# Force

**Solution 1.a:**

**Effects of force applied to an object:**

1. It moves a stationary object.
2. A force can stop a moving object.
3. A force can change the speed or direction of a moving body.
4. It can change the shape of an object.

**Solution 1.b:**

**Types of force:**

1. Muscular force
2. Mechanical force
3. Gravitational force
4. Magnetic force
5. Frictional force
6. Static electric force

**Solution 1.c:**

When an object is thrown in the upward direction by exerting a force, it reaches a certain height and then starts coming down because of gravitational force.

As a result of gravity, the motion of an object thrown upwards gradually decreases and eventually becomes zero, after that, it begins to fall downwards. As it falls, its motion increases continuously because of gravitational pull.

**Solution 1.d:**

Cranes, tractors and motor vehicles use magnetic force.

The maglev train is the recent application of magnetic force which works on the principle of magnetic repulsion.

## Solution 1.e:

**Advantages of friction:**

1. Friction makes us walk on the ground.
2. It helps us to write with a pencil on a piece of paper.
3. Friction helps us to fix a nail in the wood or wall.
4. The brakes of vehicles work because of friction.

**Disadvantages of friction:**

1. It produces heat between the moving parts of the machine.
2. Noise is produced in machines due to friction.
3. It opposes motion.
4. It causes wear and tear to the parts of the machinery.

## Solution 1.f:

Rubbing materials such as rubber, plastic, ebonite, glass and feathers against specific substances helps to obtain static electric force.

## Solution 2.a:

An object thrown upward reaches a certain height and falls down because the Earth pulls it towards itself.

## Solution 2.b:

We sprinkle talcum powder on a carom board to reduce frictional force. Thus, the force between moving coins, striker and the surface of the carom board becomes less and playing becomes easier.

## Solution 2.c:

The ramp on a railway station has a rough surface to increase friction so that we do not slip while walking on it. If the surface is smooth, then the frictional force between the ramp and the feet becomes less and the chances of slipping are greater.

## Solution 2.d:

We oil our bicycles regularly as oiling reduces the frictional force between its parts and makes it easier to ride the bicycle. Oiling reduces the wear and tear of the parts of the bicycles.

## Solution 3:

| No. | Action | Force applied |
|---|---|---|
| **1.** | A bullock pulling a cart. | Muscular force |
| **2.** | A crane lifting a heavy iron load. | Magnetic force |
| **3.** | Weighing something on a spring balance. | Gravitational force |
| **4.** | Applying the brakes on a bicycle. | Frictional force |
| **5.** | Picking up paper scraps with a plastic ruler. | Static electric force |

## Solution 4:

**Muscular force**: The force applied using body muscles such as the arms or legs are called muscular force. Force applied through the use of animals such as bullocks, horses, elephants and camels is also muscular force.

**Examples:** Kicking of a football, playing cricket, walking, running

**Gravity**: The force applied by the Earth to pull all objects towards it is called gravity. Motion of an object thrown upwards gradually decreases and eventually becomes zero because of gravity. After that, it falls downwards and its motion increases continuously.

**Examples:** Fruits and leaves falling down from trees, a stone thrown upwards falling down

**Static electric force**: The electric force produced because of friction between two bodies is called static electric force. It is a weak force as compared to other forces.

**Example:** When a piece of thermocol is rubbed on terylene cloth and is brought close to the scraps of paper, the scraps of paper move because of attraction between terylene cloth and the scraps of paper.

## Solution 5:

| No. | Muscular force | Mechanical force |
|---|---|---|
| **a.** | The force applied using parts of the body like arms or legs is called mascular force. | Force applied by using machines is called mechanical force. |
| **b.** | Mascular force is applied through the use of animals or human beings. | Mechanical force is applied through the use of tractors, motor vehicles and other machines. |

## Solution 6:

1. Muscular force
2. Ebonite, rubber and plastic
3. A spring balance
4. Frictional force