

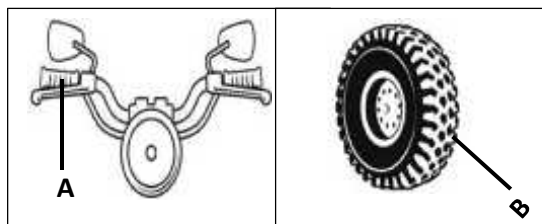
SIMPLE MACHINES AND FRICTION

FRICTION

1. Define the term friction.
2. Give three types of friction
3. Which type of friction opposes motion between moving surfaces?
4. Which type of friction occurs between bodies at rest?
5. Which type of friction makes swimming in water difficult?
6. Which type of friction exists in liquids and gases?
7. Give two forms of energy produced during friction

Friction as a useful force

1. Identify any seven ways how friction is a useful force
2. Give any seven ways of increasing friction
3. Which type of force enables a match-stick to light when it is struck at the side of its box?
4. How useful was friction force to early man in keeping himself warm?
5. Below are diagrams showing the parts of machines. Use them to answer the questions that follow.



- a. Why are part marked with letter A made with grips?
 - b. Of what importance are treads on the part of the machine marked with letter B?
6. How do road builders increase friction on slippery roads?
 7. Give one way in which friction is useful to a person riding a bicycle?
 8. How useful s friction to a teacher writing on a chalkboard?
 9. In which one way is friction useful to a cook?
 10. Outline any four situations at home where friction is applied.
 11. State the importance of friction to a p.7 pupil sitting for exams?

Friction as a nuisance force

1. State any six ways how friction is a nuisance force.
2. What force makes a pencil to reduce in length as one writes?
3. Name one form of energy produced by friction
4. Stat any five ways of reducing friction
5. State any two examples of streamlined objects
6. Why do flying birds have streamlined bodies?
7. Whenever Alex opens his doo, the hinges make noise. What can he do to stop the noise when he is opening the door?
8. State two examples of lubricants

9. Why should parts of machines be regularly lubricated?
10. How can friction be reduced in the hinges of doors?

MACHINES

1. What is a machine?
2. Give 4 ways how machines simplify man's work?
3. Give 3 quantities used in machines
4. What do you understand by:
 - a) Load
 - b) Effort
 - c) Mechanical Advantage
5. State the main reason why mechanical Advantage has no specific units of measurements.
6. Calculate the mechanical advantage of these machines with:
 - a) Load of 60 kg and Effort of 60 kg
 - b) Load of 15 kg and Effort of 3 kg
 - c) Effort 25 kg and Load 100 kg

TYPES OF MACHINES

1. Give two types of machines.
2. Define complex machines.
3. Give any three examples of complex machines.
4. Define the term simple machines.
5. Why is a tractor not considered as a simple machine?
6. What do you understand by the following terms used in machines
 - i) Force
 - ii) Distance

- iii) Work
 - iv) Power
 - v) Mass
 - vi) Weight
7. State the basic units for measuring the following
- i) Force
 - ii) Distance
 - iii) Work
 - iv) Power
 - v) Mass
 - vi) Weight
8. Calculations on work
- a) A boy pushed a log using a force of 200N through a distance of 8 metres. Calculate the work done by the boy
 - b) A man pushed a stone using a force of 40 kg through a distance of 20 metres. Calculate the work done by the man
- Types of simple machine
- 1. List 6 groups/classes of simple machines.
 - 2. What is a Lever?
 - 3. Mention the 3 main parts of a lever.
 - 4. What do we call the force to be overcome by the machine?
 - 5. What do we call the turning point of a lever?
 - 6. What do we call the force applied to the machine to overcome the load?
 - 7. Give the 3 classes of lever
 - 8. Why are levers grouped into classes?

- 9. Describe the arrangement of fulcrum, Load and Effort in the first class lever.
 - 10. Draw an illustration to show the position of load effort and fulcrum in the first class lever
 - 11. What do we call the distance between the load and fulcrum?
 - 12. What do we call the distance between the effort and fulcrum.
 - 13. Give 9 examples of first class levers.
 - 12. Draw diagrams for the above named machines and indicate the position of Load, Effort and Pivot.
 - 13. Why a pair of scissors is called a double lever?
 - 14. Apart from a pair of scissors, draw and name any other two double levers
 - 15. Give the advantage of using first class levers
 - 16. How do first class levers simplify work?
 - 17. State the main use of these machines in the first class levers
 - a) beam balance
 - b) A pair of scissors
 - 18. How can you be able to use less effort to move a load using a first class lever?
 - 19. Give a reason why a see-saw is grouped under first class levers?
- Second Class levers
20. What are second class levers?

- 21. Draw an illustration and indicate the position of load, pivot and fulcrum in second class levers
- 22. Give examples of second class levers
- 23. Draw diagrams of second class levers and indicate position of load, pivot and effort.
- 24. How does a second class lever simplify work?
- 25. State the advantage of using second class levers
- 26. Why is a wheelbarrow not grouped under first class lever?

Third class levers

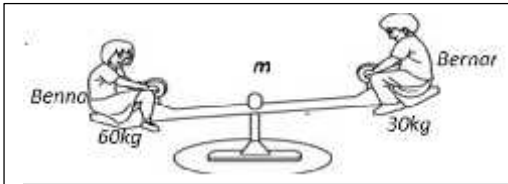
- 1. Name the class of lever where the effort lies between the load and fulcrum.
- 2. Give examples of third class levers
- 3. Draw some of the above third class levers and indicate the position of load pivot and effort.
- 4. State the advantage of using a third class lever.
- 5. Why is a fishing rod grouped under third class levers?
- 6. What determines the class of levers in machines?

Principle of moments

- 1. What is a moment of a force?
- 2. What is meant by a moment of a force about a point?
- 3. State the condition necessary for the lever to balance

Calculations on moment.

4. The diagram below shows two children playing on a see-saw. Study it carefully and answer the questions that follow.



a. In which class of levers is the machine above classified?

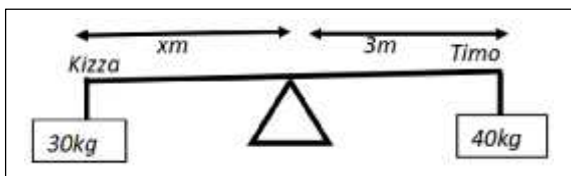
b. Name the point marked M

5. A man weighs 90kg and sits 4m from the pivot of a see-saw. Where will his wife who weighs 60kg sit in order for them to balance?

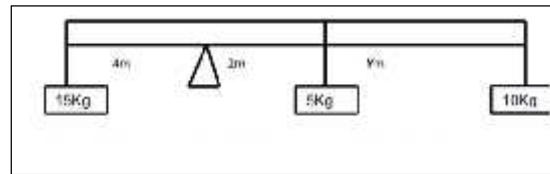
6. Maria is heavier than Ritah. They want to play on a see-saw. Of the two children, who will sit closer to the fulcrum to balance the see-saw?

7. Tendo who weighs 50kg sits 4m away from the pivot of a see-saw. How far will Musa who weighs 100kg sit in order to balance the see-saw?

8. Find the value of y in order for the two boys to balance on the see-saw below?



8. Calculate the value of Y needed to balance the see-saw.



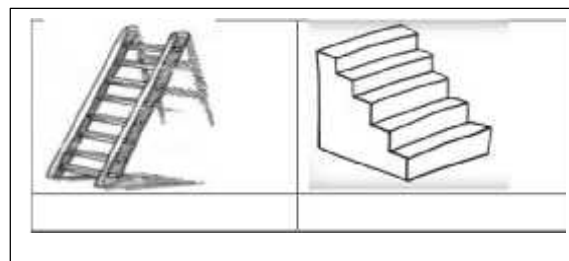
INCLINED PLANES/SLOPES

1. What term is used to mean a slanting surface connecting a lower level to a higher level?

2. Mention any four examples of inclined planes

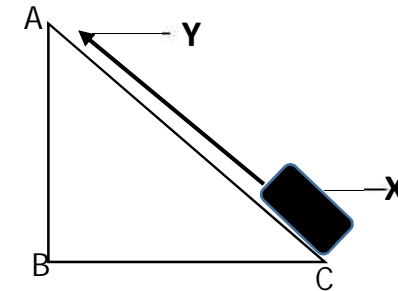
3. How do inclined planes simplify man's work?

4. Name the inclined planes shown below



5. Suggest any three uses of inclined planes in everyday life

6. In which way is the inclined plane important to a builder?



a) Name parts marked X and Y

b) What can be done to the machine above in order to use less force to lift a given load X to point A?

WEDGES

1. What is a wedge?

2. Draw the symbol to represent a wedge

3. Why is a wedge called a double inclined plane?

4. Mention six examples of wedges and draw a diagram for each

5. State five uses of wedges.

6. State any one importance of the following tools to a farmer

a) Panga

b) Knife

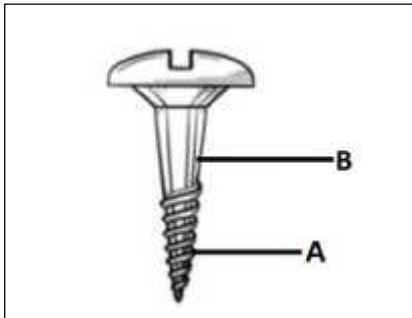
c) Axe

7. Mention one example of a wedge used for sharpening pencils at school
8. State any two applications of wedges in our homes
9. State the reason why a nail is considered as a wedge?

SCREWS

1. What is a screw?
2. Name the three main parts of a screw.
3. Draw a screw and label these parts: Rod, Pitch and Thread
4. What do we call the distance between two successive threads?

Below is a diagram of a screw. Use it to answer questions that follow.



5. Name the part of the screw marked with letter A and B
- b) How are threads important to a screw?

c) Mention any four examples of machines that use screws

6. Mention any two uses of screws in our daily life
7. Why are bottle tops made of screws?
8. Identify any two instances where screws are put into use in our daily life
9. Give one advantage of using screws

WHEELS AND AXLE

1. What do we call machines composed of two rotating wheels fixed together?
2. What do we call a circular rim rotating on an axle?
3. What do we call a rod that passes through a wheel to make rotate easily?
4. Give six examples of wheels and axle machines.
6. State any four applications of wheels and axle in daily life?

PULLEYS

1. Name the simple machine which has a freely rotating wheel with a grooved rim?
2. Name the part of a pulley that prevents its rope from sliding?

3. What do we call a frame on which a pulley is fixed?

4. Give three types of pulleys.

5. Name the type of pulley where the block is attached to a frame and only the wheel moves?

6. Draw an illustration of a single fixed pulley

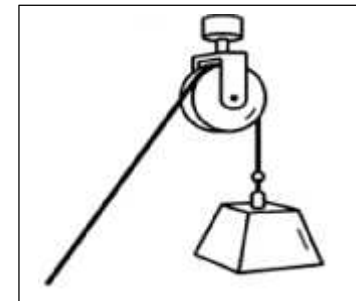
7. State any two characteristics of single fixed pulley

8. What is the mechanical advantage of a single fixed pulley?

10. Why is the mechanical advantage of a single fixed pulley is one?

11. Why is a single fixed pulley grouped under first class lever

12. The diagram below is of a pulley. Study it and answer questions



a) What type of pulley is shown in the diagram?

- b) Use arrow to show the direction of force in the pulley shown above
- c) State any three applications of the type of pulley shown above.
- d) Calculate the effort needed to raise a load of 70kg using the above pulley

13. How does a single fixed pulley change the direction of force?

14. How do schools make use of single fixed pulleys?

SINGLE MOVABLE PULLEY

- 1. Name the type of pulley made of a wheel moving from one position to another while rotating?
- 2. Draw an illustration of a single movable pulley
- 3. Why is a single movable pulley grouped under second class levers?
- 4. State three characteristics of single movable pulleys
- 5. What is the mechanical advantage of single movable pulley?
- 6. Why is the mechanical advantage of a single movable pulley is 2?
- 7. James used a single movable pulley to lift a load of 40kgf. Calculate the effort he used.

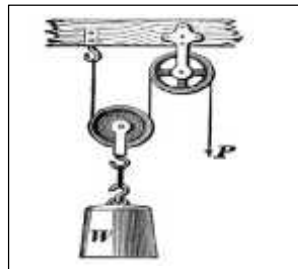
8. State any one advantage of using a single movable pulley.

9. If the mechanical advantage of a machine is 2 and the load being carried by the machine is 50kg. Find the effort needed to raise the load.

10. Give three differences between fixed and movable pulley.

BLOCK AND TACKLE PULLEY

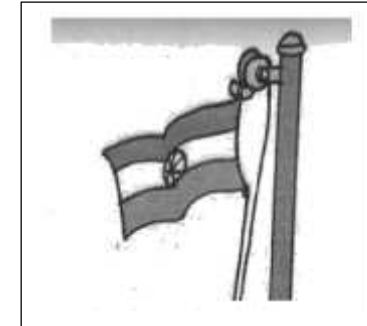
- 1. Which type of pulley is a combination of a single fixed pulley and single movable pulley?
- 2. The diagram below is a pulley. Use to answer questions that follow



- a) Name the type of pulley marked with letter W and P
- b) Use an arrow to show the direction of force
- 3. Suggest any three advantages of using block and tackle pulley

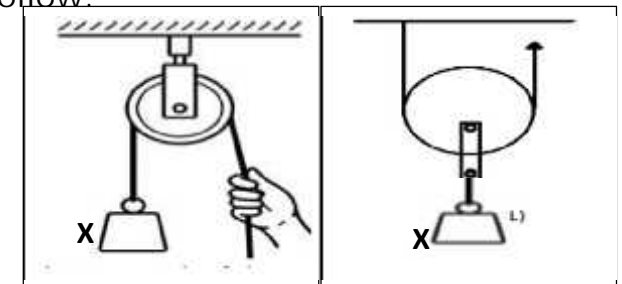
USES OF PULEYS

- 1. Give seven uses of pulleys in daily life
- 2. The diagram below is a hosting flag. Use it answer the questions that follow



- a) Name the type of pulley that helps to raise up and lower down the flag
- b) How is the pulley important in the raising and lowering of the flag?
- c) Apart from schools, mention two other places where flag poles are used
- d) Identify one way pulleys are used on a construction site

3. The diagram below shows two types of simple machines labelled A and B. Use it answer questions that follow.



- a) Name each of the machines shown in the diagram
- b) Which of the two machines would you choose to use to lift the load X to a height of two metres?
- c) Give a reason for your choice of machine in (a) above