

LEARNING OUTCOMES -

- **EXPLAIN THE TERMS FRICTION AND DRAG.**
- **LIST ADVANTAGES AND DISADVANTAGES OF FRICTION**
- **DIFFERENTIATE BETWEEN STATIC FRICTION AND SLIDING FRICTION.**
- **TABULATE METHODS OF INCREASING AND REDUCING FRICTION.**

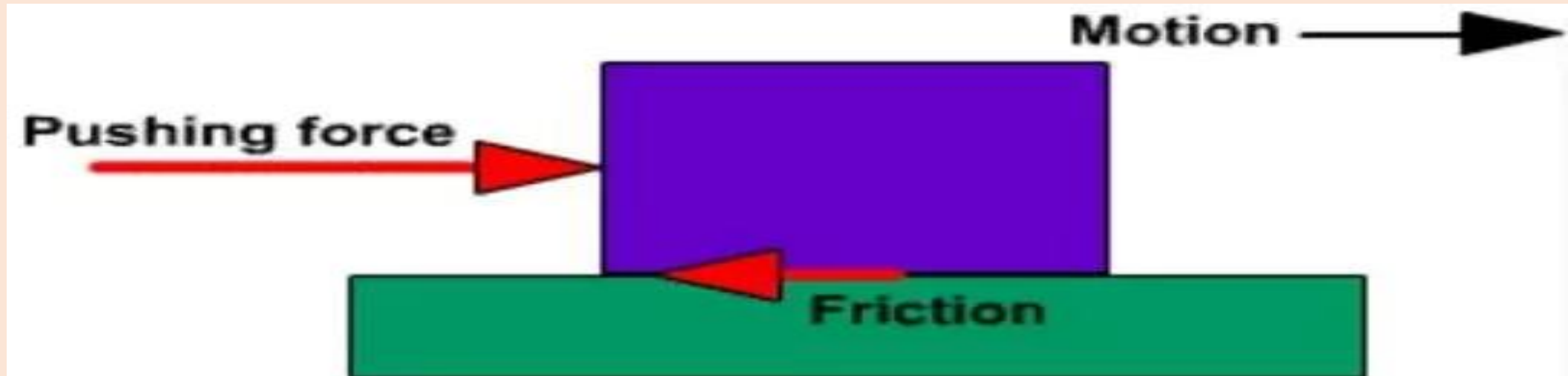
CONTENT TO BE COVERED

- **1.INTRODUCTION TO FRITION**
- **2.CAUSE OF FRICTION**
- **3.TYPES OF FRICTION**
- **4.DIFFERENCE BETWEEN TYPES OF FRICTION**
- **5.NECESSITY OF FRICTON**
- **6. DISADVANTAGES OF FRICTION**
- **7.METHODS TO REDUCE FRICTON**
- **8.RECAP**
- **9.BIBLIOGRAPHY**

INTRODUCTION

WHAT IS FRICTION?

Friction is the force that opposes motion between surfaces that are in contact.

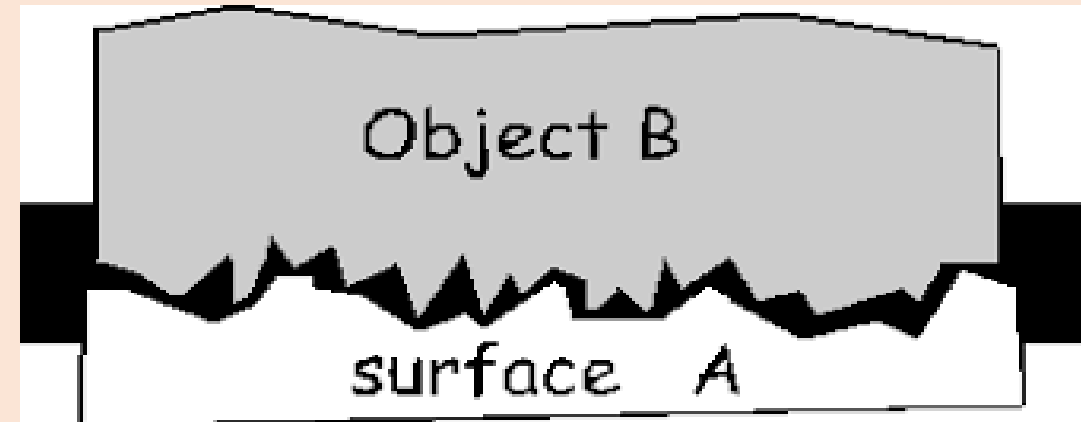


- It comes in notice when only when two surfaces are in contact with each other. It is called **contact force** . It is offered by Solid , Liquids, and gases but It is **maximum in case of solids** and **least in case of gases**.



CAUSES OF FRICTION

- The surface of solids etc. That appears to be smoother are not actually smooth they possess some irregularities that is ridged and grooves.
- When these type of surfaces come in contact with other surface their ridges and grooves get interlocked .



FACTORS AFFECTING FRICTION

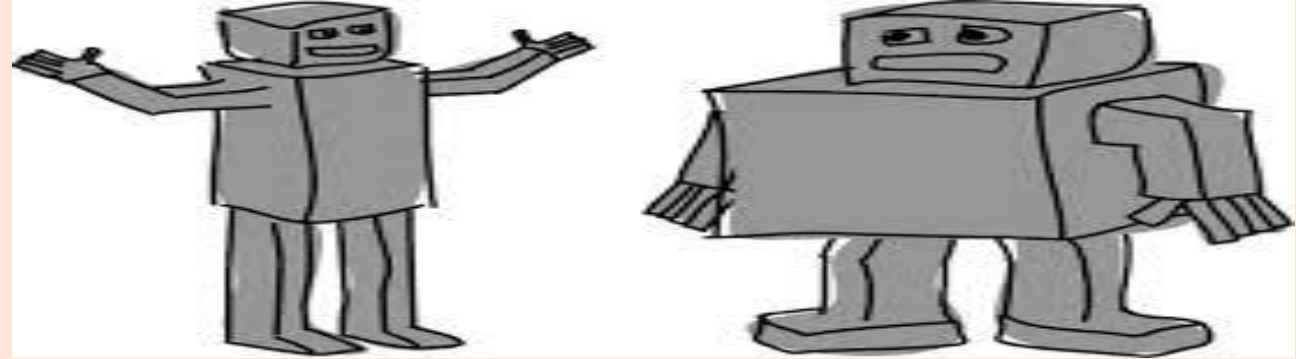
1. NATURE OF THE SURFACE – MORE IS THE ROUGHNESS MORE IS THE FRICTION .

Which is easier to ride a bicycle on,
the floor or the grass

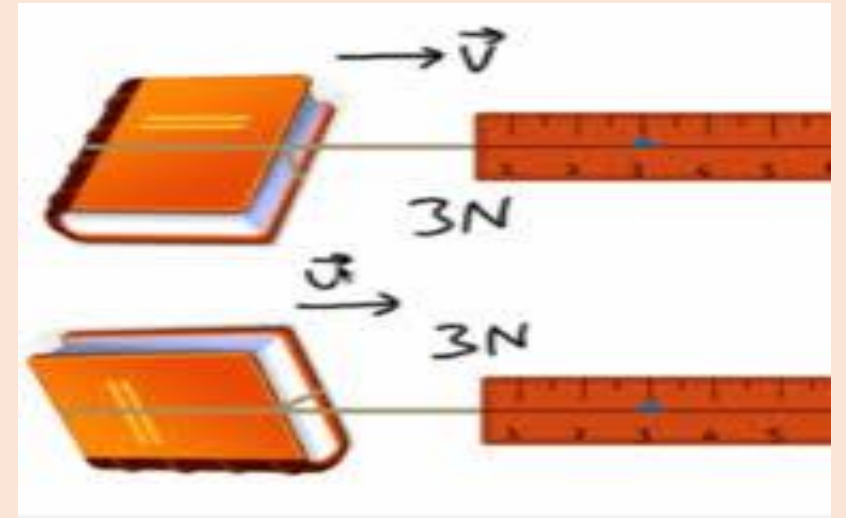


Smooth surfaces, produces less friction.

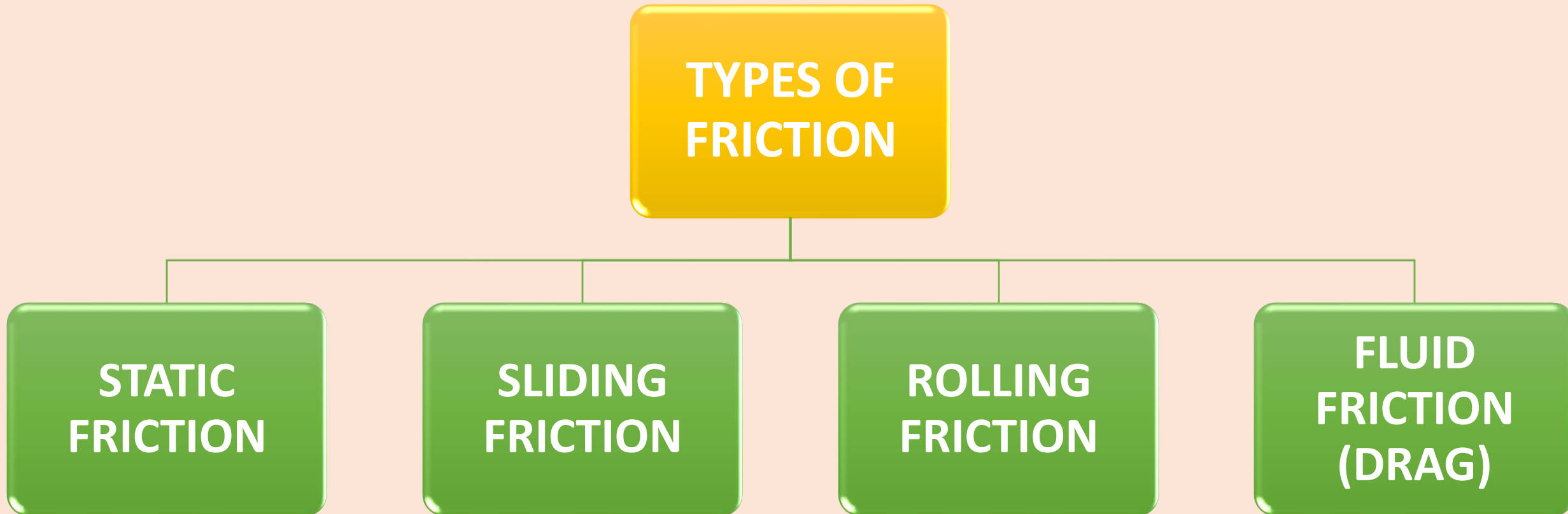
- 2.WEIGHT{NORMAL FORCE} – MORE IS THE WEIGHT OF BODY, MORE IS THE FRICTION.



- 3.SURFACE IN CONTACT- MORE IS THE SURFACE OF CONTACT ,MORE IS THE FRICTION.



TYPES OF FRICTION

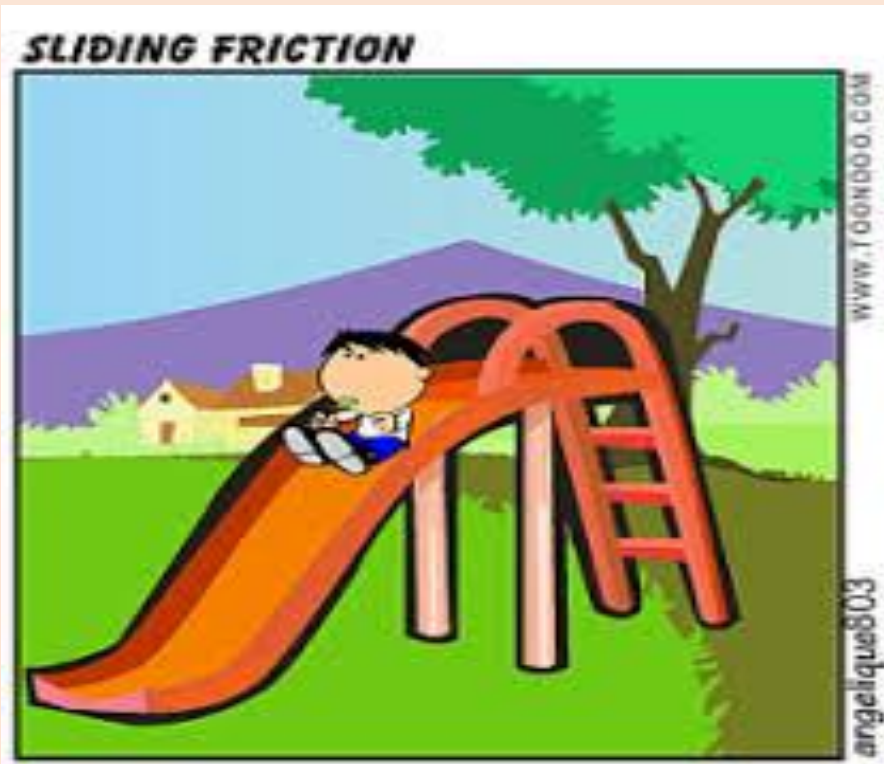


TYPES OF FRICTION:

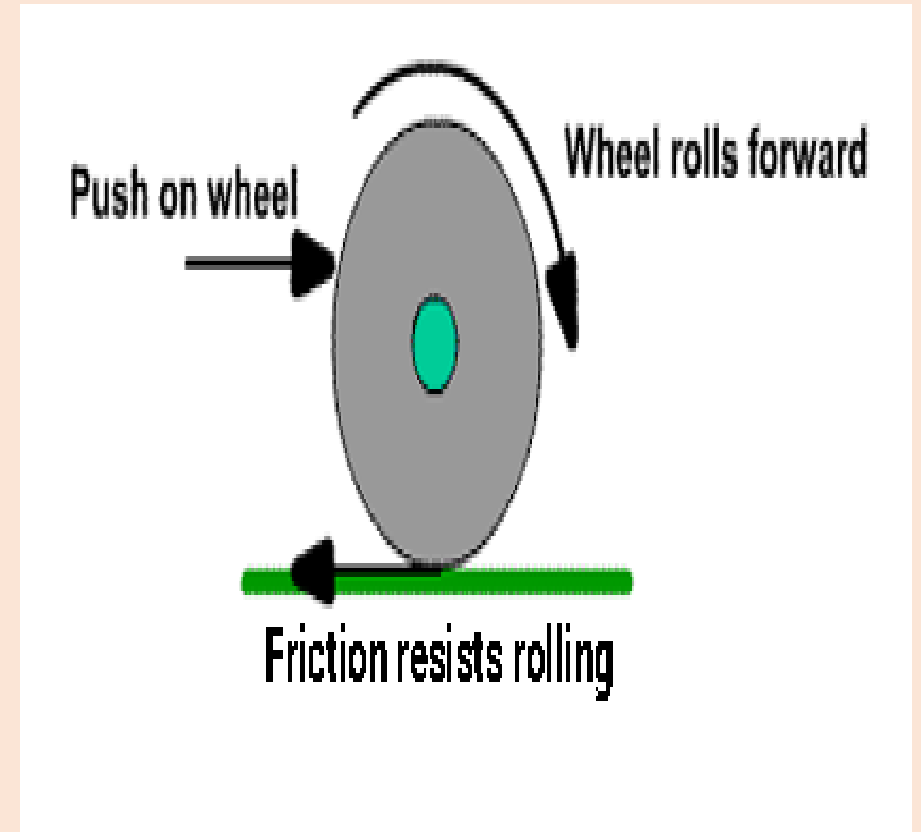
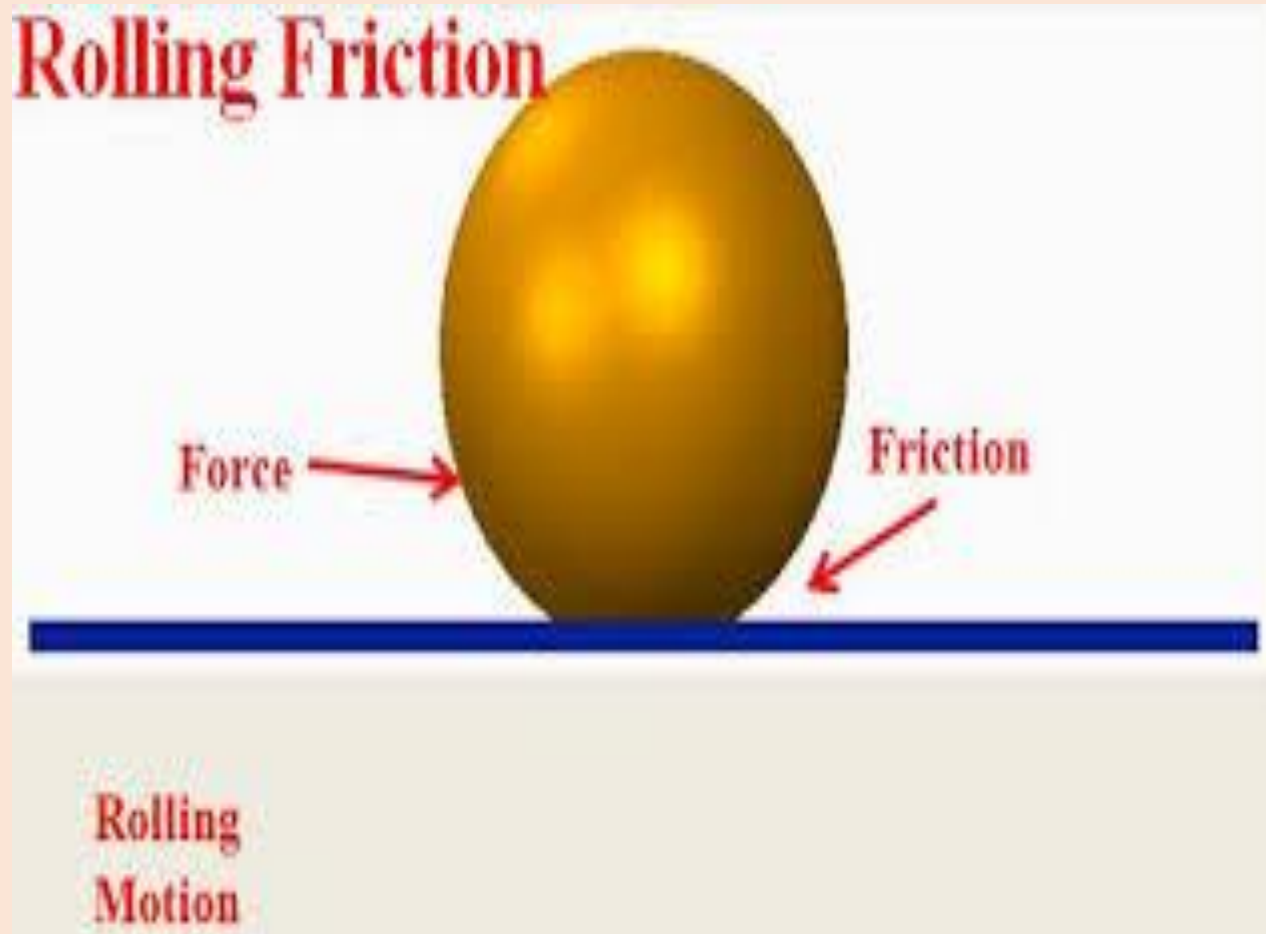
- **1.STATIC FRICTION**- It is friction between two or more solid objects that are not moving relative to each other. For example- pushing anything etc.



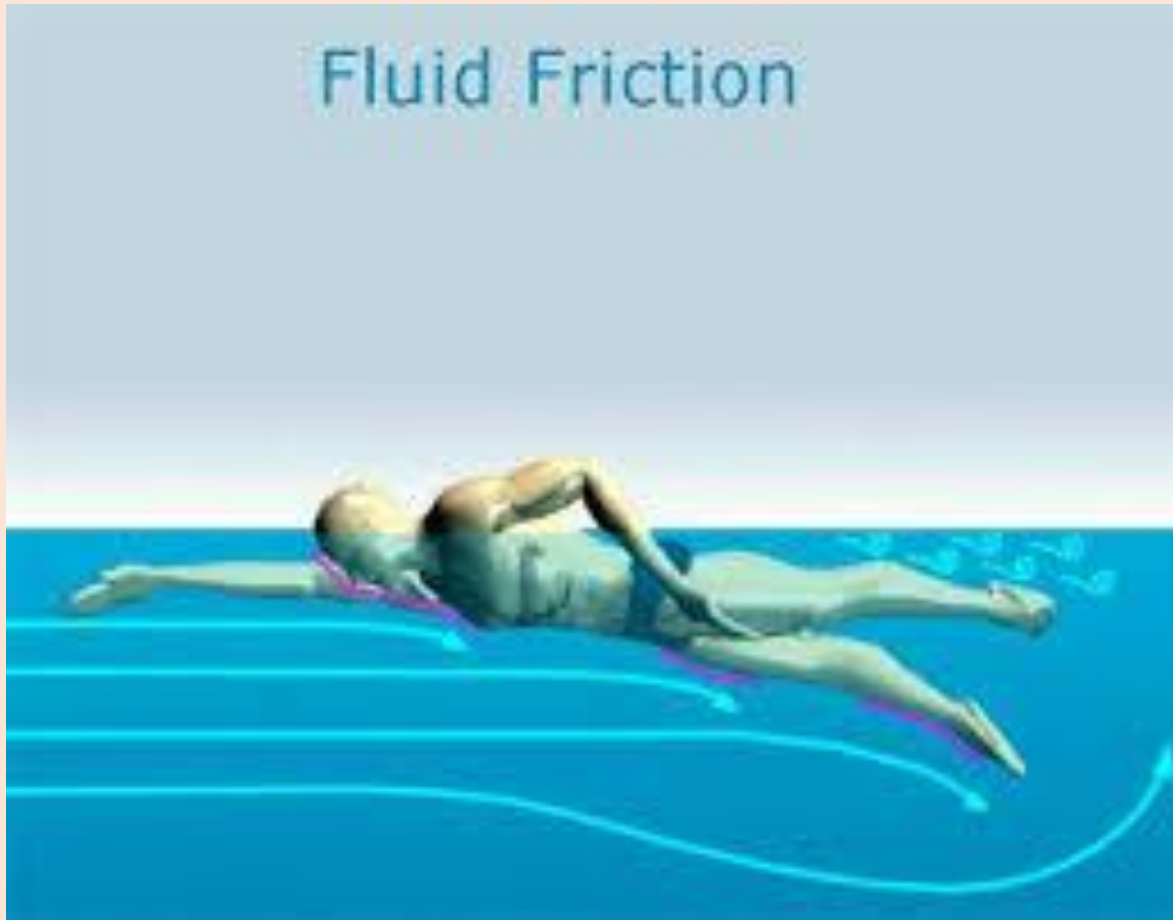
2.SLIDING FRICTION- It is the resistance created by any two objects when sliding against each other. This friction is also known as kinetic friction .



3. ROLLING FRICTION-Rolling friction is the frictional force that occurs when one object rolls on another, like a car's wheels on the ground.



4. FLUID FRICTION- (drag) It is friction that occurs when objects move across or through a fluid. For ex- Swimming – swimmer's body and surface of water

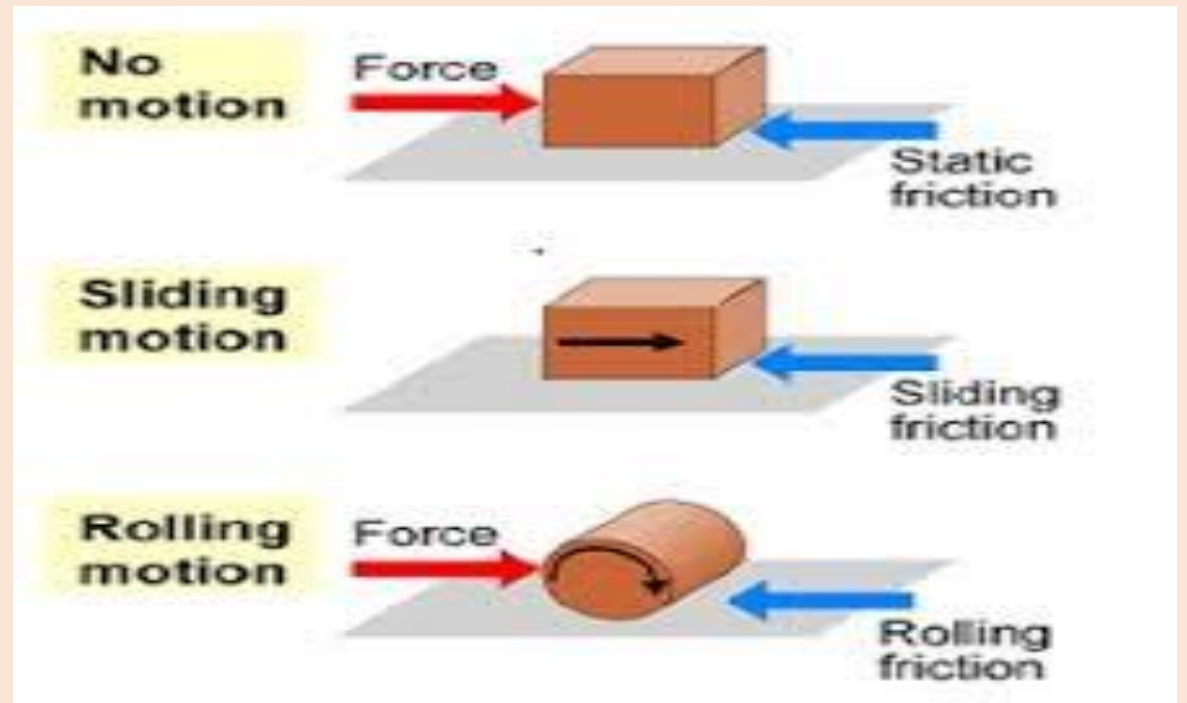


FACTORS AFFECTING DRAG

- **1. SPEED OF THE OBJECT WITH RESPECT TO FLUID-** MORE IS THE SPEED OF THE OBJECT MORE IS THE FRICTION
- **2. NATURE OF FLUID-** DENSER THE FLUID, GREATER THE FRICTION
- **3. SHAPE OF THE OBJECT-** MORE IS THE SURFACE AREA OF THE OBJECT , MORE IS THE FRICTION

ORDER OF STRENGTH OF DIFFERENT TYPES OF FRICTION

Static Friction > **Sliding Friction** > **Rolling Friction**

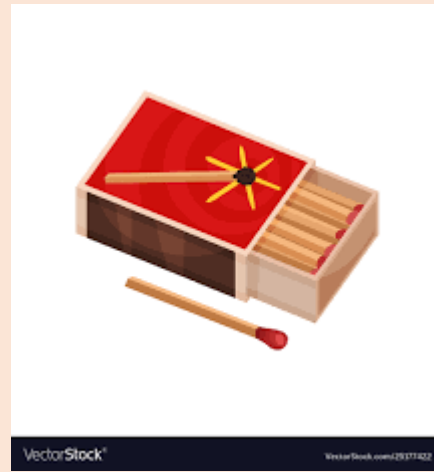
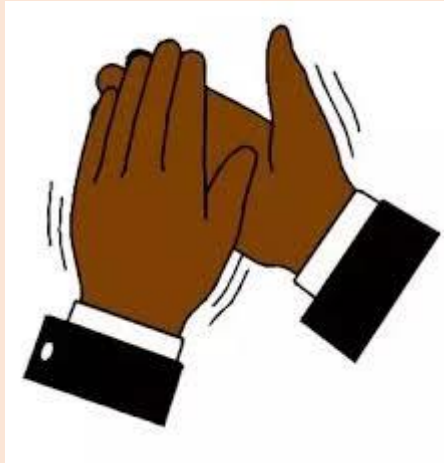


APPLICATION/ NECESSITY OF FRICTION

- Friction finds application when matchsticks are ignited.
- Motion of pistons in a cylinder is an application of friction.
- It is possible to write on books and board as there is friction between pen and the board.
- Friction is also responsible for the wear and tear on bike gears and other mechanical parts.

- **It is becomes difficult to walk on a slippery road due to low friction. When we move on ice, it becomes difficult to walk due to low friction of ice.**
- **We can not fix nail in the wood or wall if there is no friction. It is friction which holds the nail.**
- **A horse can not pull a cart unless friction furnishes him a secure Foothold.**

DAILY LIFE EXAMPLES OF FRICTION



DISADVANTAGES OF FRICTION

- **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.**
- **Due to friction we have to exert more power in machines.**
- **It opposes the motion.**
- **Due to friction, noise is also produced in machines.**
- **Due to friction, engines of automobiles consume more fuel which is a money loss.**
- **It causes wear and tear of sole of shoes.**

METHODS OF REDUCING FRICTION

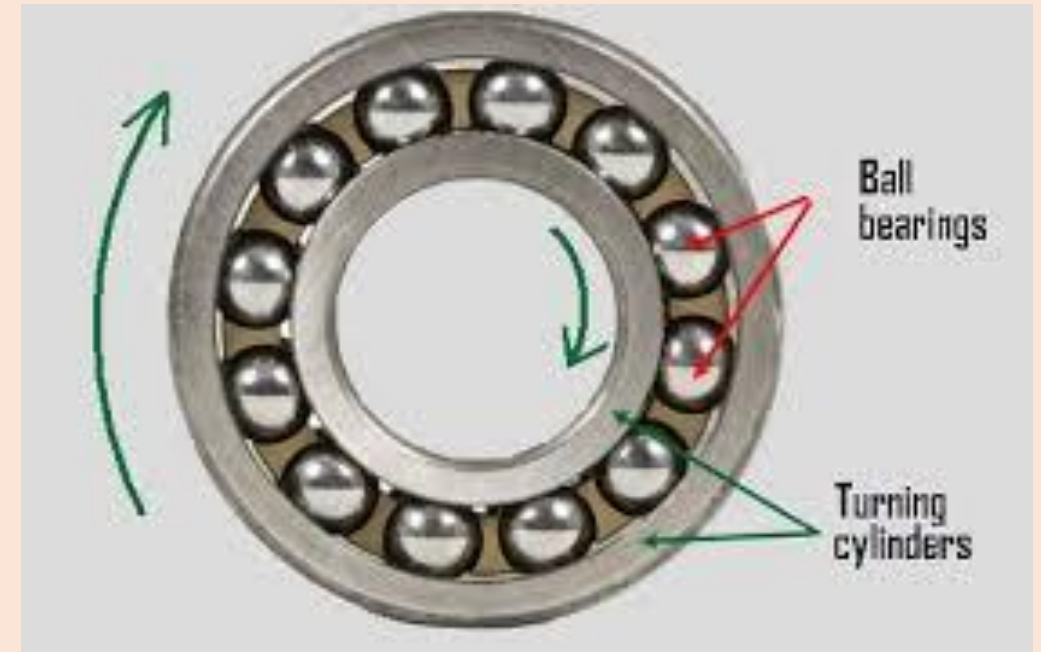
1. USE OF LUBRICANTS:

- The parts of machines which are moving over one another must be properly lubricated by using oils and lubricants of suitable viscosity.



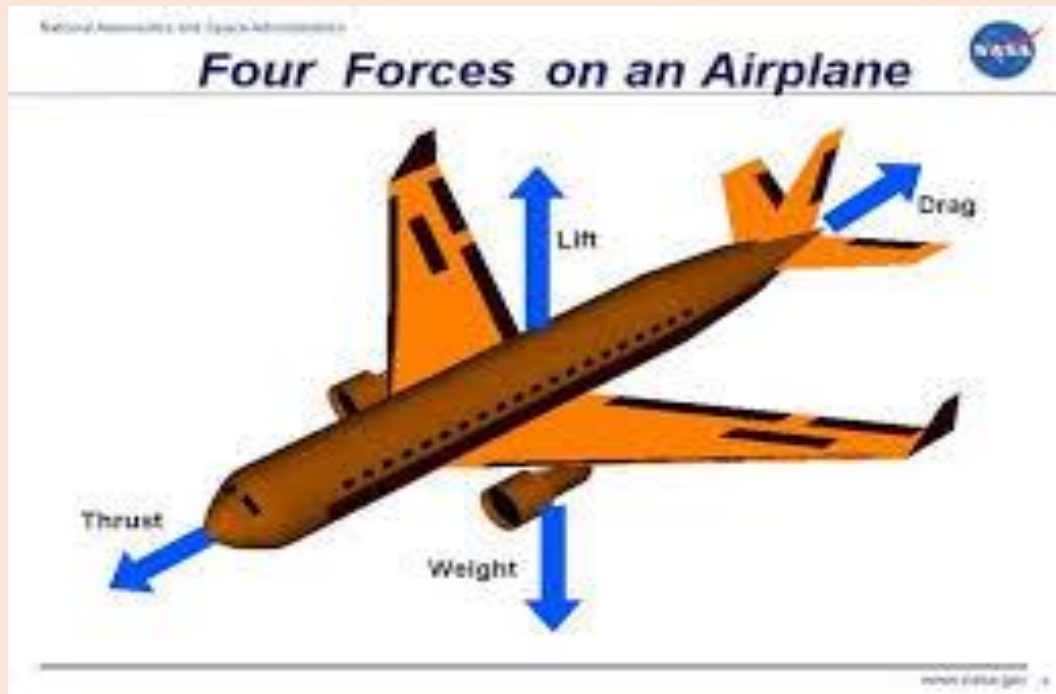
2.USE OF BALL BEARING:

- In machines where possible, sliding friction can be replaced by rolling friction by using ball bearings.



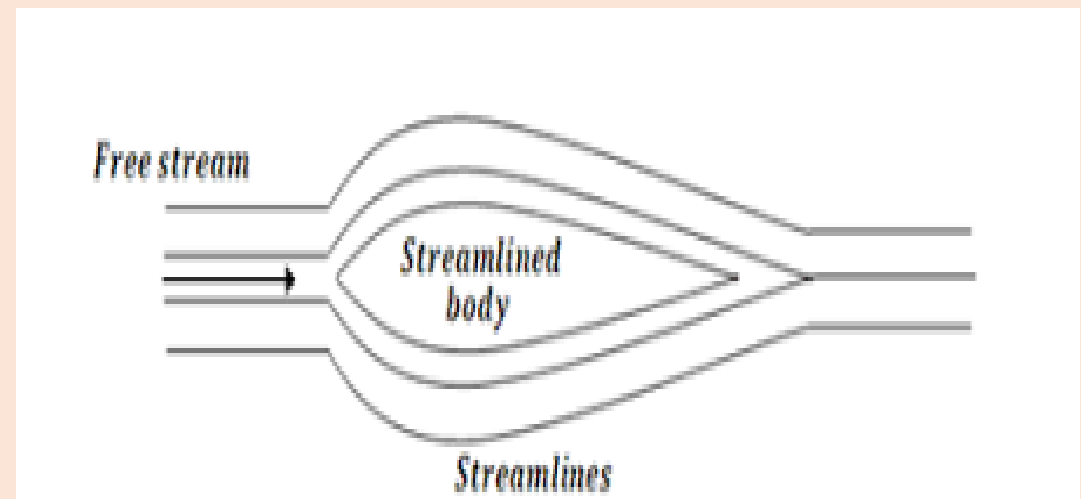
3. DESIGN MODIFICATION:

- Friction can be reduced by changing the design of fast moving objects. The front of vehicles and airplanes made oblong to minimize friction.



4. STREAMLINED BODY-

- A streamlined body is a shape such that it helps to reduce the friction between a fluid and an object moving through that fluid.



RECAPTULATION

- FRICTION IS A TYPE OF FORCE WHICH RESIST MOTION.
- INTERLOCKING BETWEEN SURFACE CAUSES FRICTION
- TYPES OF FRICTION- 1. STATIC, 2.SLIDING , 3.ROLLING
4.FLUID FRICTION
- FRICTION IS A NECESSARY EVIL.
- METHODS OF REDUCING FRICTION-1. USE OF LUBRICANTS, 2. USE ODF BALL BEARING, 3. DESIGN MODIFICATION, 4.STREAMLINED BODY

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THANK YOU