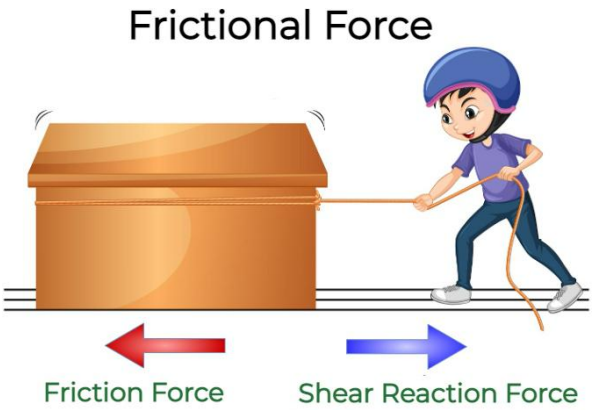
# G2. Friction

## Friction

Have you ever tried sliding a book across a table? Or noticed how your shoes slow down when you drag your feet on the ground? These everyday experiences are examples of friction, a force that affects how objects move. Let's explore what friction is and how it works!



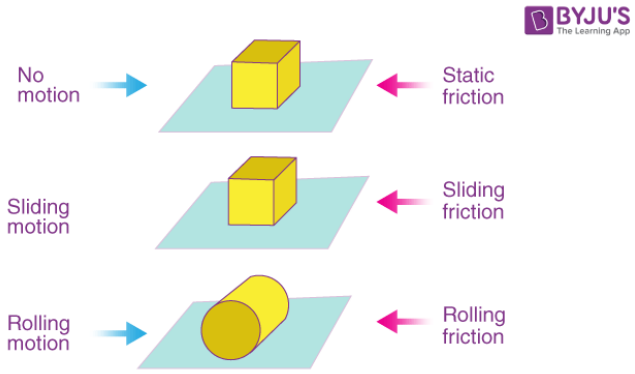

**What is Friction?**
Friction is a force that happens when two objects rub against each other. It's like a little roadblock that tries to stop things from moving smoothly. The amount of friction depends on the type of surface and how much force is pushing the objects together.

**Types of Friction**
There are different types of friction, but the three main ones are:

1. **Static Friction**
   This type of friction happens when two objects are not moving relative to each other. For example, when you try to push a heavy box, it might not move at first because static friction is holding it in place.

2. **Sliding Friction**
   Sliding friction occurs when two objects are moving past each other. If you push that heavy box again and it starts moving, sliding friction is at work.

3. **Rolling Friction**
   Rolling friction is what helps objects like wheels move smoothly. When you ride your bike, the wheels roll on the ground, and rolling friction reduces the resistance, making it easier to move forward.




**Reducing Friction**

Friction can be helpful, but sometimes we want to reduce it to make things move more easily. We use different methods to achieve this:

1. **Lubricants**
   Lubricants, like oil or grease, are substances that we use to reduce friction between two surfaces. When you put oil on a bike chain, it helps the chain move smoothly.

2. **Smoother Surfaces**
   Polishing or smoothing surfaces can also reduce friction. For example, waxing a surfboard or polishing a floor can make objects slide more easily.

3. **Wheels and Ball Bearings**
   Wheels and ball bearings are designed to reduce friction in moving parts. They are often used in vehicles and machines to make them more efficient.

**Everyday Examples of Friction**

Friction is all around us, and we encounter it in our daily lives:

1. **Walking**
   When you walk, your shoes grip the ground to prevent you from slipping. This is because of the friction between your shoes and the surface.

2. **Playing Sports**
   Friction affects how balls bounce or roll on different surfaces, like soccer balls on grass or basketballs on a court.

3. **Sliding Down a Slide**
   The slide's surface creates enough friction to slow you down as you slide down.

4. **Riding a Bike**
   Friction between the bike's tires and the road allows you to ride smoothly.

1. What is friction?

A) A force that happens when two objects rub against each other.
B) A force that pulls objects toward the ground.
C) A force that pushes objects apart.
D) A force that makes objects float.

2. What is static friction?
   A) Friction between two objects that are not moving relative to each other.
   B) Friction between two objects that are sliding past each other.
   C) Friction between two rolling objects.
   D) Friction between two floating objects.

3. Which type of friction helps objects like wheels move smoothly?
   A) Static friction
   B) Sliding friction
   C) Rolling friction
   D) Liquid friction

4. How can we reduce friction?
   A) By using lubricants, smoother surfaces, and wheels.
   B) By adding more force to objects.
   C) By increasing the roughness of surfaces.
   D) By cooling down objects.

5. What happens when you push a heavy box, and it doesn't move at first?
   A) Sliding friction is at work.
   B) Rolling friction is at work.
   C) Static friction is at work.
   D) Liquid friction is at work.

6. What are lubricants used for in reducing friction?
   A) To make surfaces rougher.
   B) To create more resistance between objects.
   C) To increase friction.
   D) To reduce friction between two surfaces.

7. How does friction affect walking?
   A) It makes you slide more easily.
   B) It reduces the grip between your shoes and the ground.
   C) It prevents you from slipping.
   D) It makes walking faster.

8. What does rolling friction help with?
   A) Sliding objects past each other.
   B) Moving wheels smoothly.
   C) Stopping objects from moving.
   D) Increasing the resistance between surfaces.

9. Which type of friction occurs when two objects are moving past each other?
    A) Static friction
    B) Sliding friction
    C) Rolling friction
    D) Liquid friction

10. Why do we use ball bearings in vehicles and machines?
    A) To increase friction.
    B) To reduce friction and make them more efficient.
    C) To make them move slower.
    D) To create more resistance between parts.

## ANSWERS & EXPLANATIONS

1. A - A force that happens when two objects rub against each other.
    - Friction is the force that occurs when two objects rub against each other.

2. A - Friction between two objects that are not moving relative to each other.
    - Static friction happens when two objects are not moving relative to each other.

3. C - Rolling friction.
    - Rolling friction helps objects like wheels move smoothly.

4. A - By using lubricants, smoother surfaces, and wheels.
    - We can reduce friction by using lubricants, smoother surfaces, and wheels.

5. C - Static friction is at work.
    - When a heavy box doesn't move at first, it's because of static friction.

6. D - To reduce friction between two surfaces.
    - Lubricants are used to reduce friction between two surfaces.

7. C - It prevents you from slipping.
    - Friction between your shoes and the ground prevents you from slipping while walking.

8. B - Moving wheels smoothly.
    - Rolling friction helps wheels move smoothly.

9. B - Sliding friction.
    - Sliding friction occurs when two objects are moving past each other.

10. B - To reduce friction and make them more efficient.
    - Ball bearings are used to reduce friction and make vehicles and machines more efficient.