

Lesson 11. Force and Pressure Basic concepts – A Flow Chart

Grade VIII

Force and pressure

Force

A push or a pull, that changes or tends to change the state of rest or uniform motion of an object or changes its direction or shape.

Pressure

- The force acting on a unit areas of a surface.
- Pressure (P) = $\frac{\text{Force (F)}}{\text{Area (A)}}$
- Liquids and gases exert pressure on the walls of their containers.
- The pressure exerted by air around us is known as atmospheric pressure.

Direction of Force

- If two forces are acting on an object in the same direction, the net force on it also acts in the same direction.
- If two forces act on an object in the opposite directions, the net force acting on it acts along the direction of the larger force.

Effects of Force

- **A force can**
 - Make a stationary object move.
 - Make a moving object stop.
 - Change the speed of a moving object.
 - Charge the shape or size of an object.

Types of Forces

Contact Forces

The forces act on a body when the source of force is in actual contact with the body.

- Muscular Force: The force exerted by the muscles of the body.
- Mechanical Force: the force produced by a machine.
- Frictional Force: The force that opposes the motion of an object.

Non – Contact Forces

Force which do not involve physical contact between two bodies on which they act.

- Magnetic Force: A magnet exerts a non- contact force on objects made of iron, steel, cobalt or nickel.
- Electrostatic Force: The force which results due to repulsion of similar charges or attraction of opposite charges.
- Gravitational Force: The force that exists between any two masses because of their mass.

Know the Terms

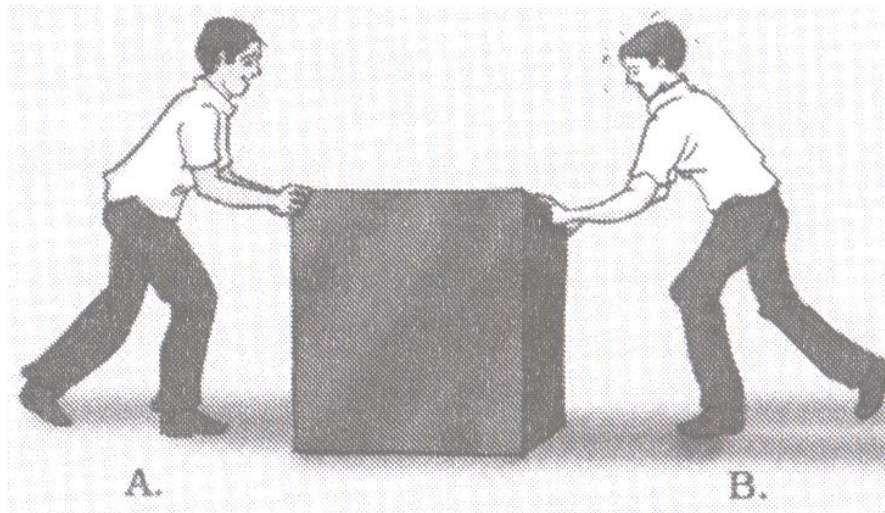
- **Magnitude** : The strength of a force is usually expressed by its magnitude
- **State of Motion** : The state of motion of an object is described by its speed and the direction of motion. At rest the state of the objects is considered the state of zero speed
- **Muscular Force** : The force resulting due to the action of muscles is known as the muscular force.
- **Contact Force** : Force that can be applied only when it is in contact with an object is called a contact force. For example, muscular force can be applied only when it is in contact with an object. Friction is also an example of contact force. The force of friction always acts on all the moving objects and its direction is always opposite to the direction of the motion.
- **Non - Contact Force** : The force exerted on an object without touching it is known as non-contact force. For example, the force exerted by a magnet on a piece of iron and Electrostatic Force which is force exerted by a charged body on another charged or uncharged body.
- **Gravitational Force (Gravity)** : The attractive force of the earth which acts upon all the objects is known as the force of gravity. Every object in the universe, whether small or large, exerts a force on every other object. This force is called the gravitational force.

Objective Type Questions

(1 Marks)

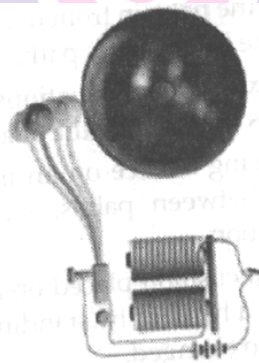
I. Multiple Choice Questions

1. In the Fig. Two boys A and B are shown applying force on a block moves towards the right, which one of the following statements is correct?
 - a) Magnitude of force applied by A is greater than that of B
 - b) Magnitude of force applied by A is smaller than that of B



- c) Net force on the block is towards A
- d) Magnitude of force applied by A is equal to that of B

2. In the circuit shown in the Fig., when the circuit is completed, the hammer strikes the gong. Which of the following forces is responsible for the movement of hammer.



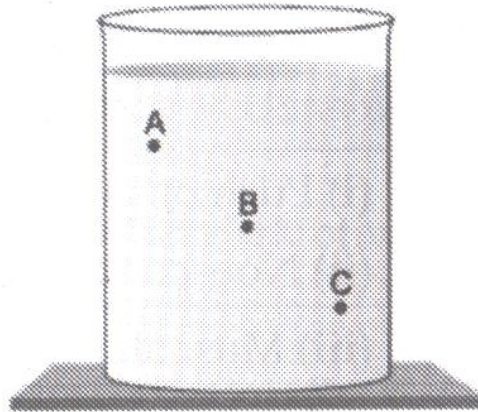
- a) Gravitational force alone
- b) Electrostatic force alone
- c) Magnetic force alone
- d) Frictional force alone

3. During dry weather, while combing hair, sometimes we experience hair flying apart.

The force responsible for this is :

- a) Force of gravity
- b) Electrostatic force
- c) Force of friction
- d) Magnetic force

4. Fig. Shows a container filled with water. Which of the following statements is correct about pressure of water ?



- a) Pressure at A > Pressure at B > Pressure at C
- b) Pressure at A = Pressure at B = Pressure at C
- c) Pressure at A < Pressure at B > Pressure at C
- d) Pressure at A < Pressure at B < Pressure at C

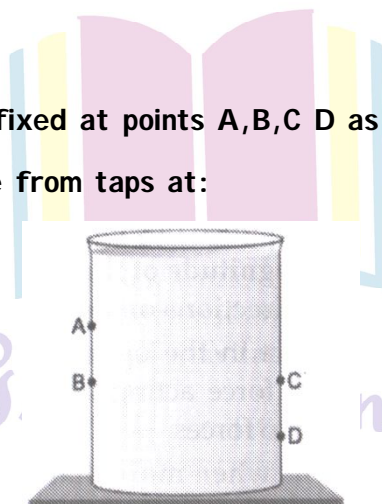
5. Two objects repel each other. This repulsion could be due to :

- a) Frictional force only
- b) Electrostatic force only
- c) magnetic force only
- d) Either a magnetic or an electrostatic force

6. Which one of the following forces is a contact force?

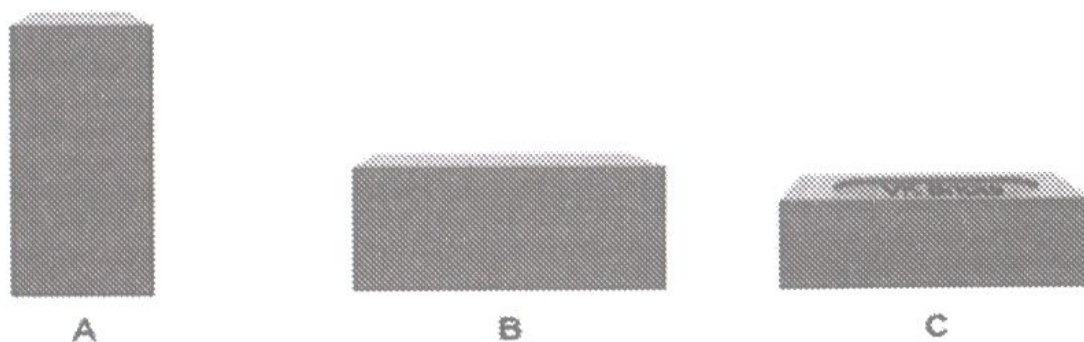
- a) Force of gravity
- b) Force of friction
- c) Magnetic force
- d) Electrostatic force

7. A water tank has four taps fixed at points A, B, C, D as shown in Fig. The water will flow out at the same pressure from taps at:



- a) B and C
- b) A and B
- c) C and D
- d) A and C

8.



A brick is kept in three different ways on a table as shown in Fig. The pressure exerted by the brick on the table will be :

- a) Maximum in position A
- b) Maximum in position B
- c) Maximum in position C
- d) Equal in all cases

1. a	2. c	3. b	4. d	5. d	6. b	7. a	8. a
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Match the following.

Column - I		Column - II	
1	Contact force	(i)	Push or Pull
2.	Pressure	(ii)	Non-contact force
3.	Magnitude	(iii)	Muscular force
4.	Force	(iv)	Strength of force
5.	Force of gravity	(v)	Force on unit area

1. (iii)	2. (v)	3. (iv)	4. (i)	5. (ii)
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II. Multiple Choice Questions

1. Force is a

- a. Pull
- b. Push
- c. Pull and push both
- d. None of these

2. The strength of force is expressed by

- a. Weight
- b. Mass
- c. Magnitude
- d. Longitudinal force

3. The force between two charged bodies is called
 - a. Muscular force
 - b. Gravitational force
 - c. Magnetic force
 - d. Electrostatic force
4. When two forces act in opposite directions, then net force acting is the
 - a. Sum of two forces
 - b. Differences between two forces
 - c. Both of these
 - d. None of these
5. State the motion is described by
 - a. Position of rest
 - b. Position of motion
 - c. Both by the state of rest or motion
 - d. None of these
6. Magnetic force is
 - a. Contact force
 - b. Non-contact force
 - c. Both a and b
 - d. None
7. Force acts on an object may change
 - a. Direction
 - b. Shape
 - c. Speed
 - d. All of above
8. The net force on an object is zero if the two forces act on it in
 - a. Opposite direction
 - b. Same direction
 - c. Sometimes opposite and sometimes in same direction
 - d. All of above
9. Leaves or fruits fall on the ground due to
 - a. Magnetic force
 - b. Gravitational force
 - c. Electrostatic force
 - d. Muscular force
10. Otto von Guericke was a scientist of
 - a. Italy
 - b. Russia
 - c. Germany
 - d. America

1. c	2. c	3. d	4. b	5. c	6. b	7. d	8. a	9. b	10. c
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II. Fill in the blanks

1. The pull or push is called _____.
2. Force of friction is an example of _____ force.
3. The wear and tear in the machine parts is due to _____.
4. Force acting due to action of muscles is called _____.

5. The force exerted per unit area is called _____.
6. A force applied on an object may change its _____.
7. The pressure exerted by air around us is known as _____.
8. Force has _____ as well as _____.
9. A force arises due to the _____ between two objects.
10. Water in rivers flows _____ due to the force of gravity.

1. Force	2. Contact	3. Friction	4. Muscular force
5. Pressure	6. Speed or shape	7. Atmospheric pressure	8. Magnitude , direction
9. Interaction	10. Downward		

I. Match the following

I. Column A		Column B	
(i)	Force	(a)	Non-contact force
(ii)	Contact	(b)	Force on a unit area
(iii)	Magnitude	(c)	Push or pull
(iv)	Force of gravity	(d)	Muscular force
(v)	Pressure	(e)	Strength of force

(i). (c)	(ii). (d)	(iii) . (e)	(iv) . (a)	(v) . (b)
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II. Column A		Column B	
(i)	Magnet	(a)	Unit area
(ii)	Gravity	(b)	Non-contact force
(iii)	Pressure	(c)	Earth
(iv)	Friction force	(d)	Pull or push
(v)	Force	(e)	Contact force

(i). (b)	(ii). (c)	(iii) . (a)	(iv) . (e)	(v) . (d)
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II. True or False

1. Force of friction is an example of non-contact force.
2. If two forces act in opposite directions on an object, the net force is the difference between the two forces.
3. The force of friction can be reduced by using lubricants.
4. The force exerted per unit area is called magnitude.
5. A force can change the state of motion of an object.
6. Muscular force is a kind of contact force.
7. Force of gravity is contact force.
8. At least two objects must interact for a force to come into play.
9. Pascal is the unit of force.
10. To move an object faster it has to be pushed or pulled repeatedly.

1. False	2. True	3. True	4. False	5. True	6. True	7. False	8. True	9. False	10. True
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Quiz Time

1. What is a force?
2. At least how many objects are needed to apply a force?
3. If two forces acting on an object are in the same direction, what would be the magnitude of force?
4. How is the state of motion of an object is described?
5. In which direction the force of friction acts on a moving object?
6. What will you call the force which is exerted by an object on the other object?
7. What is pressure?
8. Why do porters place a round piece of cloth on their head, when they have to carry heavy loads?
9. If the area of an object is 20 cm x 20 cm, how much is its mass? How much atmospheric pressure would exert on the object?
10. What is the SI unit of pressure?

Answers:

1. A push or pull on an object is called force.
 2. At least two objects.
 3. The magnitude of the forces acting in the same direction will be equal to the sum of the magnitudes of both the forces.
 4. The state of motion of an object is described by its speed and the direction of motion.
 5. The force of friction acts opposite to the direction of motion (movement).
 6. Contact force.
 7. The force acting on a unit area of a surface is called pressure.
 8. The round piece of cloth increases the area of contact of the load with their head this reduces pressure and it facilitates to carry the load.
 9. Mass of the object = 400 kg, Atmospheric pressure = 4000 N.
 10. Pascal (Pa).
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NCERT CORNER

Intext Questions

1. Paheli remembers that a magnet attracts a piece of iron towards it. Is attraction also a pull ? What about repulsion between similar poles of two magnets? Is it a pull or a push?

Attraction or repulsion between poles can be seen as another form of pull or push both

2. Paheli wants to know whether the net force on an object is zero if the two forces acting on it in opposite directions are equal

If two forces act in the opposite directions on an object, the net force acting on it is the difference between the two forces. If the magnitude of the two forces in opposite directions is equal then net force will be zero.

3. Boojho has seen children competing with one another in moving a rubber tyre or a ring by pushing it. He always wondered why the speed of tyre or ring increased whenever it is pushed.

Push on the tyre is a force on tyre and we know that force applied on object can change its speed so, on continuous pushing, the tyre gets higher speed

4. Paheli wants to know whether friction also acts on the objects that move in air

Friction does affect the motion of object moving through air. However, the force of friction due to air is very small when compared to the force of friction between solid surfaces, or between liquids. Therefore, the effect of friction due to air is generally not noticeable.

5. Paheli wants to know if there is any simple way to feel the force of gravity

Stretch your hand and keep your book on it. You will feel the weight of the book which is due to force of gravity.

6. Paheli wants to understand why porters place a round piece of cloth on their heads when they carry heavy loads.

By doing this they increase the area of contact of the load with their head. So, the pressure on their head is reduced and they find it easier to carry the load.

7. If the area of my head were 15 cm x 15 cm is nearly equal to the weight of air would I be carrying on my head?

The weight of air in a column of the height of the atmosphere and area 15 cm x 15 cm is nearly equal to the weight of an object of mass 225 kg. This weight does not affect us because the pressure inside our body is also equal to the atmospheric pressure and cancels the pressure from outside.

8. Boojho wants to know how we take advantage of the knowledge that pressure can be increased or decreased by changing the area on which a force acts.

We make use of the relation between force, area and pressure to our advantages in many situations. To walk over a muddy patch of wet kachcha road without slipping, a wooden plank is used, the foundation is made wider than the width of the wall to be erected on it, the width of tyres used for heavy vehicles like trucks and buses is larger than those used in cars or bicycles. On the other hand, tools used in cars or bicycles. On the other hand, tools meant for cutting and piercing always have a sharp edge. This ensures that the area of their surfaces in contact with the material to be cut or pierced is as small as possible.

9. Boojho is confused; he thinks if the area of his head were even one hundredth of a square meter he should be carrying a weight of 1030 kg on his head. Why does such a large force not crush him?

We are not crushed by the atmospheric pressure because air is present everywhere. The pressure of air inside our body is same as that of the atmosphere. Therefore, we do not experience its effect.

10. What happens to the air in the bicycle tube, when it has a puncture?

Air exerts pressure on the walls of the tube. When it gets puncture, air of the tube comes out rapidly.

Textbook Questions

1. Give two examples each of situations in which you push or pull to change the state of motion of objects.

(i) Goalkeeper dives or jumps up to apply a force on a moving ball due to which he can stop or deflect the ball, saving a goal being scored.

(ii) On putting the palm in front of an inflated balloon by pressing it between palms, we can change the shape of balloon.

2. Give two examples of situations in which applied force causes a change in the shape of an object.

(i) On applying a force on an inflated balloon by pressing it between palms, we can change the shape of balloon.

(ii) When a foam cushion placed on a chair or a bed is pressed with a hand or by standing on it, the shape of foam is also changed.

3. Fill up the gaps to complete the following statements:

(i) To draw water from a well we have to the rope.

(ii) A charged body an uncharged body towards it

(iii) To move a loaded trolley we have toit

(iv) The north pole of a magnetthe north pole of another magnet.

Ans. (i) pull, (ii) attracts, (iii) push, (iv) repels

4. An archer stretches her bow while taking aim at the target. She then releases the arrow, which begins to move towards the target. Based on this information fill up the gaps in the following statements using terms : muscular/contact/non-contact/gravity/friction/shape/attraction:

- (i) To stretch the bow, the archer applies a force that causes a change in its
- (ii) The force applied by the archer to stretch the bow is an example ofForce
- (iii) The type of force responsible for a change in the state of motion of the arrow is an example of aForce

example of aForce

(iv) While the arrow moves towards its target, the forces acting on it are due to and due to.....of air.

- (i) Shape
- (ii) muscular or contact
- (iii) non-contact
- (iv) gravity, friction.

5. In the following situations identify the agent exerting a force and the object on which it acts. State the form in which the affect of force is observable in each case.

- (i) Expelling lemon juice by squeezing it between the fingers.**
- (ii) Taking out paste from a toothpaste tube**
- (iii) A load suspended from a spring while its other end is on hook fixed to wall**
- (iv) An athlete taking a high jump to clear the bar at a height of 5 metres.**

(i) Force is exerted by fingers on the lemon, due to which the shape of lemon changes and its juice comes out.

(ii) Force is exerted by fingers on the lemon, due to which the shape of lemon . changes and its juice comes out.

(iii) Force is exerted by load on the spring due to which spring stretches.

(iv) Force is exerted by body on the earth due to which athlete becomes able to clear the bar,

6. A blacksmith hammers a hot piece of iron while making a tool. How does the force due to hammering affect the piece of iron?

Due to hammering, the shape of piece of iron changes.

7. An inflated balloon was pressed against a wall after it has been rubbed with a piece of synthetic cloth. It was found that the balloon sticks to the wall. Name the force that might be responsible for attraction between the balloon and the wall.

The balloon sticks to the ball due to the electrostatic force because on rubbing the balloon with a piece of synthetic cloth, the balloon becomes charged and charged body attracts another uncharged body.

8. Name the forces acting on a plastic bucket containing water held above ground level in your hand. Discuss why the forces acting on the bucket do not bring a change in its state of motion. In what form can one observe the effect of force on the bucket or on your body?

The forces acting on a plastic bucket are gravitational force and muscular force. These forces not bring a change in its state of motion because being equal and opposite in magnitude. The effect of net force on bucket becomes zero.

9. A rocket has been fired upwards to launch a satellite in its orbit. Name the two forces acting on the rocket immediately after leaving the launching pad.

Two forces are :

- (i) Gravitational force
- (ii) Friction due to air or force of friction.

10. When we press the bulb of a dropper with its nozzle kept in water, air in the dropper is seen to escape in the forms of bubbles. Once we release the pressure on the bulb, water gets filled in the dropper. The rise of water in the dropper is due to :

- (i) Pressure of water
- (ii) Gravity of earth
- (iii) Shape of rubber bulb
- (iv) Atmospheric pressure

Atmospheric pressure

The pressure exerted by air around us is known as atmospheric pressure.

I. Very Short Answer Type Questions.

1. How can we decide whether an object is moving faster than the other?

By their speed.

2. What is the distance moved by an object in unit time called?

Speed.

3. How can we change the speed and the direction of a moving body?

By applying force.

4. What is force?

A push or a pull on an object is called force.

5. What is the requirement for a force to come into play?

Interaction between two objects is required for a force to come into play.

6. What is the resultant force when two forces act in same direction?

Forces applied on an object in the same direction add to one another.

7. What will be the resultant force when two forces act in opposite directions on an object?

When two forces act in opposite directions on an object then the net force will be the difference between two forces.

8. What happens in a tug of war when two teams pull equally hard?

When two teams pull equally hard then the rope does not move in any direction.

9. Name the term used to express the strength of a force.

Magnitude.

10. When does the net force become zero?

When two forces acting on an object in opposite directions are equal then the net force becomes zero.

11. A ball is at rest. Push it gently. Does the ball begin to move?

Yes, the ball begins to move.

12. What happens when we push again while the ball is moving?

When we push a moving ball, then its speed increases.

13. Place your palm in front of a moving ball. Does your palm apply any force on the ball?

Yes, our palm applies a force on the ball.

14. What happens to the speed of the ball when you place your palm in front of the moving ball?

The speed of the ball is decreased.

15. What are two states of motion?

There are two states of motion;

(i) The state of rest

(ii) The state of motion

16. Does the application of a force would always result in the change in the state of motion of an object?

No, it does not always change the state of motion of an object.

17. What is muscular force?

The force resulting due to the action of muscles is known as muscular force.

18. Give two examples of muscular force.

Bending of our body and kicking the ball.

19. Does the force can change the speed of a moving object?

Yes.

20. What effect does a force put on the shape of an object?

The force may cause change in shape of the object.

21. Is muscular force a type of contact force?

Yes, muscular force is a type of contact force.

22. What is force of friction?

The force which acts on all moving objects in opposite direction to the motion of the body is called force of friction.

23. What kind of force is friction?

Force of friction is also a type of contact force.

24. Why is force of friction called contact force?

Since the force of friction arises due to contact between surfaces of moving body and other surfaces, so it is called a contact force.

25. Give two examples of contact forces.

(i) Muscular force

(ii) Force of friction

26. What are non-contact forces?

The forces acting from a distance without making contact are called non-contact forces.

27. Give an example of a non-contact force.

Magnetic force.

28. What is magnetic force?

The force exerted by a magnet on any magnetic object is called magnetic force.

29. What are the interaction of poles of two magnets?

(i) Like poles repel each other

(ii) Unlike poles attract each other

30. What do you mean by electrostatic force?

The force exerted by a charged body on another charged or non-charged body is called electrostatic force.

31. What kind of force is an electrostatic force?

It is non-contact force.

32. What is gravitational force?

The force by which earth or any other object attracts objects towards itself is called the gravitational force.

33. Is the gravity a property of earth only?

No, gravity is not a property of earth only.

34. Is the gravitational force a contact or non-contact force?

The gravitational force is non-contact force.

35. Name the force due to which every object falls on the earth.

Due to gravitational force.

36. What do you mean by pressure?

The force acting on a unit area of a surface is called pressure.

Pressure = Force/Area

37. How can we increase the pressure by exerting same force?

To increase pressure we should exert the same force on a smaller area.

38. Do liquids and gases also exert pressure?

Yes, liquids and gases also exert pressure.

39. What is the site of the pressure exerted by a liquid on the container?

A liquid exerts pressure on the walls of the container.

40. Do gases also exert pressure on the walls of containers?

Yes, gases also exert pressure on the walls of the containers.

41. What is atmosphere?

The envelop of air around us is called atmosphere.

42. What is atmospheric pressure?

The pressure exerted by the air is known as atmospheric pressure.

43. Can you separate two hemispheres, if all the air is suck out from them?

There is no air inside the two hemispheres, so only outer surface is in contact of atmospheric pressure. This is because we cannot separate them.

44. Give an example of pushing.

The pushing of table.

45. What is the example of pulling?

The pulling of chair.

46. In which situation the net force becomes zero?

When two equal forces act in opposite direction, the net force becomes zero.

47. What is the unit of force?

Newton.

II. Very Short Answer Type Questions.

1. A ball of dough is rolled into a flat chapati. Name the force exerted to change the shape of the dough.

The shape of the dough is changed due to muscular force applied by the hand

2. Where do we apply force while walking?

We apply force on ground while walking and ground applies reaction force on our feet due to which we are able to move forward.

3. Two thermocol balls held close to each other but move away from each other, when they are released. Name the force which might be responsible for this phenomenon Explain.

This is electrostatic which is created due to the rubbing and since same charges are induced on two balls, so they move away from each other.

4. During dry weather, clothes made of synthetic fibre often stick to the skin. Which type of force is responsible for this phenomenon?

The electrostatic force starts working between the cloth made of synthetic fibre and cloth sticks to skin.

5. While sieving grains, small pieces fall down. Which force pulls them down?

It is the force of gravity which is responsible for this grains to fall down.

6. A gas filled balloon moves up. Is the upward force acting on it larger or smaller than the force of gravity?

The upward force will be greater than the force of gravity, only then the balloon will be able to go up against this force.

7. A girl is pushing a box towards east direction. In which direction should her friend push the box so that it moves faster in the same direction?

Her friend should push the box towards east direction, so that it will start moving faster towards east because the magnitude of force increases.

8. Fruits detached from a tree fall down due to the force of gravity. We know that a force arises due to interaction between two objects. Name the objects interacting in this case.

The interacting objects in this case are earth and fruit. Earth applied force of gravity on fruit towards its center so fruit falls down.

9. What is force?

Force could be a push or pull on an object?

10. What is the magnitude to the force when it acts in the opposite directions on an object?

If two forces act in the opposite directions on an object, the net force acting on it is the difference between the two forces.

11. What happens when more than one force acting on an object?

The effect on the object is due to the net force acting on it.

12. What is the contact force?

A force that appears due to physical contact of two objects is called contact force.

13. Which force is responsible for wearing and tyres of motor vehicles?

Tyres or motor vehicles wear out due to frictional force between tyres and the road.

14. What is an electrostatic force?

The force exerted by a charged body on another charged or uncharged body is known as electrostatic force.

15. What is pressure?

The force acting on a unit area of a surface is called pressure.

16. What would be the pressure if a force of 25N is applied over area of 100 m²?

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}} = \frac{25}{100} = 0.25 \text{ Nm}^{-2} = 0.25 \text{ Pascals.}$$

17. What is atmosphere?

The envelope of air surrounding the earth is known as atmosphere.

18. A force can act on an object without being in contact with it . What is it called?

It is called non-contact force.

19. What are the interactions of poles of two magnets ?

- (i) Like poles repel each other
- (ii) Unlike poles attract each other ?

20. In which situation does the net force become zero?

When two equal force act in opposite directions , the net force becomes zero.

III. Very Short Answer Type Questions.

1. A ball of dough is rolled into a flat chapatti, Name the force exerted to change the shape of the dough.

Muscular force

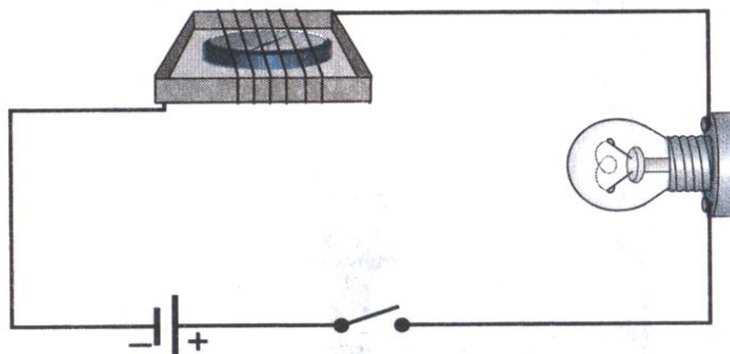
2. Where do we apply a force while walking?

While walking we apply force on the ground.

3. A Girl is pushing a box towards east direction. in which direction should her friend push the box so that it moves faster in the same direction?

Towards east.

4.



In the circuit shown above, when the key is closed, the compass needle placed in the matchbox deflects. Name the force which causes this deflection.

Magnetic force

5. During dry weather, clothes made of synthetic fibre often stick to the skin. Which type of force is responsible for this phenomenon?

Electrostatic force.

6. While sieving grains, small pieces fall down, which force pulls them down?

Force of gravity.

7. Does force of gravity act on dust particles?

Yes.

8. A gas filled balloon moves up. Is the upward force acting on it larger or smaller than the force of gravity.

Upward force is larger than the force of gravity.

9. Does the force of gravitation exist between two astronauts in space?

Yes

10. A chapatti maker is machine which converts balls of dough into chapattis. What effect of force comes into play in this process?

The force changes the shape of the dough.

11. Fruits detached from a tree fall down due to force of gravity. We know that a force arises due to interaction between two objects. Name the objects interacting in this case.

Earth and fruits.

12. A man is pushing a cart down a slope, Suddenly the cart starts moving faster and the wants to slow it down. What should he do?

He should apply a force to pull the cart up the slope.

I. Short Answer Type Questions.

1.



The figure above shows a man with a parachute, Name the force which is responsible for his downward motion. Will he come down with the same speed without the parachute?

Force of gravity. No, without the parachute his speed will be higher.

2. Two persons are applying forces on two opposite sides of a moving cart, the cart still moves with the same speed in the same direction. what do you infer about the magnitudes and direction of the forces applied?

Both the forces are of equal magnitudes and applied in the opposite directions.

3. A force of 200 N is applied to an object of area 4 m². Calculate the pressure.

Force = 200N

Area = 4 m²

$$\begin{aligned} \text{So, Pressure} &= \frac{\text{Force}}{\text{Area}} \\ &= \frac{200}{4} \\ &= 50 \text{ N/m}^2 \end{aligned}$$

4. Two thermocol balls held close to each other move away from each other. When they are released, name the force which might be responsible for this phenomenon explain.

Electrostatic force. The balls have similar charges. They move away due to repulsion between similar charges.

5.



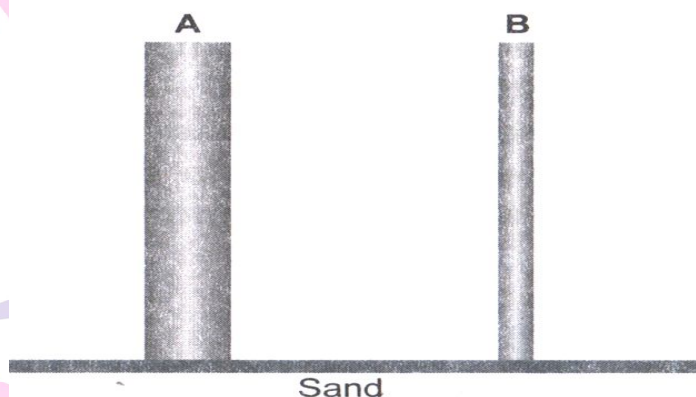
Figure shows a car sticking to an electromagnet. Name the forces acting on the car. Which one of them is larger?

Magnetic force (in the upward direction) and force of gravity or the weight of the car (downward). Magnetic force is larger than the force of gravity.

6. It is difficult to cut cloth using a pair of scissors with blunt blades. Explain.

Blunt blades have larger area compared to the sharp - edged blades. Thus, the applied force produces a lower pressure in case of blunt blades, which makes it difficult to cut the cloth.

7. Two rods of the same weight and equal length have different thickness. They are held vertically on the surface of sand as shown in figure. Which one of them will sink more? Why?

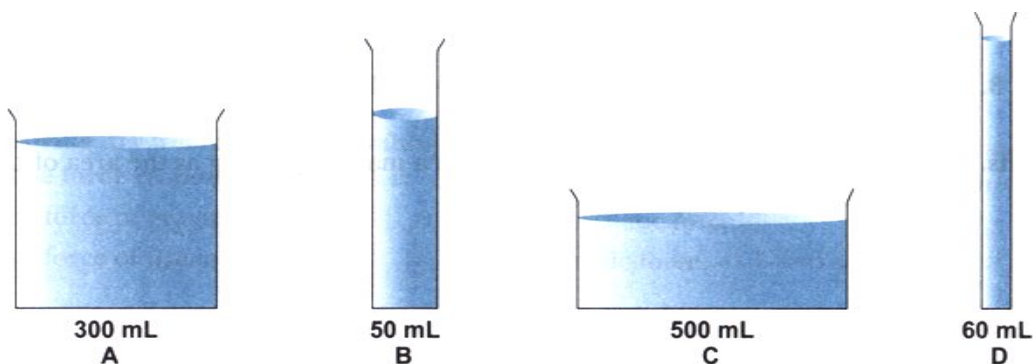


Rod B will go deeper as it has a smaller area of contact, therefore the same force (weight of the rod) produces more pressure. In case of rod A the same force produces less pressure.

8. It is much easier to burst an inflated balloon with a needle than by a finger. Explain.

When we prick the surface of an inflated balloon with a needle it exerts a larger pressure because it has a smaller area of contact compared to the finger. The large pressure pieces the surface of the balloon easily.

9. Observe the vessels A, B, C and D shown in the figure below carefully.



Volume of water taken in each vessel is as shown. Arrange them in the order of decreasing pressure at the base of each vessel. Explain.

D,B,A,C because pressure of a liquid column depends upon the height of the liquid column and not on volume of the liquid.

II. Short Answer Type Questions.

1. What is a force? Explain with the help of some examples.

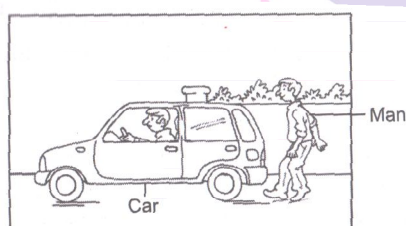
Force is a pull or push of the objects. The action like, pushing, pulling, picking, hitting, lifting, running and bending are the examples of force. Moving or stopping of a body, changing shape and direction of motion of objects are various actions which show force in play.

2. How do we feel force in our daily life?

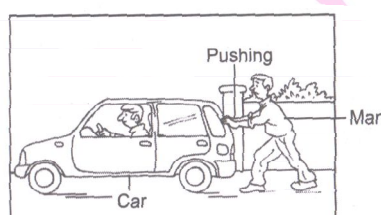
Various big or small actions make us feel the force. We hit or catch many objects in our daily life. We see that a moving ball stops on its own. The ball changes the direction of its motion when it is hit with a bat. We make lassi etc, by churning of curd. These are many actions which help us to feel that a force is exerted.

3. Explain the forces are due to an interaction between objects.

Imagine, a man is standing behind a stationary car. The car does not move due to his presence.



A man standing behind a stationary car



A car being pushed by a man

Now allow the man to push the car, it means he applies a force on the car. The car may begin to move in the direction of the applied force. Note that the man has to push the car to make it move. This example shows that at least two objects must interact with each other for a force to come into play.

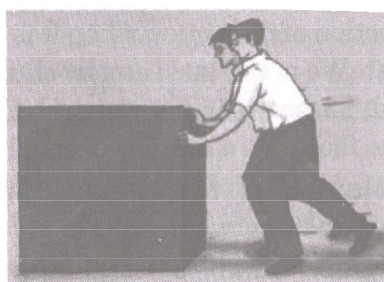
4. What happens when

(i) Two forces are exerted in same direction?

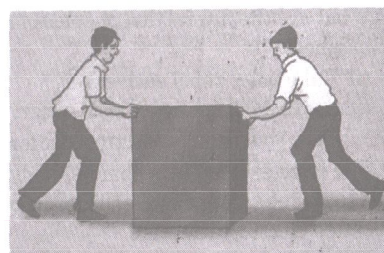
(ii) Two forces are exerted in opposite directions?

(i) When two forces are exerted in same direction on an object, then the forces are added and action becomes easy.

(ii) When two forces act in the opposite directions on an object, the net force acting on it is the difference between the two forces.



(a)



(b)

5. What are the two factors on which effect of force depends?

There are following two factors on which the effect of force depends.

- (i) **Magnitude** : The strength of force is usually expressed by its magnitude.
- (ii) **Direction of force** : We have also to specify the direction of force in which it acts.

If the direction or magnitude of force changes, its effect also changes.

6. What are the effects of force?

A force changes or try to change the

- (i) Speed of moving body
- (ii) Direction of motion of a body
- (iii) Shape of a body

7. What are states of motion?

An object can be in two positions, one is at rest or other in motion; both are its states of motion. Any change in this position (rest or motion) can be called the change in the state of motion. The state of motion of an object is described by its speed and the direction of motion.

8. How can a force change the states of motion.

There are two states of an object: (i) Rest and (ii) Motion

When a force is applied on a body then it can move. In the same way a force can change the direction of a moving object as well as its speed. A force can stop a moving object.

If the force is applied in the direction of motion at an object, then its speed is increased. If the force acts in opposite direction, then the speed of the object is decreased.

9. What is the effect of force on the shape of an object?

A force can change or try to change the shape of an object. When a force is applied on an object then change in shape takes place. It may be smaller or greater. At last we can say that the application of force on an object may change its shape.

10. Explain contact and non-contact forces.

Contact Forces : The forces which come into play only when two objects come in contact with each other are called contact forces. Muscular force and force of friction are the examples of contact forces.

Non-contact forces : The forces which come into play without any contact of objects with one another are called non-contact forces. Electrostatic and magnetic forces are the examples of non-contact forces.

11. What is muscular force? Why is it called contact force?

The force resulting due to the action of muscles is known as the muscular force. Muscular force is called contact force because it comes in action only when two bodies come in contact with each other.

12. What do you understand by the force of friction?

The force which always acts on all the moving objects and whose direction is always opposite to the direction of motion is called force of friction. Since the force of friction arises due to contact between surfaces, it is also called contact force.

13. What is electrostatic force? Why is it called non-contact force?

The force exerted by a charged body on another charged or uncharged body is called electrostatic force. This force comes into play even when the bodies are not in contact, so it is called non-contact force.

14. Explain force of gravity.

Objects or the things that fall towards the earth because the earth pulls them. This force is called force of gravity or the force due to gravitation. This is also called just gravity. It is an attractive force. This force acts on all objects.

15. What is pressure? What happens to the pressure when area on which it is applied increases?

The force acting on a unit area of a surface is called pressure.
Pressure = Force/Area on which it acts. The pressure is inversely proportional to the area on which force is applied. As the area on which force is applied is increased, the pressure decreases. We can say that pressure increases with decrease in area.

16. We observe that the wheels of buses and trucks are heavier than the wheels of cars or scooters. Why?

The buses and trucks are heavy and require to exert less pressure. We know that pressure decreases as area of contact increases, so the tyres are broadened so that they exert less pressure on earth and move easily. If they exert more pressure, they will sink in earth. The scooters and cars have less wide wheels because they need more pressure for gripping.

17. What is atmospheric pressure?

The envelope of air around the earth is known as atmosphere. The atmospheric air extends up to many kilometres above the surface of the earth. The pressure exerted by the air is called atmospheric pressure.

18. If the area of your head is 15 cm x 15 cm, how much force air will exert on your head?

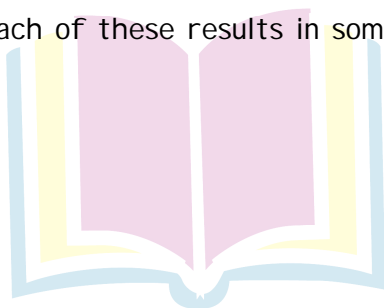
The force due to air in a column of the height of the atmosphere and area 15 cm x 15 cm is nearly equal to the force of gravity on an object of mass 225 kg (2250 N). We have air inside our body, so we are not crushed under this force of gravity and the pressure inside our bodies is also equal to the atmospheric pressure and balances the pressure from outside.

19. What do you mean by gravitational force?

Gravity is not a property of the earth alone. In fact every objection in the universe, whether small or large, exerts a force on every other object. This force is called the gravitational force.

20. Write some tasks in which change of motion takes place.

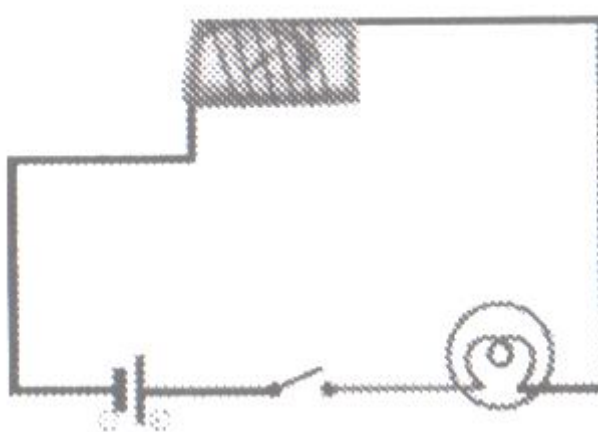
Picking, opening, shutting, kicking, hitting, lifting, flicking, pushing and pulling are often used to describe certain tasks. Each of these results in some kind of change in motion takes place.



Next Generation School

III. Short Answer Type Questions-I

1. In the circuit shown in Fig., when the key is closed the compass needle placed in the match box deflects. Name the force which causes this deflection.



On closing the switch, the current starts flowing in the wire and due to this current, a magnetic field gets established around the wire which exerts magnetic force on the needle and it gets deflected.

2. A chapatti maker is a machine which converts balls of dough into chapattis. What effect of force comes into play in this process?

The force on unit area is called pressure. This is the pressure which works on the dough balls and makes them chapattis with the help of machines.

3. Does the force of gravitation exist between two astronauts in space?

Yes, there will be gravitational force between the astronauts because every object in universe, whether smaller or larger, exerts a force on every other object ; it is the universal law of gravitation.

4. What is the state or motion? How can we change the state of an object?

The state of motion of an object is described by its speed and the direction of motion. An object may be at rest or in motion, both are its states of motion. It can be changed by action of force on that object.

5. Fig. Shows a man with a parachute. Name the force which is responsible for his downward motion. Will he come down with the same speed without the parachute?



The name of force responsible for the downward motion of the parachute is force of gravity. No because the air friction will become less.

6. Enlist the types of contact forces

Contact forces can be of two types.

- i) Muscular force
- ii) Force of friction

7. A ball rolling along the ground gradually slows down and finally comes to rest. Why does this happen? What is the effect of this force?

The force responsible for changing the state of motion of ball is the force of friction. The ball will come to rest position. This force causes wear and tear of the objects in motion.

8. Enlist the types of non-contact forces

Non-contact forces:

- i) Gravitational force
- ii) Magnetic force
- iii) Electrostatic Force

9. Define frictional force

The force responsible for wearing out tyres of motor vehicle is force of friction.

10. Why is cutting vegetables with a blunt knife not easier?

Blunt knife has larger area than of sharp knife. So less pressure will be on vegetable which makes it tough to cut.

11. Why is it easy to fix the pointed nail into a wooden plank?

Because the area of pointed end of the nail is much smaller than that of its head. The same force therefore produces a pressure sufficient to push the pointed end of the nail into the wooden plank.

12. How can you prove that the pressure is exerted by liquids?

Take a glass tube open at both ends. The length of tube should be about 15 cm. Take a thin sheet of a good rubber, stretch the rubber and fix tightly over one end of the pipe. Hold the tube in vertical position. Pour water in it. The rubber sheet bulges out. This bulging is due to the pressure exerted by water. Hence it is proved that pressure is exerted by liquids.

13. Give two examples of situation in which applied force causes a change in shape of an object.

- i) We press a balloon to change its shape.

ii) We make chapatti from a ball of dough.

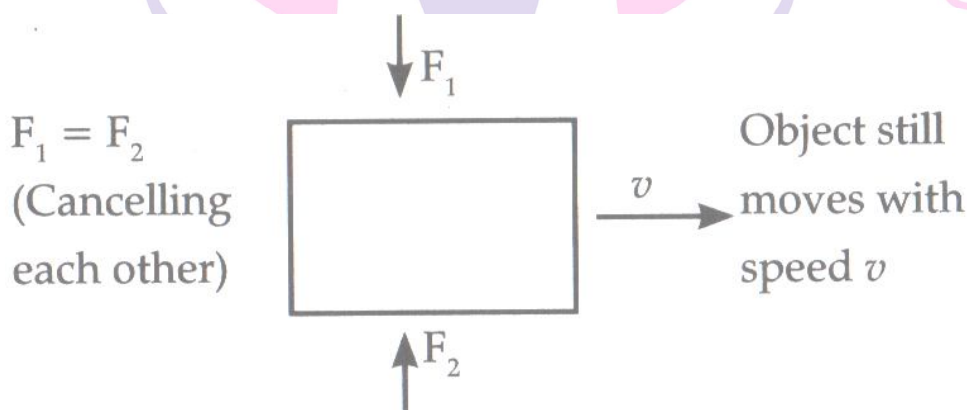
14. Give two examples of each situation in which you push or pull to change the state of motion of an object.

i) We push the door to open it

ii) We pull the drawer to open it

15. Two persons are applying forces on two opposite sides of a moving cart. The cart still moves with the same speed in the same direction. What do you infer about the magnitudes and direction of the forces applied.

The magnitudes of forces is equal and they act in opposite direction so they are cancelling each other. The following diagram shows this.



III. Short Answer Type Questions-II

1. A man is pushing a cart down a slope. Suddenly the cart starts moving faster and he wants to slow it down. What should he do? (NCERT Exemplar)

A man can do followings things.

i) He can start pulling the cart instead of pushing it in order to balance the downward force due to gravity.

ii) He can go the opposite side by moving himself very fast in the direction of motion and try to slow down the speed of cart by giving an opposite force to the moving cart.

2. Fig. Shows a car sticking to an electromagnet. Name the forces acting on the car. Which one of them is larger? (NCERT Exemplar)

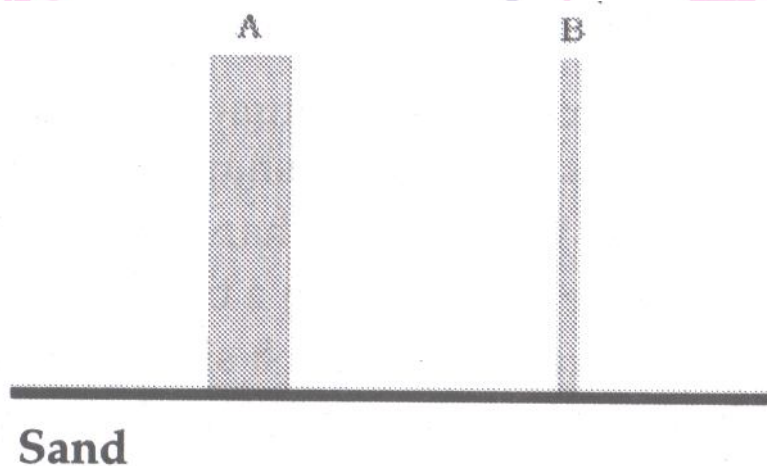


The forces working on the object (car) are:

- i) Force of gravity (downwards)
- ii) Magnetic force (upwards)

since the car is moving upwards, so magnetic force due to electromagnet is greater.

- 3. Two rods of the same weight and equal length have different thickness. They are held vertically on the surface of sand as shown in Fig. Which one of them will sink more? Why? (NCERT Exemplar)**



We know that pressure exerted by the body is inversely proportional to the area where force is applied. So, the thinner rod i.e., rod B will sink more because it has less area of cross-section in contact with the surface, hence it will exert more pressure on the sand as compared to the rod A

- 4. Describe each effect of the force given below with one example**

- i) Make an object move from rest.**
- ii) May change the speed of an object**
- iii) May bring about a change in the shape of an object.**

Effect of the force in given situations.

i) While taking a penalty kick in football the player applies a force on the ball. Before being hit, the ball was at rest and so its speed was zero. It indicates that an object can move from rest with effect of force.

ii) A car is moving on the road at a slow speed. Applying force on the accelerator will increase the speed of the car.

iii) Take lump of dough in a plate. Make chapattis from that dough by rolling roller and putting pressure on it. It changes the shape by force.

5. What is atmospheric pressure ? How can we get an idea about the magnitude of atmospheric pressure?

The envelope of air surrounding the earth is known as the atmosphere. The pressure exerted by this air is known as atmospheric pressure. The magnitude of atmospheric pressure can be felt by following experiment. Take a good quality rubber sucker. Press it hard on a smooth plane surface. When we press the sucker, most of the air between its cup and surface escapes out. The sucker sticks to the surface because the pressure of atmosphere acts on it. To pull the sucker off the surface, the applied force should be large. This activity might give us an idea about the magnitude of atmospheric pressure.

6. What are the effects of force?

A force changes or try to change the :

- i) Speed of a moving body
- ii) Direction of motion of a body
- iii) Shape of a body

7. We observe that the wheels of buses and trucks are heavier than the wheels of cars or scooters. Why?

The buses and trucks are heavy and require to exert less pressure. We know that pressure decreases as area of contact increases, so the tyres are broadened so that they exert less pressure on earth and move easily. If they exert more pressure, they will sink earth. The scooters and a cars have less wide wheels because they need more pressure for gripping.

8. What do you understand by the force of friction?

The force which always acts on all the moving objects and whose direction is always opposite to the direction of motion is called force of friction. Since the force of friction arises due to contact between surfaces, it is also called contact force.

I. Long Answer Type Questions.

1. It is much easier to burst an inflated balloon with a needle than by a finger. Explain.

(NCERT Exemplar)

Because needle tip has very less area of cross section in comparison to that of our finger and we know that pressure exerted by a force is inversely proportional to the area when it has been applied, so pressure exerted will be more by the needle tip than the finger.

2. Two women are of the same weight. One wears sandals with pointed heels while the other wears sandals with flat soles. Which one would feel more comfortable while walking on a sandy beach? Give reasons for your answers. (NCERT Exemplar)

While walking on a sandy surface, one needs the footwear of longer area so that the pressure exerted on the ground is minimum. So, in this case, the woman having the sandals with pointed heels will be less comfortable while sandals with flat soles feel more comfortable while walking on sandy beach.

3. It is difficult to cut cloth using a pair of scissors with blunt blades. Explain

It is difficult to cut cloth using a pair of scissors with blunt blades because blunt blades have more area due to which applied force produces very less pressure. As we know that pressure is inversely proportional to area of cross-section, so it is difficult to cut cloth from blunt blade. ($P = F/A$)

4. Observe the vessels A, B, C AND D shown in fig. Carefully volume of water taken in each vessel is as shown. Arrange them in the order of decreasing pressure at the base of each vessel Explain.

Ans : Pressure at depth due to liquid column depends upon :

- i) gravitational acceleration (g)
- ii) density of liquid
- iii) height of liquid

And in this case, g and density are same. So, only thing that can change pressure is height. So the order of pressure exerted the fluid. A, B, C, and D at base is given by $P_D > P_B > P_A > P_C$

5. Experimentally explains that pressure is exerted by liquids and gases on the walls of the containers.

Pressure exerted by liquids and gases on the wall of container can be explained by the following experiments.

Take a plastic bottle. Fix a cylindrical glass tube (a few cms long) near its bottom. Make sure that the water does not leak from the joint. Cover the mouth of glass tube with a thin rubber sheet. Fill the bottle up to half with water. The bulging of the rubber sheet in this case indicates that water exerts pressure on the sides of container or we can say that liquid exerts pressure on the walls of container.

In the case of gas, when we inflate a balloon the balloon will be filled with air and air exerts pressure and its shape has changed. So we find pressure and its shape has changed. So we find that gases, too, exert pressure on the walls of their container.

6. What are contact and non-contact forces? Explain briefly with suitable examples

Forces can be of two types

i) **Contact Forces**

ii) **Non - contact forces**

i) **Contact forces** : The forces that come into play when two objects come in contact with each other.

a) **Muscular force** : The force which is exerted due to action of muscles is known as the muscular force. E.g. running, bending, walking etc.,

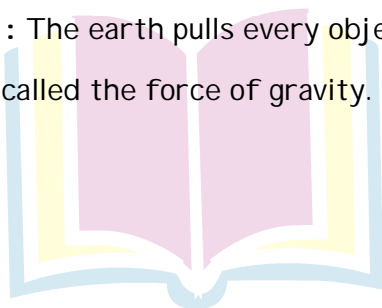
b) **Frictional Force** : The force responsible for changing the state of motion of an object. Equal and opposite forces are being exerted on an object when its surface comes in contact with other surface e.g. a car or scooter comes to rest.

ii) **Non- contact forces** : The forces that can be exerted from a distance without establishing a contact are called the non-contact forces.

a) **Magnetic forces** : Force exerted by a magnet on another magnet or magnetic substances like iron is called magnetic force e.g. Car sticking to an electromagnet

b) **Electrostatic force** : Force exerted by a charged body on another charged body or uncharged body is called electrostatic force. E.g. If we rub a comb with hair and bring it near some small bits of paper it attracts the bits of paper towards itself. This is electrostatic force.

c) **Force of gravity** : The earth pulls every object towards its centre. The force exerted by the earth is called the force of gravity.



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II. Long Answer Type Questions.

1. Read table no.11.1 , page 128 of NCERT Textbook and try to identify the action as push or pull.

Table 11.1 Identifying actions as Push or Pull

S.No	Description of the situation	Action : (Pushing / pulling / picking / hitting / lifting / lowering / flying / kicking / throwing / shutting / flicking)				Action can be grouped as a	
		Pushing	Pulling	Lifting	Lowering	Push	Pull
1	Moving a book placed on a table	Pushing	Pulling	Lifting	1	Yes	Yes
2	Opening or shutting a door	Pulling	Pushing	Lifting	Lowering	Yes	Yes
3	Drawing a bucket of water from a well	Pulling	Lifting	Lowering	-	-	Yes
4	A football player taking a penalty kick	Kicking	Flying	-	-	Yes	-
5	A cricket ball hit by a batsman	Hitting	Flying	-	-	Yes	-
6	Moving a loaded cart	Pulling	-	-	-	-	Yes
7	Opening a drawer	Pulling	-	-	-	-	Yes

2. Read Table no.11.2, Page 133 of NCERT Textbook and complete it.

Table 11.2 Studying the Effect of Force on Objects

Description of situation	How to apply force	Action of force			
		Change in state of motion		Change in shape	
		Yes	No	Yes	No
A lump of dough on a plate	Pressing it down with your hands	-	No	Yes	-

Spring fixed to the seat of bicycle	By sitting on the seat	-	No	Yes	-
A rubber band suspended from a hook-nail fixed on a wall	By hanging a weight or by pulling its free end	Yes	-	Yes	-
A plastic or metal scale placed between two bricks	By putting a weight at the centre of the scale	-	No	Yes	-

3. What are the various effects of force on different objects?

The various effects of force are;

- (i) A force can make an object move from rest.
- (ii) It can change the speed of a moving object.
- (iii) It can bring about a change in the shape of an object.
- (iv) It can change the direction of motion of an object.
- (v) It can cause some or all of these effects.

4. What are contact forces? State different types of contact forces.

The forces which come into play only when two objects come in contact with each other are called contact forces. Some contact forces are;

(i) Muscular force : The forces resulting due to the action of muscles are known as muscular forces. Muscular force is a contact force because it comes into play when two objects come in contact with each other.

(ii) Force of friction: When a body is moving, then a force equal and opposite to the direction of motion is exerted on that moving body. This force is called force of friction. It is also a contact force because it is exerted when two surfaces come in contact with each other.

5. What are non-contact forces? Explain different types of non-contact forces.

The forces which can be exerted from a distance, without establishing a contact are called non-contact forces. Some non-contact forces are;

(i) Magnetic force : The force exerted by a magnet on another magnet or some other magnetic substance like iron is called magnetic force. Like poles of a magnet repel each other and unlike poles of a magnet attract each other without contact. So it is called non-contact force.

(ii) **Electrostatic force** : The force exerted by a charged body on other charged or uncharged body is called electrostatic force. Electrostatic force also acts without making a direct contact with other charged or uncharged body. So it is also a non-contact force.

6. What is force? Name different types of forces.

A push or pull on an object is called force. There are following types of forces.

- (i) Muscular force
- (ii) Force of friction
- (iii) Magnetic force
- (iv) Force of gravity
- (v) Electrostatic force

7. Prove that the force of friction depends on the nature of the two surfaces in contact.

Collect the following things:

A thick book, nylon cloth, gunny cloth, plastic sheet, jute cloth and sand paper. Place the book on each of the materials and slide it on the floor one by one. If your book slides off the plastic sheet or nylon cloth, use adhesive tape to stick it firmly on the surface of the book.

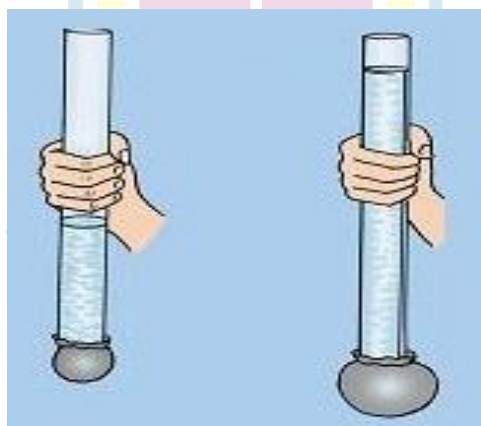
You will observe that the different materials offer different amounts of resistances to sliding.

This activity shows that force of friction depends on the nature of the surface in contact. In general, smooth surface offers lesser friction than rough surface.

8. Prove that the pressure exerted by water at the bottom of the container depends on the height of its column.

Take a transparent glass tube or plastic pipe. Also take piece of thin sheet of a good quality rubber. Stretch the rubber sheet tightly over one end of pipe. Hold the pipe at the middle, keeping it in a vertical position. Pour some water in the pipe. Note the height of the water column in the pipe. Pour some more water. Observe, the bulge in rubber sheet and height of water column in the pile.

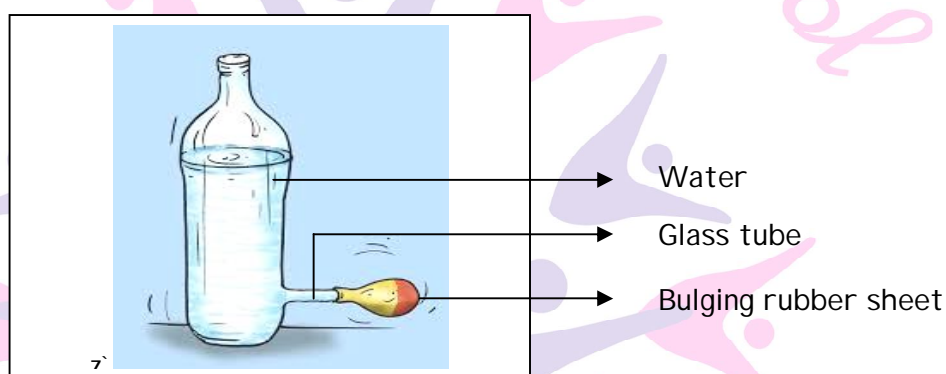
Repeat this process a few more times. You observe that as the height of water column increases the bulge in the rubber sheet also increases.



9. Show that a liquid exerts pressure on the walls of the container.

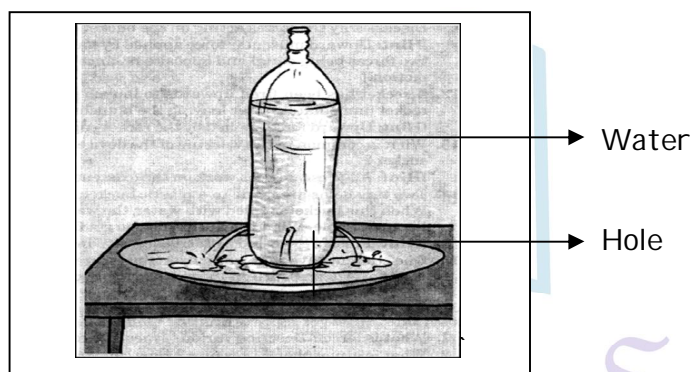
Take a plastic bottle. Fix a cylindrical glass tube a few cm long near its bottom. You can do so by slightly heating one end of the glass tube and then quickly inserting it near the bottom of the bottle.

Make sure that water does not leak from the joint. If there is any leakage seal it with molten wax. Cover the mouth of the glass tube with a thin rubber sheet. Now fill the bottle up to half with water. We observe the bulge in the rubber sheet. Pour some more water in the bottle. We see more bulge in rubber sheet. This activity indicates that water exerts pressure on the walls of the container.



10. Explain that liquids exert equal pressure at the same depth.

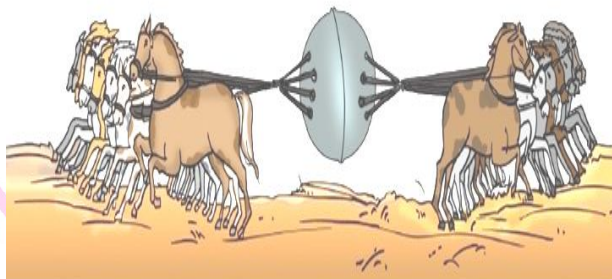
Take an empty plastic bottle. Drill four holes all around near the bottom of the bottle. Make sure that all the holes are at the same height from the bottom. Now fill the bottle with water. We observe that different streams of water coming out of the holes fall at the same distance from the bottle. This observation indicates that liquids exert equal pressure at the same depth.



11. What experiment was performed to prove that air has pressure?

Otto von Guerick, a German Scientist invented a pump in 17th century to extract air out of a vessel. He demonstrated the force of the air pressure. He joined two hollow metallic

hemispheres of 51 cm diameter each and pumped air out of them. Then he employed eight horses on each hemisphere to pull them apart. So great is the force of air pressure that the hemisphere could not be pulled apart.



III. Long Answer Type Questions.

- 1. An archer shoots an arrow in the air horizontally. However, after moving some distance, the arrow falls to the ground. Name the initial force that sets the arrow in motion. Explain why the arrow ultimately falls down.**

The archer stretches the string of the bow by applying muscular force. In the process, the shape of the bow changes. When the string is released, it regains its original position that provides the initial force to set the arrow in motion. The force of gravity that acts on the arrow in the downward direction brings it to the ground.

- 2. Two women are of the same weight. One wears sandals with pointed heels while the other wears sandals with flat soles. Which one would feel more comfortable while walking on a sandy beach? Give reasons for your answer.**

The woman wearing sandals with flat soles will feel more comfortable while walking on the sandy beach. The flat soles have larger area compared to the sandals with pointed heels. Since the two women are of the same weight, they will apply same force on the ground. Therefore, the pressure are of the same weight, they will apply same force on the ground. Therefore. The pressure exerted by the pointed heels will be more compared to that with sandals having flat soles, as a result the pointed heel sandals having flat soles. As a result the pointed heel sandals will sink more in the sand than the flat sole sandals. Hence. Walking with flat sole sandals will be more comfortable.

I. High Order Thinking Skills (HOTS) Questions.

1. An astronaut travels from the earth to the moon. How do its weight and mass change?

Mass of an object remains constant at all the places, so mass of astronaut will not change. Weight of an object depends upon the gravity and at the moon gravity is lesser than earth, so weight of astronaut will decrease.

2. We can increase the pressure by exerting same force. Explain how?

In order to increase pressure, we should exert same force on a smaller area.

3. Why is easy to cut the fruit with sharp knife as compared to blunt knife?

The surface area of sharp knife is lesser than that of blunt knife, so pressure applied by sharp knife is higher than blunt knife.

4. Double tyres are provided at the rear wheels of trucks explain why?

In order to carry the heavy loads the rear wheels in the heavy vehicles such as bus, trucks etc., are provided with double tyres. It is due to the fact that most of the weight of these vehicles is on their rear axle. So the double tyre increases area of cross section (for tyre) and hence, decreases pressure on the road.

5. Wooden on concrete sleepers are kept below the railway line Explain why?

Since the area on which weight of train acts, increases which results in the decrease in the pressure on the ground due to which the train moves easily on the rail line without any risk of accident. So wooden or concrete sleeper are kept below the railway line.

6. An inflated gas balloon is placed in a jar, which is connected to an evacuating pumps.

What happened if the air inside the jar is pumped out? Explain

The balloon contains gas at a pressure which is more than the atmosphere pressure, i.e., outside pressure of balloon. When the air in the jar is removed there is no opposition to the pressure exerted. So when the air inside the jar is pumped out, the balloon will expand rapidly and burst.

7. In walking the pressure on the ground is more as compared to that while standing on the ground Explain this statement

If a person is walking on the ground, then at one time his one foot is on the ground. Therefore, the force of entire weight of man falls on smaller area of the ground which results into large pressure on the ground. While in another case if the man is standing on the ground,

then the force of weight of man, fall on larger area of ground and results in less pressure on the ground.

II. High Order Thinking Skills (HOTS) Questions.

1. Why do you need to breathe faster at the top of a tall mountain?

Because at higher altitudes, the molecules of oxygen decrease, therefore we need to breathe faster to bring the few oxygen molecules into the lungs to make up for the difficult.

2. Why does the high atmospheric pressure at sea level not squash us?

The atmospheric pressure acting on our body from outside is balanced by the blood pressure acting from inside. That is why we do not get squashed at sea level.

3. When is the pressure on the ground more-when a man is lying or when a man is standing? Explain.

The pressure on the ground is more when a man is standing as the area of contact is smaller therefore pressure is larger.

Value Based Questions

1. Mridul and Aryan were good friends . They both went to gym for exercises. The coach of gym told them to complete 10 dips each. Mridul started doing it by stretch in the palms on the floor while Aryan opted to do the same job on pair of rods at some height from floor.

(i) Mridul got less pain while Aryan got more pain on his palms why?

(ii) Mention the idea used by Mridul here

(i) Aryan applied more pressure on his palms by bearing the maximum load of his body on small area of palms while Mridul applied pressure on his palms by bearing the same load on larger area of palms.

(ii) Mridul had the presence of mind and he thought of an excellent idea about pressure on the body part.

2. Raman was very curious to know how the porters carried heavy load on their head easily. Suddenly he asked his teacher and teacher told him that by reducing the pressure on the head, the porters carried heavy load.

(i) Explain how the porters carry heavy loads easily

(ii) Mention your views about Raman

i) The porters usually cover their head by thick round clothes before carrying the load.

This increases the area of contact, thereby reducing pressure on the head so, the porters carry heavy load easily.

ii) According to me, Raman is very curious to know about science.

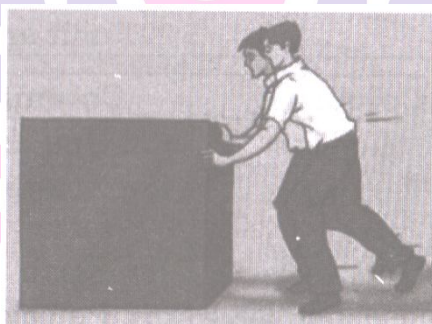
Skill Based Questions

1. Observe the following figure and answer the questions.

(i) What are these two men doing?

(ii) What is the direction of forces applied by these two men?

(iii) What is the net force in this case?



(i) These two men are applying force on a box.

(ii) The force are applied in the same direction.

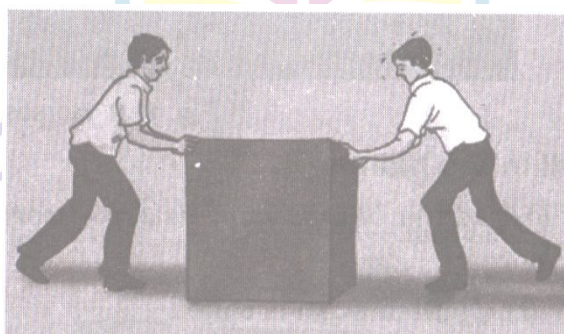
(iii) The net force in this case is the sum of two forces.

2. Observe the following figure and answer the questions.

(i) What are these two men in figure doing?

(ii) What is the direction of forces applied by these two men?

(iii) What is the net force in this case?



- (i) These two men are applying force on the box.
- (ii) The direction of applied forces is opposite.
- (iii) The net force in this case is the difference of two forces.

3. Observe the following figure and answer the questions.

- (i) What are the bullocks doing?**
- (ii) What types of force are applied by bullocks?**
- (iii) In such type of force a contact or non-contact force?**



- (i) The two bullocks are drawing a cart having load.
- (ii) The bullocks applied the muscular force.
- (iii) Such types of forces are contact forces.

4. Observe the following figure and answer these questions.

- (i) Identify the figure.**
- (ii) What is that man doing?**
- (iii) Why such man places a round piece of cloth on his head?**



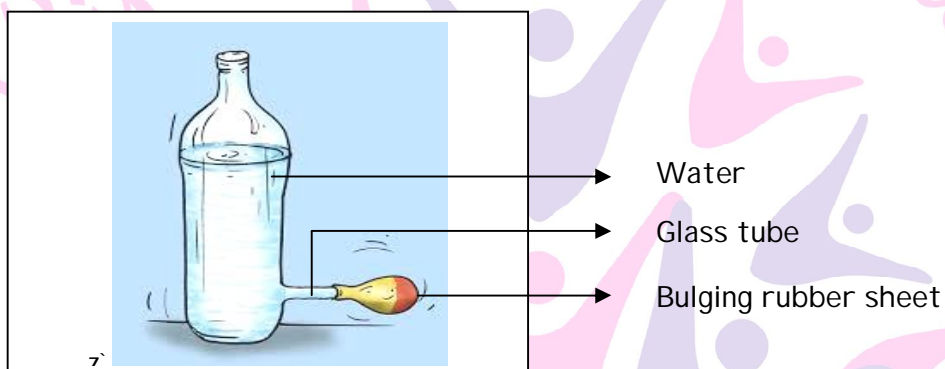
- (i) The figure is showing a porter.
- (ii) That man (porter) carries heavy loads.

(iii) The porter places a round piece of cloth on his head to increase the area of contact of the load with his head. So the pressure on his head is reduced.

5. (i) Draw a diagram to show that liquids exert force (pressure) on the walls of the container.

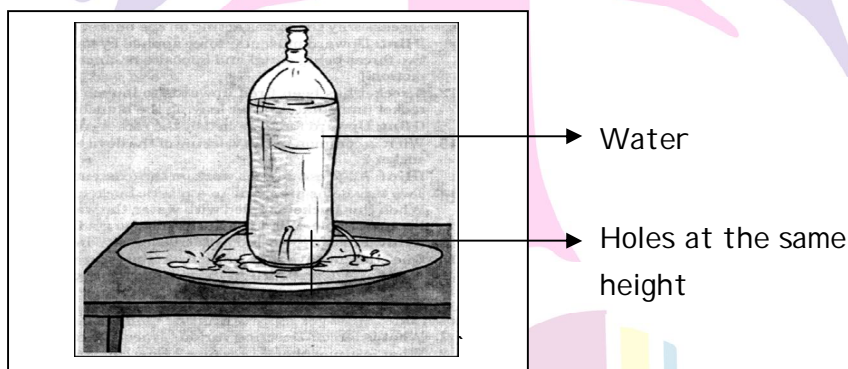
(ii) What happens to the force if some more water is added in the bottle.

(i)

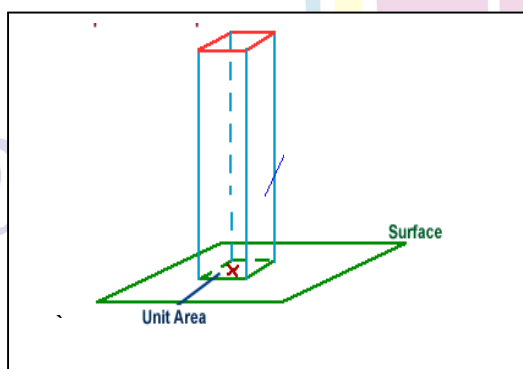


(ii) If we add some more water in the bottle then there is more bulge in the rubber sheet.

6. Draw a diagram to show that liquids exert equal pressure at the same depth.



7. Draw a diagram to show atmospheric pressure.



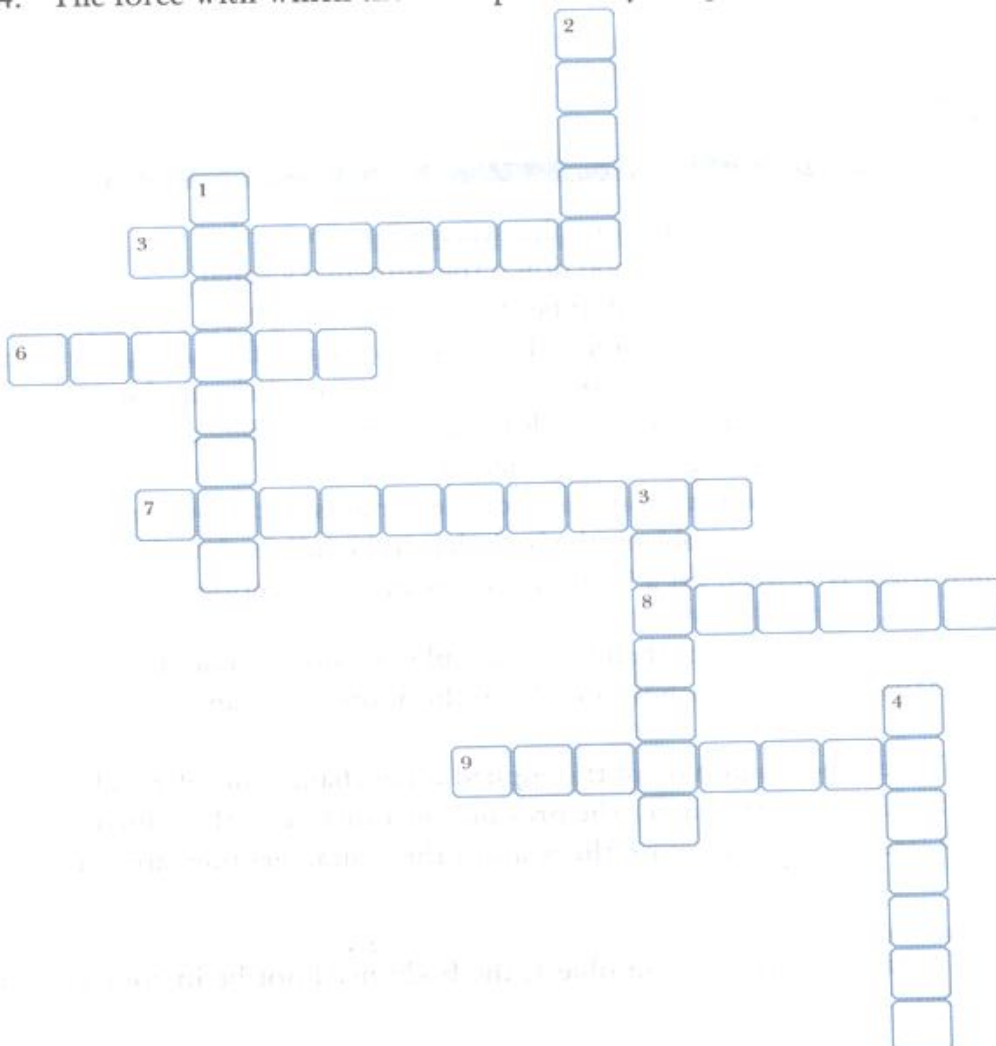
Cross word Puzzle

Across

3. Force exerted per unit area.
6. The unit of pressure.
7. A force that acts on an object without being in contact with it.
8. The unit of force
9. Force used to lift a bag.

Down

1. The force that prevents things from moving it.
2. A push or a pull.
3. A force that acts only when it is in contact with an object.
4. The force with which the earth pulls everything towards itself.



Across

3. Pressure 6. Pascal 7. Non-contact 8. Newton 9. Muscular

Down

1. Friction 2. Force 3. Contact 4. Gravity

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