



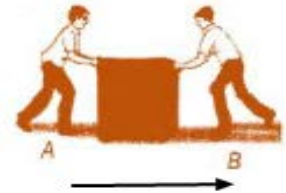
## INDIAN SCHOOL AL WADI AL KABIR

<b>Class: VIII</b>	<b>Department: SCIENCE 2020 -2021</b>	<b>Date of completion : 28.05.2020</b>
<b>Worksheet No.: 3 WITH ANSWERS</b>	<b>Topic: FORCE AND PRESSURE</b>	<b>Note: A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT:</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### I. OBJECTIVE TYPE QUESTIONS:

1. In figure, two boys A and B are shown applying force on a block. If the block moves towards the right, which one of the following statements is correct?

- i) **Magnitude of force applied by A is greater than that of B.**
- ii) Magnitude of force applied, by A is smaller than that of B
- iii) Net force on the block is towards A
- iv) Magnitude of force applied by A is equal to that of B



2. During dry weather, while combing hair, sometimes we experience hair flying apart. The force responsible for this is
- i) force of gravity
  - ii) **electrostatic force**
  - iii) Force of friction
  - iv) magnetic force
3. Which one of the following forces is a contact force?
- i) Force of gravity
  - ii) **Force of friction**
  - iii) Magnetic force
  - iv) Electrostatic force
4. Two objects repel each other. This repulsion could be due to the
- i) Frictional force only
  - ii) electrostatic force only
  - iii) Magnetic force only
  - iv) **either a magnetic or an electrostatic force**
5. The force acting on a unit area is \_\_\_\_\_.
- i) force
  - ii) **pressure**
  - iii) density
  - iv) none of these
6. When two forces act in opposite directions, then net force will be \_\_\_\_\_.
- i) sum of two forces
  - ii) **difference between two forces**
  - iii) both of these
  - iv) none of these

7. Force acting on an object may change\_\_\_\_\_.

- i) direction                      ii) shape                      iii) speed                      iv) all of the above

For question numbers 8 to 10, two statements are given- one labelled Assertion (A) and the other labelled Reason (R).

Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

**i) Both A and R are true and R is correct explanation of the assertion.**

**ii) Both A and R are true but R is not the correct explanation of the assertion.**

**iii) A is true but R is false.**

**iv) A is false but R is true**

8. **Assertion (A):** Water begins to flow towards the ground as soon as we open a tap.

**Reason (R):** It is because of force of gravity, which makes things/objects fall towards the earth as it pulls them.

i) Both A and R are true and R is correct explanation of the assertion.

9. **Assertion (A):** The relationship between force, pressure and area is given by  $P=F/A$ .

**Reason (R):** The SI unit of pressure is  $N/m^2$  or Pascal (Pa).

ii) Both A and R are true but R is not the correct explanation of the assertion.

10. **Assertion (A):** Fountains of water comes out of the leaking joints or holes in pipes.

**Reason(R):** It is because liquids (water) exerts pressure on the walls of the pipes.

i) Both A and R are true and R is correct explanation of the assertion.

## II. BASIC CONCEPTS LEVEL:

1. What is force? [A push or pull that tends to affect an object in some way like change in speed, shape or direction of motion is called force.]

2. Two forces 200N and 300N acting on a body in same direction. What is resultant force? [When two or more forces act in the same direction, the net force or the resultant force is the sum of the two forces i.e.,  $200\text{ N} + 300\text{ N} = 500\text{ N}$ ]



3. What will be the net force on an object if two forces acting on it in opposite directions are equal? Why? [If two forces acting in opposite directions are equal, then they cancel each other's effect, hence net force will be zero.]

4. Give two examples of situations in which force can bring about a change in the state of body. [When we push a bicycle to move it, when we pull the table it leads to change in position of table.]
5. In tug of war, Side A applies 15N force and side B applies 88N force. Which side will the rope move? What will be the net force acting on the rope? [If two forces are acting in opposite directions, then the net force will be the difference between the two forces. Therefore net force is  $88-15=73\text{N}$ . The rope will move towards B]
6. Define pressure. [The force acting on a unit area of a surface is called **pressure**.  
Pressure = force / area]
7. What is atmospheric pressure? [The pressure exerted by air around us is known as **atmospheric pressure**.]
8. Identify the type of force in the below situations.
  - i) A coin or a pen falls to the ground when it slips out of your hand. [Force of gravity]
  - ii) A boat comes to rest if we stop rowing it. [Frictional force]
  - iii) When a person lifts a bucket of water. [Muscular force]



### III. INTERMEDIATE LEVEL:

1. In a tug of war, three boys of team A pull the rope with forces of 100 N, 120 N and 170N. In team B, the three members pull the rope with forces of 130 N, 150 N and 155 N. Who will win the tug of war? What is the resultant force?  
 Force applied by team A =  $F_A = 100 + 120 + 170 = 390\text{ N}$   
 Force applied by team B =  $F_B = 130 + 150 + 155 = 435\text{ N}$   
 As  $F_B > F_A$ , the resultant force is in the direction of  $F_B$ . So, team B will win the tug of war. Resultant force =  $F_B - F_A$   
 $= 435 - 390$   
 $= 45\text{ N}$
2. Write one point of difference between contact and non-contact forces with an example. [Contact force- The force between two objects that are in physical contact. E.g. lifting a bucket of water. Non-contact force-The force applied to a body by another body that is not in direct contact with it. E.g. A plastic comb gets charged when it is run through dry hair. This charged comb attracts small bits of paper.]
3. How would you distinguish between balanced and unbalanced force.

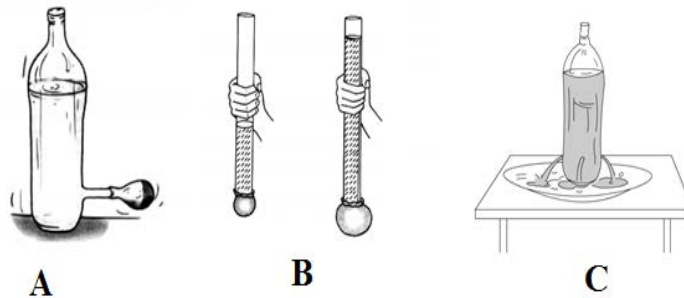
BALANCED FORCE	UNBALANCED FORCE
Equal forces acting on one object in opposite directions is called balanced forces.	Unequal forces acting on one object in opposite directions is called unbalanced forces.
State of motion of the object remains unchanged.	There is a change in the state of motion of the object.
Net force is zero	Net force is not zero

4. Why do you think that a ball rolling down the ground come to rest? [It is the force of friction between the surface of the ball and the ground that brings the rolling ball to rest.]
5. Why do porters place a round piece of cloth above his head before he places his luggage? [This helps in increasing the area of contact between the luggage and his head. The increased area of contact reduces the pressure, enabling him to carry heavy loads.]
6. Describe the state of motion of an object. [The state of motion of an object is described by its speed and the direction of motion. The state of rest is considered to be the state of zero speed. An object may be at rest or in motion; both are its states of motion.]
7. Distinguish between force of gravity and gravitational force. [Force of gravity is the earths gravitational pull on a body. It is always attractive in nature. Gravitational force is the force of attraction acting between any two bodies of the universe.]



8. Give reason for the following-
  - a) If you walk on the snow, your feet will sink. But if you put on skies, you can move over the snow easily. [Skies increases the area of contact with the snow, thereby reducing the pressure on it. The reduced pressure enables the skies to slide over the snow without sinking much.]
  - b) Iron rails of railway track are fixed over wide wooden or concrete sleepers. [Iron rails are fixed over wide wooden or concrete sleepers to reduce pressure received from the train by increasing the area of contact, because if surface area increases pressure decreases and vice versa.]
  - c) It is easier to sew with a pointed needle than a blunt needle. [It is easier to sew with a pointed needle because the pointed end reduces the area of contact thereby increasing pressure and enabling us to stitch easily.]
  - d) Foundations of high rise buildings are kept wide. [It is because wide foundations increases the area of contact. The increased area reduces the pressure.]
  - e) A heavy truck is fitted with six to eight wheels. [A heavy truck is fitted with six to eight wheels because increased area reduces the pressure on wheels so they do not burst or damage on the road. That is why truck has broad tyres so that there is less pressure on the ground and the tyres do not sink.]

- f) It is easy to peel vegetables with a sharp knife. [It is easy to peel vegetables with sharp knife instead of using blunt knife because less area of contact more is the pressure exerted.]
9. Why is it difficult to pull out a toy having a rubber sucker, which is stuck to the wall? [ It is difficult , because of difference in internal and external air pressure. There is less air pressure inside than outside, so outside air pressure pushes the surface of rubber sucker towards the wall, making it difficult to pull.]
10. What do the following activities prove?  
 [A-Liquid exerts pressure on the walls of the container. B- Pressure exerted by the water at the bottom of the container depends upon the height of the water column.  
 C- Liquid exerts equal pressure at the same depth.]



#### **IV. ADVANCED LEVEL:**

1. Explain the various types of contact and non-contact forces.

[Muscular force is the force that is caused by action of muscles inside the body. It is also a contact force. E.g. Athletes use muscular force for running.

Frictional force is the force that opposes the motion of one body over the surface of another body. It is contact force. E.g. A bicycle eventually comes to rest when you stop pedaling it.

Magnetic force is the force exerted by magnets on iron objects. It can be either attractive or repulsive in nature. E.g. A magnet attracting magnetic materials.

Electrostatic force is the force of attraction or repulsion exerted between charged particles. E.g. A straw rubbed with paper attracts another straw but repels it if it has also been rubbed with a sheet of paper.

Gravitational force is the force exerted by earth's gravity on all objects. It is always attractive in nature. Falling of apple from tree or falling of any object when we through anything up.]

2. What are the effects of application of force on an object? [A force may make an object move from rest, may change the speed of an object if it is moving, may change the direction of motion of an object, may bring about a change in the shape of an object, may cause some or all of these effects.]
3. Why do some people suffer from nose bleeding at high altitudes? [The atmospheric pressure is at a maximum on the surface of the earth. When we go to a higher altitude (say a high mountain), then the atmospheric pressure decreases. So, at high altitudes, the atmospheric pressure becomes much less than the pressure exerted by our fluids inside our body. Since our internal pressure by fluids is greater than the external air pressure some of the thin blood vessels in our nose burst and bleeding can occur.]
4. Calculate the pressure produced by a force of 800 N acting on an area of 2 m<sup>2</sup>.  
[ $P = F/A$ ,  $800/2 = 400\text{N/m}^2$ ]
5. Over what area should a force of 100 N act to produce a pressure of 500Pascal?  
[ $A = F/P = 100/500 = 1/5 = 0.2\text{m}^2$ ]
6. The pressure of a gas contained in a cylinder with movable piston is 300 Pa. The area of piston is 50 m<sup>2</sup>. Calculate the force exerted on the piston. [ $F = P \times A = 300 \times 50 = 15000\text{N}$ ]

#### **V.EXEMPLAR 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 shoots an arrow by applying muscular force; string is released, regains original position; force of gravity that acts on the arrow in the downward direction]
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. [Footwear of larger area so pressure exerted on the ground is minimum. the woman having the sandals with pointed heels will be less comfortable in walking while the other woman wears sandals with flat soles feels more comfortable while walking on sandy beach.]

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