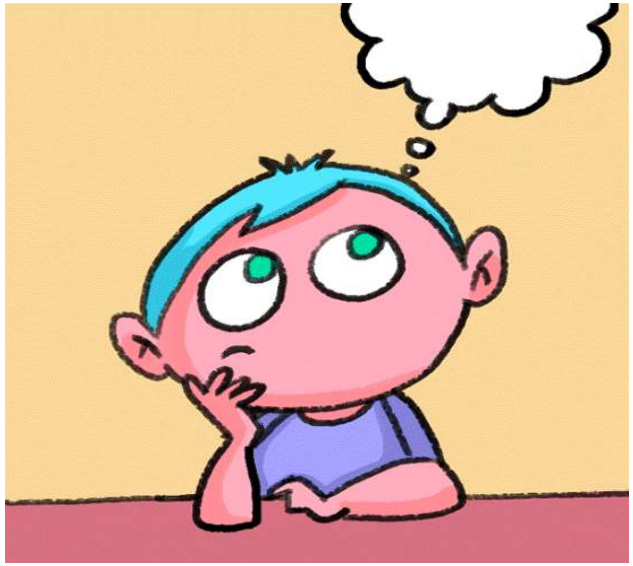
LEARNING OBJECTIVE

- Students will be able to
- familiarize with the kinds of friction
- Describe the different kinds of friction with appropriate examples
- Know the disadvantages of friction



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WARM UP QUESTIONS

Recapitulation of previous topic by asking the following questions.

Q. Explain with example how friction opposes motion

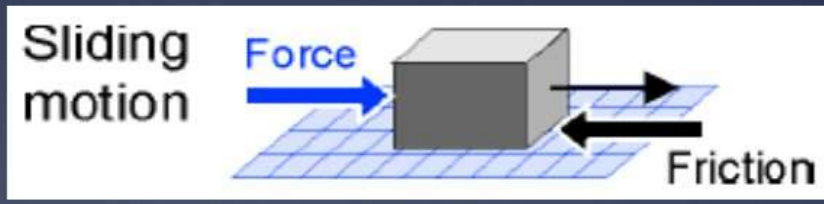
Q. 'Friction always acts in a direction opposite to the direction of motion'. Elaborate the statement by giving an example.

Kinds of friction

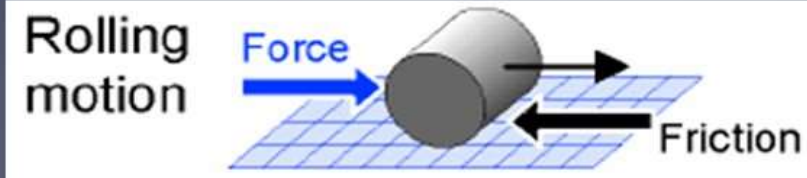
Types of Friction

Static friction

Sliding friction



Rolling friction



- Explain the kinds of friction by showing a video
- https://youtu.be/R10tuvCdl8c

Real life examples

- Activity(discussion)
- Students after understanding, share some real life experiences.

- Demonstrate activity 3
- https://youtu.be/tfXHifE2jgU

Disadvantages of friction

DISADVANTAGES OF FRICTION

Despite the fact that the friction is very important in our daily life, it also has some disadvantages like:

1. The main disadvantage of friction is that it produces heat in various parts of machines. In this way some useful energy is wasted as heat energy.
2. Due to friction we have to exert more power in machines.
3. It opposes the motion.
4. Due to friction, noise is also produced in machines.
5. Due to friction, engines of automobiles consume more fuel which is a money loss.

HOME ASSIGNMENT

Exercise- B 15,16

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SUBJECT-PHYSICS

CHAPTER NO- 3

Ways of reducing friction

PERIOD-6

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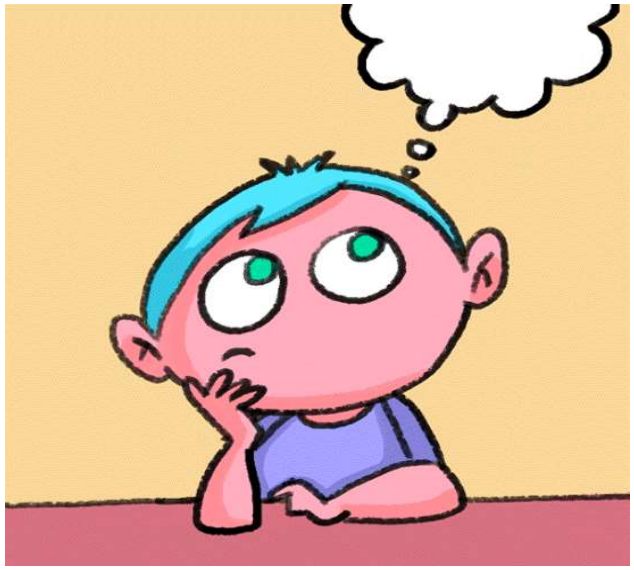
LEARNING OBJECTIVE

- Students will be able to
- familiarize with the ways of reducing friction
- Describe the different ways of reducing friction with appropriate examples



WARM UP QUESTIONS

- Recapitulation of topic by asking the following questions.
- What do you mean by static friction?
- Give an example of a rolling friction
- ----------friction is less than the static friction?
- Give any 3 disadvantages of friction.

Ways of reducing friction

Reducing friction

Friction can be reduced by :-

- Using lubricants like powders or oils and grease.
- Using rollers or wheels.
- Using ball bearings.

- We sprinkle powder on a carrom board to reduce friction.
- Oil or grease is applied between moving parts of machines to reduce friction.
- Wheels are used in vehicles to reduce friction.
- Ball bearings are used in ceiling fans, bicycles and vehicles to reduce friction.

- Explain the different ways of reducing friction by giving various examples.
- https://youtu.be/glXGDpEOU58
-
- https://youtu.be/M0W04bUSvAc

HOME ASSIGNMENT

Exercise- B 17,18

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SUBJECT-PHYSICS

CHAPTER NO- 3

Advantages of friction, ways of increasing friction

PERIOD-7

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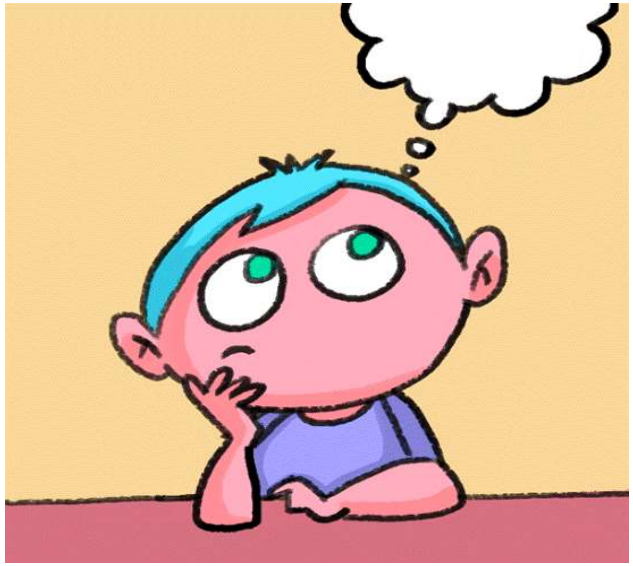
LEARNING OBJECTIVE

- Students will be able to
- familiarize with the advantages of friction
- Describe the different ways of increasing friction with appropriate examples



WARM UP QUESTIONS

- Ask the following questions

- Explain the different ways of reducing friction.
- Give some real life examples

Advantages of friction

Benefits Of Friction

Striking a matchstick

Spiked shoes of cricket players

We are able to drive automobiles

Writing on paper

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- Explain the advantages of friction by giving various examples.
- https://youtu.be/hFGsxxDHeys

Ways of increasing friction

INCREASING FRICTION

WAYS TO INCREASE FRICTION

- Make surfaces that rub together rougher
  - i.e. putting sand on icy roads

- Increase the force pushing the surfaces together

Wiping wet ball

Kabaddi player wiping hands with sand

Sole of Shoe is grooved

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- Elaborate the ways of increasing the friction by giving some examples
- https://youtu.be/M0W04bUSvAc

HOME ASSIGNMENT

Exercise- B 24,26

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FORCE

SUBJECT-PHYSICS

CHAPTER NO- 3

Summarization of the chapter, discussion of exercise questions

PERIOD-8

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LEARNING OBJECTIVE

- Students will be able to
- Understand that forces are due to an interaction like push or pull
- Understand the concept of force as a stretch and force as a squeeze.
- Familiarize with the effects of force
- Describe the different effects of force with appropriate examples
- familiarize with the different kinds of forces
- Describe the different kinds of forces with appropriate examples
- Relate different kinds of forces in real life situations.
- Sensitize about the force of friction
- familiarize with the effects of friction
- Describe the different effects of friction with appropriate examples
- familiarize with the kinds of friction
- Describe the different kinds of friction with appropriate examples
- Know the disadvantages of friction
- familiarize with the ways of reducing friction
- familiarize with the advantages of friction
- Describe the different ways of increasing friction with appropriate examples

WARM UP QUESTIONS

- Teacher should ask certain questions based on the previous classes followed by group discussion.

Practice and Discussion with Students- Chapter Review

- Review of the whole chapter
- Discussion of exercise question answers

HOME ASSIGNMENT

- Exercise- A 1,2
- All exercise question answers of text book.

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