

FRIC~~TION~~

necessity

evil



Walking on the ground



WALKING ON THE GROUND



our feet

and our
on).

reaction

and makes us move forward.



between our feet and ground were
it would not be possible to walk.



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Walking on the ground



For rolling

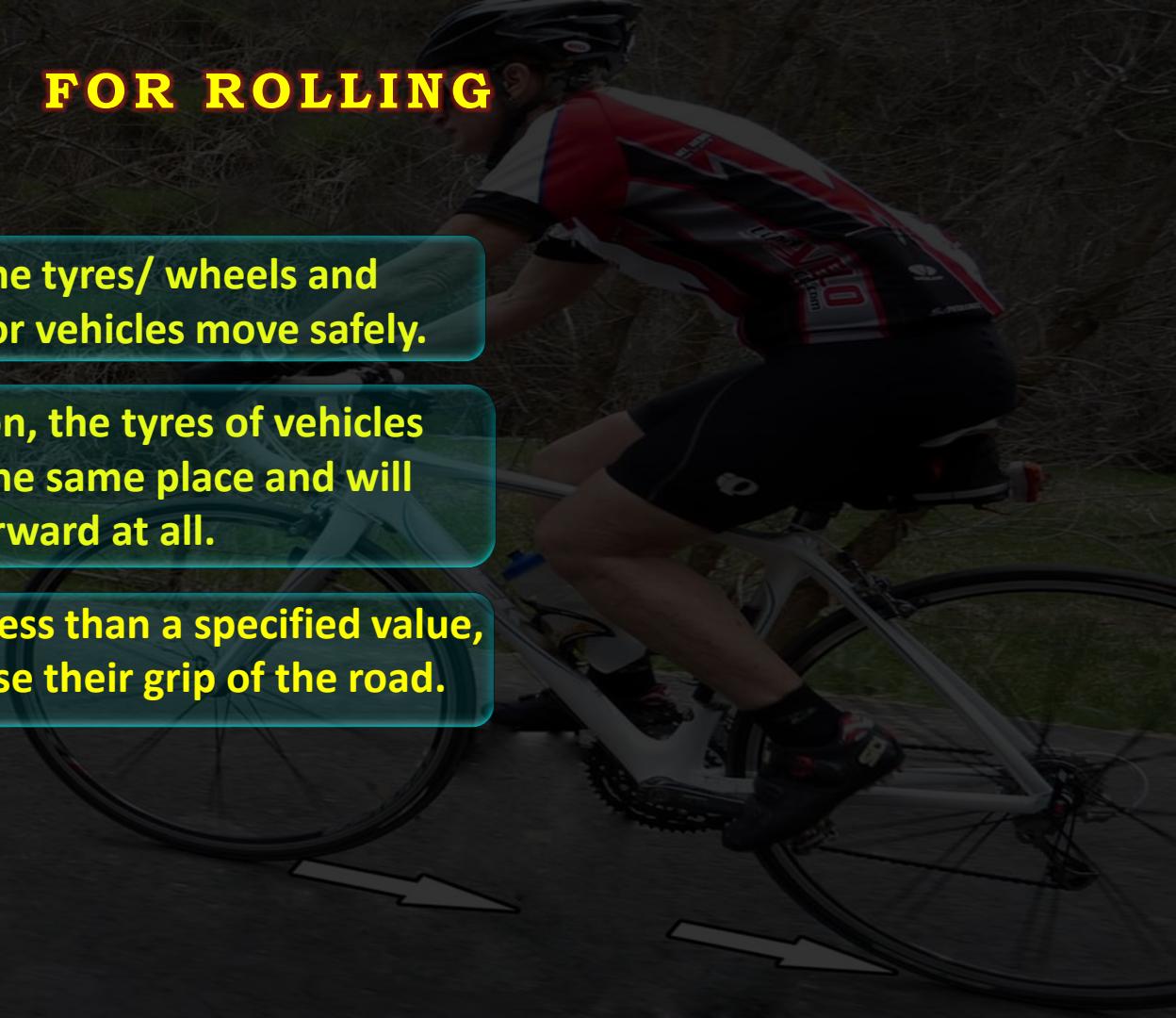


FOR ROLLING

The friction, between the tyres/ wheels and the road, is necessary for vehicles move safely.

If there where no friction, the tyres of vehicles will go on spinning at the same place and will not move forward at all.

If the friction becomes less than a specified value, the wheel/tyre can lose their grip of the road.



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-  1 Walking on the ground
-  2 For rolling
-  3 Performing small day to day activities

Performing Small Day To Day Activities

Writing with a pen or a pencil on the paper is possible only because of Friction



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Walking on the ground



For rolling



Performing small day to day activities

evil

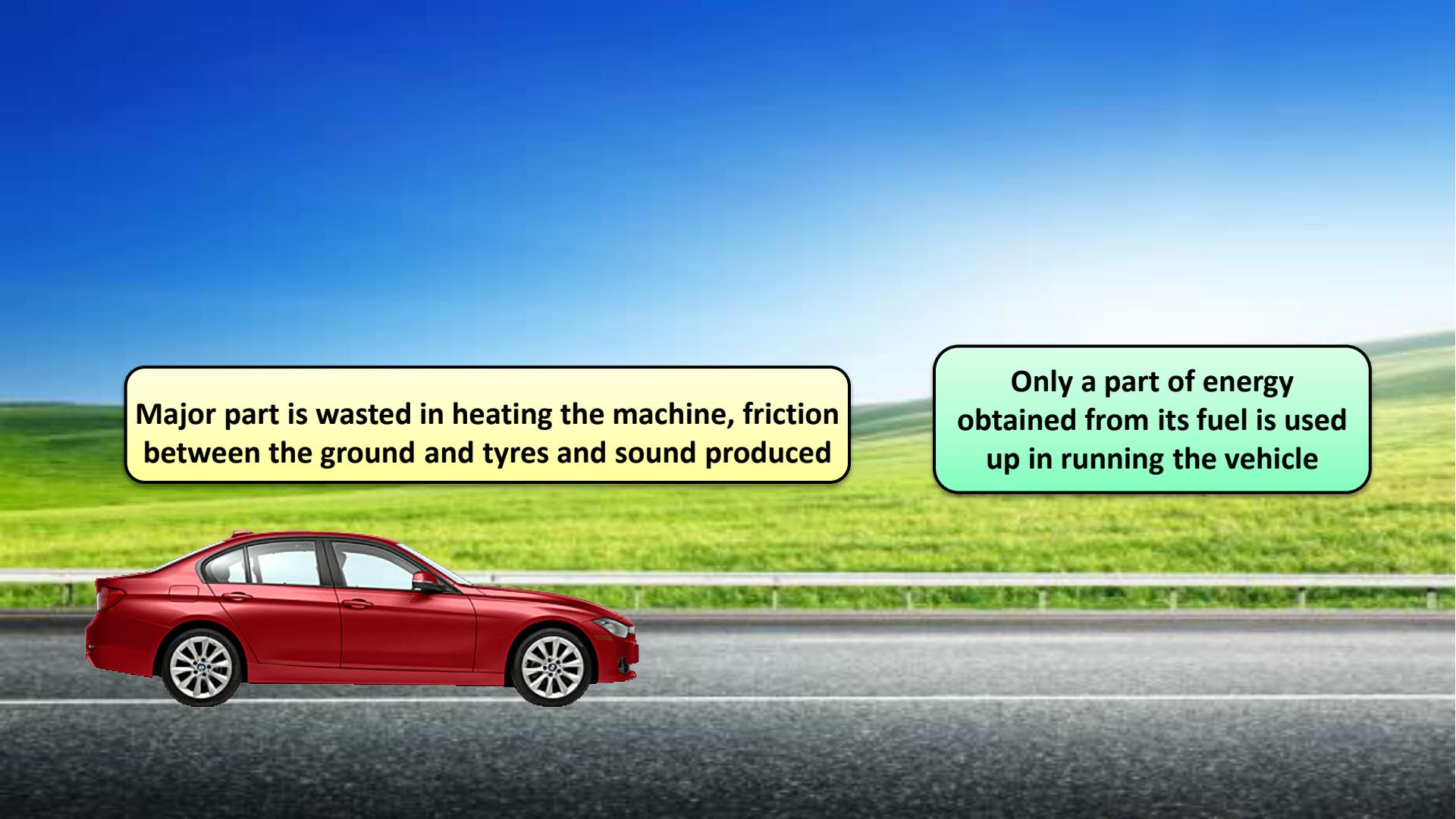


Loss of Energy

Loss of Energy

Friction consumes a substantial part of the useful energy available to us.

As friction opposes motion between two objects in contact, some of the energy to move the object is wasted in overcoming friction



Major part is wasted in heating the machine, friction between the ground and tyres and sound produced

Only a part of energy obtained from its fuel is used up in running the vehicle

Loss of Energy

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A significant amount of energy, supplied to machine, gets wasted in the form of heat energy while overcoming the force of friction

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-  1 Walking on the ground
 -  2 For rolling
 -  3 Performing small day to day activities
-  1 Loss of Energy
 -  2 Wear and Tear of Objects

WEAR and TEAR of OBJECTS

Friction is responsible for a lot of wear and tear of moving parts.

It is friction which wears out surface rubbing against each other.

Hence, the moving parts of any machines need to be replaced from time to time.



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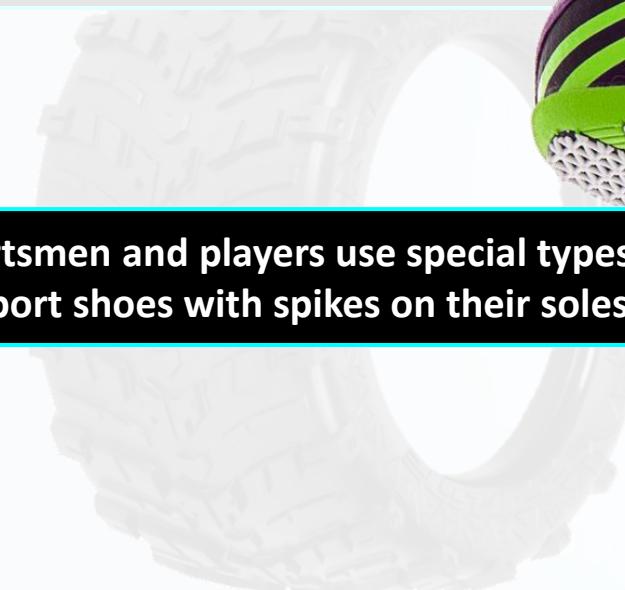
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METHODS OF INCREASING FRICTION

Whenever friction is required, it is increased by making the surface rough

The treads and grooves improve their grip on the road.



Sportsmen and players use special types of sport shoes with spikes on their soles



This helps them to have better grip on the while running

METHODS OF REDUCING FRICTION

1

Polishing :

When we polish a surface, its roughness(unevenness) decreases.

The surface becomes smooth and friction gets reduced .

We also sometimes rub the surface with a fine sand paper to reduce their unevenness.

METHODS OF REDUCING FRICTION

2

Lubrication

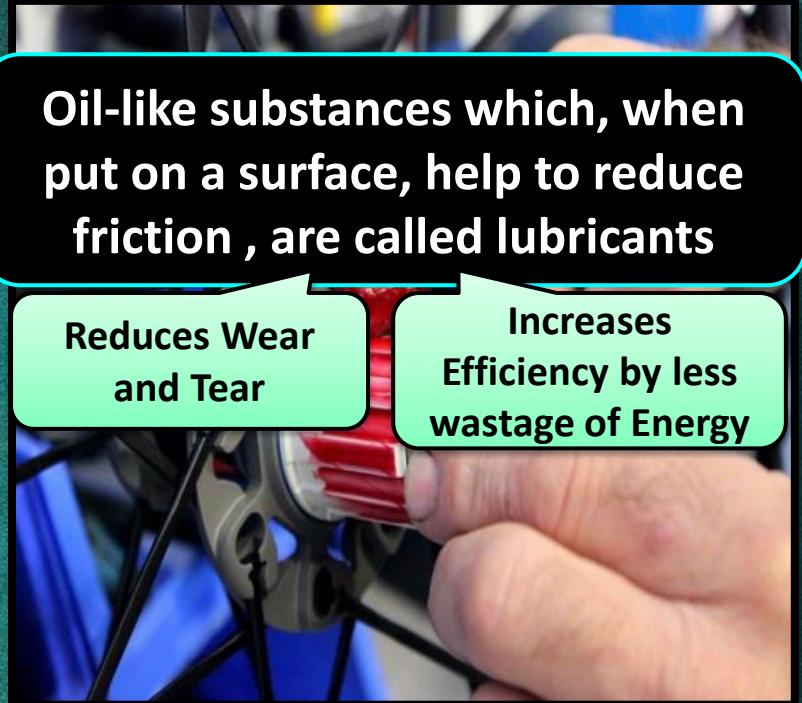
When a few drops of oil are poured on the hinges of a door, the door moves much more smoothly.

Bicycle and motor mechanics use grease between the moving parts of these machines.

Oil-like substances which, when put on a surface, help to reduce friction , are called lubricants

Reduces Wear and Tear

Increases Efficiency by less wastage of Energy



METHODS OF REDUCING FRICTION

2

Lubrication

:

Lubricants can be :

- (i) Liquid like oils
- (ii) Semi- liquids like grease
- (iii) Solids like talcum powder.



METHODS OF REDUCING FRICTION

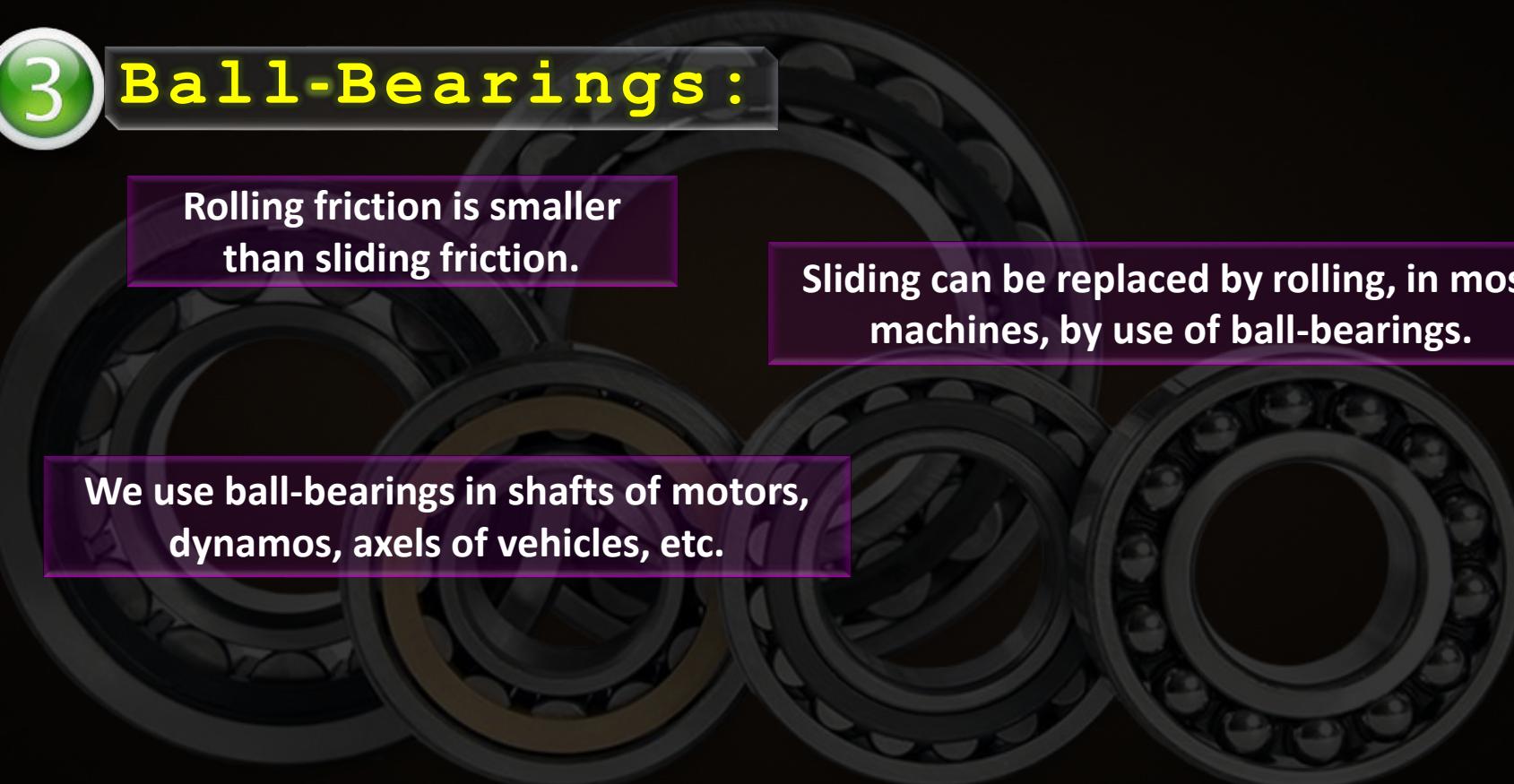
3

Ball-Bearings :

Rolling friction is smaller
than sliding friction.

Sliding can be replaced by rolling, in most
machines, by use of ball-bearings.

We use ball-bearings in shafts of motors,
dynamos, axles of vehicles, etc.



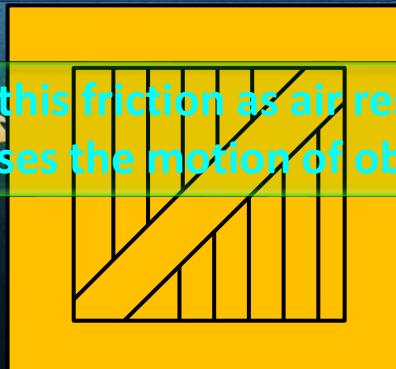
FLUID FRICTION

Whenever an object moves over the surface of another object, frictional force (solid friction) comes to play

The air also exerts a force of friction even though it is very light and thin



We call this friction as air resistance and it also opposes the motion of objects through it.



But what happens when an object moves through air?



ACTIVITY TO UNDERSTAND FORCE of FLUID FRICTION

FACTORS AFFECTING FORCE OF FLUID FRICTION

1. NATURE OF THE FLUID

2. SHAPE OF THE MOVING OBJECT

Drop both of them at the same time

3. SPEED OF THE MOVING OBJECT

Resistance is higher

The crumpled sheet of paper falls with a greater speed
What do we observe?

Air Resistance acts to the direction opposite to the Direction of Motion of Paper



Ground level



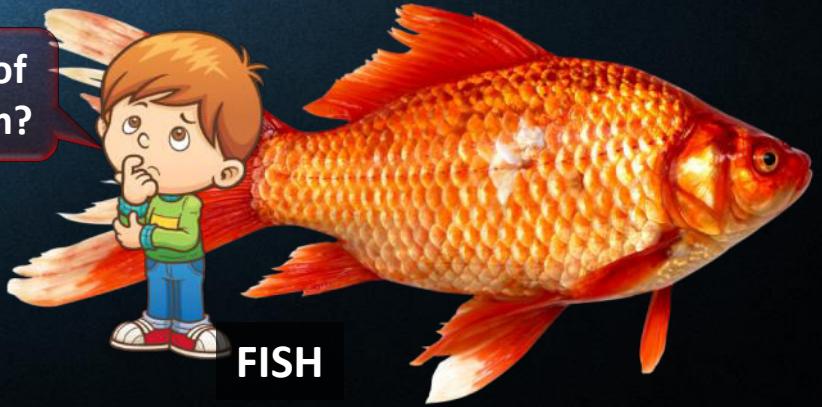
AEROPLANE



SHIP



BIRD



FISH

Where do you think the shapes of these machines got inspired from?



STREAMLINE BODIES

Sports vehicles are so designed that the air flows smoothly over their surface

STREAMLINE FLOW





AEROPLANE



SHIP

Streamline Flow of air helps to reduce the Friction of Air and helps them acquire a faster speed



BIRD



FISH

Thank You