TEACHING TASK (Page 60 – 61)

Multiple Choice Questions

1) Which of the following actions involves the use of force?

Answer: C) Writing on a paper Explanation: Writing on a paper involves applying force to move the pen across the paper, creating friction and pressure to produce marks. Thinking, reading, and watching a movie do not involve physical force.

2) Which of the following is NOT an effect of applying force on an object?

Answer: B) Create a new object Explanation: Force can move, change the direction, or change the shape of an object, but it cannot create a new object. Creation requires processes beyond just applying force.

3) Which of the following statements is true about gravitational force?

Answer: C) It depends on the mass of the objects and the distance between them. Explanation: Gravitational force is proportional to the masses of the objects and inversely proportional to the square of the distance between them (Newton's law of gravitation). It is an attractive force, not repulsive, and it exists between all objects, not just large bodies. It weakens with greater distance.

4) What happens to the gravitational force as the distance between two objects increases?

Answer: C) It decreases. Explanation: According to Newton's law of gravitation, gravitational force decreases with the square of the distance between two objects ($F = G * (m1 * m2) / r^2$).

5) Why is gravitational force between small objects usually not noticeable?

Answer: B) Because their masses are too small. Explanation: Gravitational force depends on mass. Small objects have negligible masses compared to celestial bodies, making their gravitational attraction too weak to notice.

6) Which of the following is a result of the Earth's gravitational force?

Answer: C) The moon revolves around the Earth. Explanation: The Earth's gravitational force keeps the Moon in orbit. The Sun does not orbit the Earth, we don't float away due to gravity, and planets don't move away from the Sun because of its gravitational pull.

Advanced Level

More than One Answer Type

7) Which of the following are effects of applying force on an object?

Answer: A) Move a stationary object, C) Stop a moving object, D) Change the shape of an object Explanation: Force can initiate motion, stop motion, or deform an object. Changing the color of an object is not a physical effect of force but may involve chemical or other processes.

8) Which of the following are effects of Earth's gravitational force?

Answer: A) It holds us on the surface of the Earth and stops us floating away into space, B) It keeps the moon revolving around the Earth, D) It makes the rivers flow downstream. Explanation: Earth's gravity keeps objects on its surface, maintains the Moon's orbit, and causes water to flow downward in rivers. Rain does not fall upwards, as that defies gravity.

Fill In the Blanks

9) The main two types of forces acting on a body in nature are the _____ force and _____ force.

Answer: Gravitational force, Frictional force Explanation: These are commonly referenced as fundamental forces acting on objects in everyday scenarios, such as objects falling or moving against surfaces.

10) Gravitational force depends on the mass of the objects and the _____ between their centers.

Answer: Distance Explanation: Gravitational force depends on the masses of the objects and the distance between their centers, as per Newton's law of gravitation.

Matching Type

11) Answer:

1. Writing on a paper → B. Changing the shape of an object

2. Opening a door → A. Moving a stationary object

3. Pedalling a bicycle → D. Increasing or decreasing speed of a moving object

4. Pushing an iron nail into wood → C. Changing the direction of an object

Answer the Following Questions

12) Why do we use force in our daily activities?

Answer: We use force in daily activities to move objects, change their direction, stop them, or alter their shape. Examples include pushing a door to open it, lifting a bag, kicking a ball, or squeezing a sponge. Force is essential for performing physical tasks and interacting with our environment.

13) What factors does gravitational force depend on? List four effects of Earth's gravitational force.

Answer:

Factors: Gravitational force depends on, The mass of the objects (directly proportional). The distance between the centers of the objects (inversely proportional to the square of the distance).

Effects of Earth's gravitational force: Keeps objects, like humans and buildings, on the Earth’s surface. Causes objects, like rain or a ball, to fall toward the ground. Keeps the Moon in orbit around the Earth. Causes rivers and streams to flow downhill.

LEARNER'S TASK (Page 61 – 62)

Multiple Choice Questions

1) What are the two main types of forces mentioned that act on a body in nature?

Answer: B) Gravitational force and frictional force Explanation: These are the two primary forces mentioned in the context of natural interactions, affecting motion and position of objects.

2) Which of the following is NOT true about force?

Answer: B) Force can be seen directly. Explanation: Force is an invisible interaction that causes effects like motion or deformation. We observe its effects, not the force itself.

3) Why does a ball thrown upwards come back down to Earth?

Answer: C) Gravitational force Explanation: Earth's gravitational force pulls the ball back down after it is thrown upward.

4) What is the force called that attracts all bodies towards the Earth?

Answer: D) Gravitational force Explanation: Gravitational force is the attractive force that pulls objects toward the Earth's center.

5) How does the gravitational force of the Sun affect the Earth and other planets?

Answer: A) It makes them revolve around the Sun. Explanation: The Sun's gravitational force keeps planets in elliptical orbits around it.

6) Which of the following natural phenomena is NOT a result of Earth's gravitational force?

Answer: D) Wind blowing across the surface Explanation: Wind is caused by differences in atmospheric pressure, not gravity. Rain, rivers, and the Moon's orbit are all influenced by gravity.

Advanced Level

More than One Answer Type

7) Which of the following actions involve the use of force?

Answer: A) Writing on a paper, B) Opening a door, D) Pushing an iron nail into the wood Explanation: These actions involve applying physical force to move or deform objects. Thinking is a mental process and does not involve physical force.

8) Which of the following statements about gravitational force are true?

Answer: A) Gravitational force depends on the mass of the objects, D) Gravitational force is a pulling force. Explanation: Gravitational force depends on mass and is always attractive (pulling). It does not increase with distance (it decreases), and it is not easily observed with small objects due to their small masses.

Fill In the Blanks

9) We cannot see a force but we can see its _____.

Answer: Effects Explanation: Force itself is invisible, but its effects, such as motion or deformation, are observable.

10) The force of attraction that Earth exerts on all bodies towards itself is called _____.

Answer: Gravitational force Explanation: This is the force responsible for pulling objects toward the Earth's center.

Matching Type:

11) Answer:

Gravitational force depends on → C. The mass of the objects and the distance between their centres

Gravitational force between → B. Is too small to be noticed in small objects

Gravitational force of the Sun → D. Pulls the Earth and other planets to orbit around it

Gravitational force of the Earth → A. Keeps the moon revolving around the Earth

Answer the Following Questions

12) Can we see force directly? Explain.

Answer: No, we cannot see force directly. Force is an invisible interaction between objects that causes observable effects, such as moving an object, stopping it, or changing its shape. For example, when you push a cart, you see the cart move, not the force itself.

13) List five effects of applying force on an object.

Answer:

Move a stationary object (e.g., pushing a book across a table).

Stop a moving object (e.g., catching a ball).

Change the speed of an object (e.g., pedaling a bicycle faster).

Change the direction of a moving object (e.g., steering a car).

Change the shape of an object (e.g., squeezing a clay ball).

14) What is gravitational force? Does gravitational force exist only between the Earth and other large bodies?

Answer: Gravitational force is the attractive force between any two objects with mass, causing them to come together or move closer. It depends on the masses of the objects and the distance between them. No, gravitational force does not exist only between the Earth and other large bodies; it exists between all objects with mass, but it is only noticeable with large masses (e.g., planets, stars) because the force is very weak for small objects.

TEACHING TASK (Page 64 – 65)

Multiple Choice Questions

1) What force opposes the motion of a bicycle when we stop pedaling?

Answer: B) Frictional force Explanation: Frictional force between the tires and the ground or within the bicycle's components slows it down when pedaling stops.

2) Which surfaces tend to have less friction when sliding against each other?

Answer: A) Glass and marble Explanation: Smooth surfaces like glass and marble have less friction compared to rough surfaces like sandpaper, rubber, or metal on wood.

3) What is one advantage of friction?

Answer: C) It enables walking and running on the ground. Explanation: Friction provides the grip needed for walking and running. The other options are disadvantages or unrelated to friction's benefits.

4) How does friction affect the efficiency of machines and engines?

Answer: B) It increases energy wastage. Explanation: Friction causes energy to be lost as heat, reducing the efficiency of machines and engines.

5) Why do worn out tires of vehicles need replacement?

Answer: C) As a result of friction. Explanation: Friction between tires and the road causes wear and tear, reducing tread and necessitating replacement.

6) How do ball bearings contribute to reducing friction?

Answer: B) They change sliding friction into rolling friction. Explanation: Ball bearings allow parts to roll rather than slide, significantly reducing friction.

Advanced Level

More than One Answer Type

7) Which of the following are mentioned as advantages of friction?

Answer: A) Enabling walking and running on the ground, C) Facilitating writing with a pencil, D) Stopping fast-moving vehicles by applying brakes Explanation: Friction enables grip for walking, allows pencils to mark paper, and helps brakes stop vehicles. Bird flight is not directly related to friction.

8) Which shapes or structures are designed to minimize air or water friction?

Answer: A) Streamlined bodies of sports cars, B) Streamlined bodies of cyclists, C) Streamlined bodies of swimmers, D) Streamlined bodies of ships Explanation: Streamlined shapes reduce air or water resistance (friction) by allowing smoother flow around the object.

Fill In the Blanks

9) _____ between the tires of vehicles and the ground enables them to stop when brakes are applied.

Answer: Friction Explanation: Friction between tires and the ground provides the force needed to slow or stop a vehicle.

10) The use of _____ between moving parts of machines can significantly reduce friction.

Answer: Lubricants Explanation: Lubricants like oil or grease reduce friction by creating a slippery layer between moving surfaces.

Matching Type

11) Answer:

1. Enables walking and running — B (Friction between shoes and the ground)

2. Heating of engine parts — **C** (Results from friction between moving parts)

3. Bird flight — **A** (Made possible by air resistance on the ground)

4. Enables vehicles to stop — **D** (Caused by friction when brakes are applied)

Answer the Following Questions

12) Explain three methods to reduce friction.

Answer:

Using Lubricants: Applying substances like oil or grease between surfaces reduces direct contact and friction.

Using Rollers or Ball Bearings: These change sliding friction into rolling friction, which is much lower.

Polishing Surfaces: Smoothing surfaces reduces roughness, lowering friction when they slide against each other.

13) Explain two advantages and two disadvantages of friction.
Answer:

Advantages:

Friction enables walking and running by providing grip between shoes and the ground.

Friction allows brakes to stop vehicles by creating resistance between brake pads and wheels.

Disadvantages:

Friction causes wear and tear, such as on vehicle tires, requiring frequent replacement.

Friction generates heat in machines, reducing efficiency and wasting energy.

LEARNER'S TASK (Page 66 – 67)

Multiple Choice Questions

1) Which type of force slows down and stops moving objects?

Answer: C) Frictional force Explanation: Frictional force opposes motion, slowing or stopping objects in contact with surfaces.

2) What kind of force appears when a moving object is in contact with another?

Answer: C) Frictional force Explanation: Friction arises when two surfaces in contact move relative to each other.

3) What is mentioned as a disadvantage of friction?

Answer: D) It causes moving parts of engines to become very hot. Explanation: Friction generates heat in engines, which is a disadvantage as it reduces efficiency and can cause damage.

4) Which method reduces friction by changing sliding friction into rolling friction?

Answer: C) Using rollers or wheels Explanation: Rollers or wheels allow objects to roll rather than slide, significantly reducing friction.

5) What do cyclists do to reduce friction with the road?

Answer: C) Using narrow and hard tires Explanation: Narrow, hard tires reduce the contact area and friction with the road, improving efficiency.

6) Why do sports cars and swimmers adopt a streamlined shape?

Answer: C) To reduce air or water friction Explanation: Streamlined shapes minimize resistance from air or water, reducing friction and improving speed.

Advanced Level

More than One Answer Type

7) What are the mentioned disadvantages of friction?

Answer: B) Wear and tear of vehicle tires, C) Heat generation in moving parts of engines, D) Reduction in speed of moving objects Explanation: These are negative effects of friction, unlike increased grip, which is an advantage.

8) How can friction between two objects be reduced when one object is rolled over another?

Answer: B) Using lubricants between the objects, C) Using rollers or wheels, D) Using ball bearings Explanation: Lubricants reduce contact friction, while rollers and ball bearings convert sliding friction into rolling friction.

Fill In the Blanks

9) The moving parts of engines and machines become very hot due to _____

Answer: Friction Explanation: Friction between moving parts generates heat, which can reduce efficiency.

10) Friction can be reduced by changing sliding friction into rolling friction through the use of _____.

Answer: Rollers or Ball bearings Explanation: These devices allow rolling motion, which has less friction than sliding.

Matching Type

11) Answer:

1.**Polishing of surfaces**: **B**. Reduces friction by making surfaces smooth.

2.**Using lubricants**: **A**. Applying oil or grease between moving parts of machines.

3.**Using rollers or wheels**: **C**. Converting sliding friction into rolling friction by placing them around an axle.

4.**Using ball bearings**: **D**. Converting sliding friction into rolling friction by placing them around an axle.

Answer the Following Questions

12) What happens to the amount of friction when smooth surfaces slide over each other compared to rough surfaces?

Answer: Friction is lower when smooth surfaces slide over each other compared to rough surfaces. Smooth surfaces have less roughness, reducing the resistance to motion.

13) Give examples of surfaces that have more friction when they slide over each other.

Answer: Examples include Sandpaper and wood Rubber and asphalt Brick and concrete These surfaces are rough, increasing friction when they slide against each other.

TEACHING TASK (Page 69 -71)

Multiple Choice Questions

1) Which of the following is an example of doing work according to the scientific definition?

Answer: B) Lifting a book off the floor. Explanation: Work is done when a force causes an object to move in the direction of the force. Lifting a book involves applying force to move it upward. Pushing a stationary wall or thinking does not result in motion, and sitting involves no force application.

2) How can machines make work easier?

Answer: D) All of the above Explanation: Machines can reduce the force needed, change the direction of the force, or increase the speed of work, making tasks easier.

3) In a wheel and axle system, what happens when you turn the wheel?

Answer: C) The axle also turns Explanation: In a wheel and axle system, the wheel and axle are connected, so turning the wheel causes the axle to rotate as well.

4) What does a pulley do to make lifting heavy loads easier?

Answer: B) Changes the direction of the force applied Explanation: A pulley changes the direction of the applied force (e.g., pulling down to lift a load up), making lifting easier.

5) Which of the following simple machines is described as a flat surface set at an angle?

Answer: D) Inclined Plane Explanation: An inclined plane is a flat surface set at an angle to reduce the force needed to lift objects.

6) Which of the following simple machines is NOT mentioned as part of a bicycle's components?

Answer: D) Pulleys Explanation: Bicycles typically use wheels and axles, levers, and screws, but pulleys are not commonly part of their components.

Advanced Level

More than One Answer Type

7) Select all the statements that describe when work is done according to the scientific definition.

Answer: A) A force must be applied, C) The object must move in the direction of the force. Explanation: Work requires a force and motion in the direction of the force. The object’s weight or feeling tired is irrelevant to the scientific definition.

8) Which examples illustrate the use of inclined planes?

Answer: B) Ramp, C) Slide Explanation: Ramps and slides are flat surfaces set at an angle, characteristic of inclined planes. A seesaw is a lever, and a knife is a wedge.

Fill In the Blanks

9) To do work, two things must happen: a force must be applied, and the object must move _____.

Answer: In the direction of the force Explanation: Work is defined as force applied over a distance in the direction of the force.

10) A wheel and axle consist of a larger wheel attached to a smaller rod called the _____.

Answer: Axle Explanation: The axle is the smaller rod that rotates with the wheel in a wheel and axle system.

Matching Type

11) Answer:

1.**Lever** – C. A rigid bar that pivots around a fixed point.

2.**Wheel and Axle** – A. Consists of a larger wheel attached to a smaller rod.

3.**Pulley** – D. Has a wheel with a groove through which a rope can run.

4. **Inclined Plane** – B. A flat surface set at an angle.

Answer the Following Questions

12) Define "work" as it pertains to science. What are the two essential requirements for work to be done?

Answer:

Definition: In science, work is done when a force is applied to an object, causing it to move over a distance in the direction of the force.

Requirements: A force must be applied to the object. The object must move in the direction of the applied force.

13) What is the main purpose of simple machines? Describe how a lever works. Answer:

Purpose: The main purpose of simple machines is to make work easier by reducing the force needed, changing the direction of the force, or increasing the speed of work.

How a lever works: A lever is a rigid bar that pivots around a fixed point called the fulcrum. By applying force (effort) at one end, the lever rotates around the fulcrum to lift or move a load at the other end. For example, in a seesaw, pushing down on one side lifts the other side, reducing the effort needed to lift a heavy load.

LEARNER'S TASK (Page 71 -72)

Multiple Choice Questions

1) In science, what must happen for "work" to be done?

Answer: A) A force must be applied, and the object must move in the direction of the force. Explanation: Work requires both force and motion in the direction of the force, per the scientific definition.

2) What is the primary purpose of a machine?

Answer: B) To help you do work by making it easier Explanation: Machines are designed to simplify work by reducing effort, changing force direction, or increasing efficiency.

3) What is the main purpose of simple machines?

Answer: B) To allow us to use less force or change the direction of the force Explanation: Simple machines reduce the force needed or redirect it to make tasks easier.

4) Which of the following is an example of a lever?

Answer: C) Seesaw Explanation: A seesaw is a classic example of a lever, pivoting around a fulcrum. A wheelbarrow and bicycle involve levers but are not levers themselves, and a screw is a different type of simple machine.

5) Which simple machine is an inclined plane wrapped around a cylinder?

Answer: B) Screw Explanation: A screw is an inclined plane wrapped around a cylindrical core, used to hold objects together or lift materials.

6) A car uses many simple machines. Which of the following simple machines is listed in the paragraph as being used in a car?

Answer: C) Screws Explanation: The context suggests screws are used in cars (e.g., to hold parts together), while the others are not explicitly mentioned.

Advanced Level

More than One Answer Type

7) Which of the following activities does not doing work according to the scientific definition?

Answer: A) Pushing against a stationary wall, C) Watching television. Explanation: Work requires motion in the direction of the force. Pushing a stationary wall and watching TV involve no motion of the object (wall) or no force application, respectively.

8) Which simple machines involve rotational motion?

Answer: A) Wheel and Axle, B) Pulley, C) Screw Explanation: These machines involve rotation (wheel and axle rotate together, pulleys rotate to move ropes, screws rotate to fasten). A wedge does not rotate.

Fill In the Blanks

9) In science, work happens when you use a _____ to move something over a distance.

Answer: Force Explanation: Work is defined as the application of force to move an object over a distance.

10) A lever is a rigid bar that pivots around a fixed point called the _____.

Answer: Fulcrum Explanation: The fulcrum is the fixed point around which a lever rotates.

Matching Type

11)

1.**Using a bottle opener** → **B. lever** A bottle opener works on the principle of a lever.

2.**Riding a bike** → **D. wheels and axles** A bike uses wheels and axles for movement.

3.**Climbing a hill** → **A. inclined plane** Climbing a hill can be seen as an example of using an inclined plane to make movement easier.

4.**Fastening materials** → **C. screws** Screws are used for fastening materials.

Answer the Following Questions

12) Define "machine" and explain how machines make work easier. List three ways in which machines can help with work.

Answer:

Definition: A machine is a device that makes work easier by changing the amount, direction, or speed of the force applied.

How machines make work easier: Machines reduce the effort needed, redirect forces, or increase efficiency to perform tasks.

Three ways machines help with work:

Reducing the force needed (e.g., a lever lifts a heavy load with less effort).

Changing the direction of the force (e.g., a pulley allows pulling down to lift up).

Increasing the speed or distance of motion (e.g., a wheel and axle allows faster rotation).

13) How does a pulley help lift heavy loads?

Answer: A pulley helps lift heavy loads by changing the direction of the applied force, making it easier to apply effort. For example, pulling down on a rope attached to a pulley lifts a load upward, which is often more comfortable and requires less effort than lifting directly. In a system of multiple pulleys, the force needed can also be reduced by distributing the load across multiple ropes.