



3055 BA SANGAM COLLEGE

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WORKSHEET 26

School: Ba Sangam College

Name: _____

Subject: Basic Science

Year/Level: 9

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|--------------------------|---|
| Strand 3 | ENERGY |
| Sub Strand 3.3 | Forces |
| Content Learning Outcome | Investigate the effect of force on an object at different places and describe the different ways force affects the shape and motion of objects. |

Lesson Notes

Forces

- Is a push or pull exerted by one object on another
- A force can make something start to move or can stop it from moving
- It can make it more faster or slower or change its direction
- Arrows can be used to show in which direction a force is acting.

Type of forces

1. Frictional force

- Friction is the force acting on an object when it moves against the surface of another object
- The force of friction always works in the opposite direction to a pull
- It tries to stop things from sliding
- Rough surface produce more friction than smooth surface
- If you pull to the right friction will act to the left
- When you pull with a force stronger than friction the object will move

Negative effects of friction

- An excess of friction produces heat, which in turn causes expansion, the locking of moving parts and a consequent breakdown of the machinery.
- Increases wear and tear on the machine parts.
- Increase in noise output.

Ways of reducing effects of friction

1. Lubricate surface in contact with oil or grease e.g. door hinge
2. Streamline the bodies of objects which move through liquids or air e.g. hull of a speed boat
3. Smoothing surface e.g. polishing a bowling ball
4. Place ball bearing between sliding surface e.g. in a swing

5. Pulling wheels or rollers between surfaces or use air cushion between surface e.g. in a hover craft

Uses of friction

- Holding a pen
- Used in writing
- Eating
- Walking

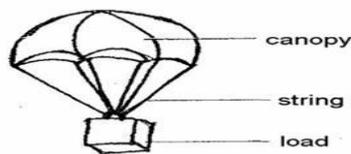
Friction In Nature

- Before man was on earth ,friction was causing changes in nature
- Rough pieces of rock that fall down a mountainside into a river are worn smooth into pebbles and finally sand
- When man wants to remove rust from steel sheets used in ships, he blow a steam of air and sand at high speed over the surface
- Friction of the sand flying over the surface removes the rust and dirt leaving the surface shinning and clan ready for painting. This process is called **SAND BLASTING**

Friction In Air And Water

Activity 1 Friction in Air

- a) Two sheets of paper were taken. one was crumbled into a tight ball, and the other was kept flat .both the pieces of paper was dropped from the same height
- b) a parachute was made from a square piece of light cloth ,4 pieces of string of equal length and a heavy object (e.g. stone) were joined together at the end as shown in the diagram



The parachute was dropped from a certain height and observations were made.

Observation

- A) the crumbled piece of paper hits the ground first
- B) the parachute fell slowly

Conclusion

The flat pieces and parachute fell slowly because the friction was acting on large surface area

Activity 2

Friction in liquids

- 1) two measuring cylinder was taken
- 2) one was filled with 10 ml of water and the other with 10 ml of oil.
- 3) the small ball bearing was dropped into each liquid the same time.
- 4) the time it took the ball bearings to reach the bottom of the measuring cylinder was measured
- 5) this was repeated 3 times and the average was found

Result

The ball bearing reached first in cylinder of water then in oil. This shows that more the viscosity of liquid more the friction it has. Oil is more viscose (thick) then water.

Activity 3

Shaped For Speed

- streaming objects reduces friction
- the less the surface area ,the lesser the friction and the faster the object will move

Example:

-shark –has streamline body

-speed boat-has a pointed nose/streamlined shape

-fast flying bird-streamlined body

Friction and space

- there is no friction in space.
- one of the harmful effects of friction is heat .
- when space travelers return to earth ,they come in a small “re-entry.”
- as the capsule moves towards earth, the gravity makes it accelerate.
- When the capsule enter the atmosphere at a very high speed ,friction between the air particles and the capsule makes it get very hot.
- To protect the people and the instrument inside the capsule is made from a special heat proof material.
- In space there are millions of pieces of rocks travelling in orbit called **meteors**.
- When **meteors** enter the earth’s atmosphere at a great speed, it becomes so hot due to air resistance ,it starts to burn and are seen as a **shooting star**.
- **Meteorites** are very large meteors that do not burn but may land on the earth
- Friction in air is useful as it slows down parachutes.
- Aero planes and birds use air resistance as brake to slow them down.

Exercise

1. What are the 2 ways in which friction is a nuisance? (2 marks)

2. What are the 2 ways in which friction can be reduced ? (2 marks)

3. Name 2 different lubricants (2 marks)

4. How do bearings help reduce friction? (2 marks)

5. Why is it important to oil machine regularly ? (2 marks)

TOTAL: ____/10