

FORCE AND LAWS OF MOTION CLASS 9 WORKSHEET pdf

1: CBSE Class 9 - Science - CH9 - Force and Laws of Motion (worksheet)

CBSE Class 9 Physics Worksheet - Force And Laws Of Motion - Practice worksheets for CBSE students. Prepared by teachers of the best CBSE schools in India. FORCE AND LAWS OF MOTION.

The net force is when two or more forces are applied on the same object and at the same time. The applied forces combined are called the net force. **Balanced Forces** The force I apply in one direction plus the force you apply in the opposite direction are added together. A force is applied in one direction and either another smaller or larger force is applied in the opposite direction or no force is applied at all in the opposite direction. **Unbalanced Forces** If I have a chair and I push on one side of it with a force of 50 N and you push on the other side, with a force of 25 N, will the chair move? Which way will it move? The direction in which the most force is applied. What is the net force? An object at rest will stay at rest, and an object in motion will stay in motion at constant velocity, unless acted upon by an unbalanced force. The direction of the acceleration is the same as the direction of the net force. The magnitude of the acceleration is directly proportional to the net force applied, and inversely proportional to the mass of the object. **The Effect of Mass** A force applied to an automobile will not have the same effect as the same force applied to a pencil. An automobile resists accelerating much more than a pencil does, because it has more inertia, or mass. The acceleration of an object depends not only on how hard you push on it, but also on how much the object resists being pushed. What is the effect of mass on acceleration? This, too, turns out to be quite simple I wonder why! For the same force, an object with twice the mass will have half the acceleration. If it had three times the mass, the same force will produce one-third the acceleration. Four times the mass gives one-fourth of the acceleration, and so on. This type of relationship between quantities double one, get half the other is called an inverse proportion or inverse variation. In other words, then: Thus, if the colliding objects have unequal mass, they will have unequal accelerations as a result of the contact force which results during the collision. For every action there is an equal and opposite reaction. Forces are interactions between objects, like conversations are interactions between people. Single, isolated forces never happen. They are equal in magnitude. Both forces exist at exactly the same time. They both start at exactly the same instant, and they both stop at exactly the same instant. They are equal in time. The size of the force on the first object equals the size of the force on the second object. The direction of the force on the first object is opposite to the direction of the force on the second object. Forces always come in pairs – equal and opposite action-reaction force pairs. In a collision between two objects, both objects experience forces which are equal in magnitude and opposite in direction. Such forces cause one object to speed up gain momentum and the other object to slow down lose momentum. **Inertia and Mass** Inertia is the tendency of an object to resist any change in its motion. An object will continue to move at the same speed in the same direction unless acted upon by an unbalanced force. Friction is an unbalanced force that causes the ball to stop or slow down. Without friction, the ball would keep going. Mass is the amount of matter in an object. A bowling ball has more mass than a tennis ball. The greater the mass of an object the greater its inertia. Mass is the measurement of inertia. **Conservation of Momentum** Law of Conservation of Momentum In a closed system, the vector sum of the momenta before and after an impact must be equal.

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2: Worksheet on Force and Momentum| Class 9 physics notes| Class 9 Science notes

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VeryShort Questions Type 1. During the game of table tennis, if the ball hits a player it does not hurt him. On the other hand when a fast moving cricket ball hits a spectator it may hurt him. Define the first law of motion. Why do a backseater moves forward when a fast moving bike is stopped suddenly? When a carpet is beaten with a stick it releases dust. Name the physical quantity that measures inertia. State its SI unit. Name the property of bodies by virtue of which they resist a change in their state of rest or of uniform motion. What is the momentum of a body of mass 5 kg moving with a velocity of 0. State the relation between the momentum of a body and the force acting on it. What is the mathematical formula and SI unit of momentum? In the collision between a heavier body and a lighter body, if the force experienced by the heavier body is F_1 and that by the lighter body is F_2 , write the relation between F_1 and F_2 . Explain why some of the leaves may get detached from a tree if we vigorously shake its branch? An object of mass kg is accelerated uniformly from a velocity of 5 ms^{-1} to 8 ms^{-1} in 6 s. Calculate the initial and final momentum of the object. Also find the magnitude of force exerted on the object. Out of the four physical quantities associated with the motion of an object viz force, velocity, acceleration and momentum which one remains constant for all bodies large or small, undergoing a free fall? A runner passes the ground with his feet before he starts his run. Identify action and reaction in this situation. An athlete always runs some distance before taking a jump. How are action & reaction forces related in magnitude and direction? Which of these is travelling faster? Short Answer Type questions 1. There are three solids made up of aluminium, steel and wood, of the same shape and same volume. Which of them would have highest inertia? Two friends on roller skates are standing 5 m apart facing each other. One of them throws a ball of 2 kg towards the other, who catches it. How will this activity affect the position of the two? Give reason and give the law related to these statements: Leaves of a tree may get detached if we vigorously shake its branch. It is necessary to run along with the moving bus in the same direction of the bus, while alighting from the bus. Which of the following has more inertia? Give reason for your answer: Two objects A and B of same masses and velocity V and $3V$ respectively are in motion. While playing football, the goalkeeper did not get sufficient time to stop a fast ball shot towards him. Why did he hurt his hand while doing so? The hand gets hurt while punching a wall. From a rifle of mass 4 kg, a bullet of mass 50 g is fired with an initial velocity of 35 ms^{-1} Calculate the initial recoil velocity of the rifle. An object of mass 1 kg travelling in a straight line with a velocity of 10 ms^{-1} collides with, and sticks to a stationary wooden block of mass 5 kg. Then they both move off together in the same straight line. Calculate the total momentum just before the impact and just after the impact. Also calculate the velocity of the combined object. What is the effect force, when it is applied in the following cases? If you are trying to push a heavy box on a horizontal surface, list various forces acting on the box. State the condition under which this box will start sliding on the surface. How will the magnitude of applied force required to move the box change if: A pile of carom coins is hit with a fast sliding strike. What happens to the carom coins and why? A stone released from the top of a tower of height A gun of mass 3 kg fires a bullet of mass 30 g. Define SI unit of force.

3: CBSE Test Papers for CBSE Class 09 Science Forces and Laws of Motion

Force And Laws Of Motion Class 9. Showing top 8 worksheets in the category - Force And Laws Of Motion Class 9. Some of the worksheets displayed are Force motion activity tub, Newtons laws of motion work, Chapter force and motion, Newtons laws work, Forces newtons laws of motion, Force and motion pdf, Big science idea, Lesson physical science newtons laws of motion.

Laws of motion Newton gave three laws of motion that describe the motion of bodies. They describe the relationship between the forces acting on a body and its motion due to those forces. The three laws of motion were first compiled by Sir Isaac Newton in his work Principia Mathematica, first published in 1687. Newton used these laws to explain and investigate the motion of many physical objects and systems. An object remains in a state of rest or of uniform motion in a straight line unless compelled to change that state by an applied force. All objects resist a change in their state of motion. The tendency of undisturbed objects whether they are at rest or moving with uniform velocity is called inertia. Hence, the first law of motion is also known as the law of inertia. Greater the inertia of the body greater will be the force required to bring the change in the state of rest or uniform motion of the body. Mass is the measure of the inertia of the body so heavier objects have more inertia than lighter objects. For example a ball of 2Kg has more inertia than a football and it takes more effort to kick a 2Kg ball than it takes to kick a foot ball. Another example is even a small child can push a toy car. It says that Force is something that changes or tends to change the state of rest or uniform motion of a body.

5. Momentum Before discussing about second law of motion we shall first learn about momentum of a moving object. From our daily life experiences like during the game of table tennis if the ball hits a player it does not hurt him. On the other hand, when a fast moving cricket ball hits a spectator, it may hurt him. This suggests that impact produced by moving objects depends on both their mass and velocity. Momentum can be defined as "mass in motion". All objects have mass; so if an object is moving, then it has momentum - it has its mass in motion. The SI unit of momentum is kilogram-meter per second kg m s^{-1} . Since the application of an unbalanced force brings a change in the velocity of the object, it is therefore clear that a force also produces a change of momentum. We define the momentum at the start of the time interval is the initial momentum and at the end of the time interval is the final momentum. When the object moves then it gains momentum as the velocity increases. Hence greater the velocity greater is the momentum.

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4: Free Printable CBSE Class 9 Science Unit 3-Motion, Force and Work Motion www.enganchecubano.com

CBSE Class 9 Science Worksheet - Force and Laws of Motion. Students can download these worksheets and practice them. This will help them to get better marks in examinations.

What is the relationship between force and acceleration? If the mass of a body and the force acting on it are both doubled, what happens to the acceleration? Which physical principle is involved in the working of a jet aeroplane? Name the principle on which a rocket works. Is the following statement true or false: A rocket can propel itself in a vacuum. Find the acceleration produced by a force of 5 N acting on a mass of 10 kg. A girl weighing 25 kg stands on the floor. She exerts a downward force of N on the floor. What force does the floor exert on her? Name the physical quantity which makes it easier to accelerate a small car than a large car. Explain the meaning of the following equation: To take the boat away from the bank of a river, the boatman pushes the bank with an oar. Why does a gunman get a jerk on firing a bullet? If action is always equal to reaction, explain why a cart pulled by a horse can be moved. Explain how a rocket works. Do action and reaction act on the same body or different bodies? How are they related in magnitude and direction? Are they simultaneous or not? If a man jumps out from a boat, the boat moves backwards.

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5: Ninth Grade (Grade 9) Forces and Motion Questions for Tests and Worksheets

Q: Fill in the blanks with suitable choice given in brackets. 1: The product of mass and velocity of a body is called _____.(momentum/force) 2: The property by the virtue of which an object tends to remain in the state of rest or of uniform motion unless acted upon by some force is called _____.

Students can download these worksheets and practice them. This will help them to get better marks in examinations. Also refer to other worksheets for the same chapter and other subjects too. Use them for better understanding of the subjects. Which rifle will hurt more and why? Show that impulse of a force is equal to the change in momentum? How does it depend on mass of the object? Explain a Dusting of a carpet by beating it with a stick. What will be the effect on the position of the ball if i The car is moving with constant velocity? Will the 1 kg mass move at a lower, higher or zero acceleration? Find the mass of the bullet? Find the impulse on the ball and force applied by the player if he is able to stop the ball in 0. Calculate the total momentum of the system before collision. It starts from rest and travels m in 12seconds. The boat undergoes constant acceleration during 12seconds. Find the magnitude of unbalanced force acting on the boat? It is brought to rest by the application of brakes, within a distance of 20m when the average resistance being offered to it is N. What was the velocity of the motor car? Find the impulse on the ball and average force applied by the player if he is able to stop the ball in 0. Find a the momentum before the action of force b the momentum after the action of force c the magnitude of force. A force of 10N is acting on m1. What is the acceleration of m1 and m2. What is the magnitude of action and reaction forces?

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7: Force And Laws Of Motion Class 9 Worksheets - Printable Worksheets

CBSE Class 9 - Science - CH9 - Force and Laws of Motion (worksheet) Worksheet. Fill in the blanks. 1. The study of motion of a body under the action of a force is.

8: Grade 9 physics force and laws of motion worksheets

Isaac Newton Force and Laws of Motion Worksheet Fill in the blanks 1. The study of motion of a body under the action of a force is called _____. 2. (Impulse/Force/Pressure) _____ is a push or pull acting upon an object.

9: Force And Law Of Motion Class 9th Worksheets - Printable Worksheets

Physics Motion Numerical Solved and Worksheet for class 9. it is said to be in motion. hence, motion is a state by virtue of which a body changes its position.

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