



Use Newton's second law to solve the following problems.

1. A 100 kg car accelerates at a rate of 1.20 m/s². What is the net force on the car?

2. A 5.0 kg object starts at rest and is pushed by a constant force of 20.0 N. How long does it take to reach a speed of 10.0 m/s?

3. A car starts from rest and accelerates at 2.0 m/s². How long does it take to reach a speed of 30.0 m/s?

4. A 1000 kg car is pushed by a constant force of 2000 N. How long does it take to reach a speed of 100 m/s?

5. A 1000 kg car is pushed by a constant force of 2000 N. How long does it take to reach a speed of 100 m/s?

Newton's 3 Laws

Law #1

What is the 1st law of motion?
An object in motion stays in motion. An object at rest stays at rest, UNLESS acted on by an unbalanced force.

Law #2

What is the 2nd law of motion?
Force is related to mass and acceleration. Force equals mass times acceleration ($F = ma$)

Law #3

What is the 3rd law of motion?
Every action has an equal and opposite reaction. All forces occur in equal and opposite pairs.

Isaac who?

Born: 1642 Died: 1727

Lived in: England

Studied at: Trinity College and Cambridge University

Accomplishments: Calculus, Optics, Astronomy

Force

Cars use all three of Newton's laws of motion. Pick one law and describe how a car uses the law. Add the picture below to show the law in action. (Answers will vary.)

A car uses law one, when it is in motion it will stay in motion until a force stops it. The brakes of a car are the unbalanced force that will slow the car down.

Physics which law?

A rocket pushes burning gases DOWN which causes the rocket to launch UP.

A sports car speeds up much faster than a large truck when a traffic light turns from red to green.

A skateboarder pushes the ground backward which causes the board to move forward.

When a ball ~~is thrown~~, the package on its back continues moving forward into the ground.

It is much more difficult to push a dresser full of clothes than an empty dresser.

A boat sitting on the lake will sink.

Action

Reaction

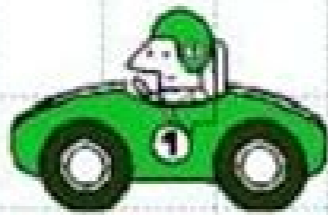
Gravity

4. Apa yang dapat disimpulkan dari percobaan tersebut?

Name: _____

Projectile Motion Worksheet #1

- 1) A marble rolls with a speed of 5.0 m/s across a level table that is 1.0 m above the floor. Upon reaching the edge of the table, it follows a parabolic path to the floor. How far along the floor is the landing spot from the table? **[2.26 m]**
- 2) A pilot drops a survival kit while her plane is flying at an altitude of 1000.0 m with a forward velocity of 50.0 m/s. If air friction is disregarded, how far in advance of the slowing raft's drop zone should she release the package? **[174 m]**
- 3) A rifle is fired horizontally and travels 400.0 m. The rifle barrel is 1.90 m from the ground. What speed must the bullet have been traveling at? Ignore friction. **[645 m/s]**
- 4) A skier leaves the horizontal end of a cliff with a velocity of 15.0 m/s and lands 70.0 m from the base of the cliff. How high is the cliff? **[107 m]**
- 5) An astronaut stands on the edge of a lunar crater and throws a half-eaten Twinkie™ horizontally with a velocity of 5.00 m/s. The floor of the crater is 100.0 m below the astronaut. What horizontal distance will the Twinkie™ travel before hitting the floor of the crater? (The acceleration of gravity on the moon is $1/6$ that of the Earth). **[55.3 m]**
- 6) A baseball player leads off the game and hits a long home run. The ball leaves the bat at an angle of 30.0° from the horizontal with a velocity of 40.0 m/s. How far will it travel in the air? Assume the ball's initial displacement is 0m. **[141 m]**
- 7) A golfer is teeing off on a 160.0 m long par 3 hole. The ball leaves with a velocity of 40.0 m/s at 20.0° to the horizontal. Assuming that she hits the ball on a direct path to the hole, how far from the hole will the ball land (no bounces or rolls)? **[8.6m]**
- 8) A kicker in a football game kicks a ball from the goal line at 60.0° from the horizontal at 25.0 m/s.
 - a) What is the hang time of the punt? **[4.41 s]**
 - b) How far downfield does the ball land? **[55.2 m]**
- 9) A cannon fires a cannonball 500.0 m downrange when set at a 45.0° angle. At what velocity does the cannonball leave the cannon? **[70.9 m/s at 45.0°]**
- 10) You are trying to throw a love letter into an open window of your significant other bedroom window. The window is 10.0 m above. Assuming it just reaches the window, and the note is thrown at 60.0° to the ground.
 - a) At what velocity should he throw the bag? **[16.2 m/s at 68.8° to the ground]**
 - b) How far from the house is he standing when he throws the bag? **[11.5 m]**



This is a list of vocabulary words corresponding to a physics unit covering motion in two dimensions (vertical and horizontal vectors, relative motion), and forces (Newton's three laws, force diagrams, friction). The entire unit, "Two Dimensional Motion and Forces Unit - Chapter 2," can be purchased as a bundle and includes animated PowerPoint lecture notes, practice assignments, quizzes, and a review game and summative assessment. The entire year-long course, "Physics with a Modern Touch," is Page 2 This resource is set of structured tasks which develop and assess students' knowledge of the following subject areas of high school physics: -Discussion about ideas to do with electric current and charge -Using the formula for current, charge and time -Synthesis of electric current with dynamics, Newton's laws of motion, specific heat capacity, efficiency Tasks are differentiated by grade using the reformed 9-1 grading system, with three tiers available (core 4-5, intermediate 6-7, extension 8 Last updated 11 February 2020 Resources to teach Newton's 1st, 2nd and 3rd law. Creative Commons "Sharealike" Select overall rating (no rating) Your rating is required to reflect your happiness. Write a review Update existing review It's good to leave some feedback. Something went wrong, please try again later. Great resource Empty reply does not make any sense for the end user Empty reply does not make any sense for the end user Empty reply does not make any sense for the end user Very useful Empty reply does not make any sense for the end user Very useful resources. Thank you Empty reply does not make any sense for the end user Report this resource to let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch. What is motion? Motion is the process of an object changing its place or its position. Motion is not speed. Speed is the rate an object changes position. Newton's law of motion. Read More... Sir Isaac Newton, born on January 4, 1643, was a scientist, mathematician, and astronomer. Newton is regarded as one of the greatest scientists who ever lived. Isaac Newton defined the laws of gravity, introduced an entirely new branch of mathematics (calculus), and developed Newton's laws of motion. The three laws of motion were first put together in a book published by Isaac Newton in 1687, Philosophiæ Naturalis Principia Mathematica (Mathematical Principals of Natural Philosophy). Newton used them to explain and investigate the motion of many physical objects and systems. For example, in the third volume of the text, Newton showed that these laws of motion, combined with his law of universal gravitation, explained Kepler's laws of planetary motion. Newton's laws of motion are three physical laws that, together, laid the foundation for classical mechanics. They describe the relationship between a body and the forces acting upon it, and its motion in response to those forces. They have been expressed in several different ways, over nearly three centuries, and can be summarized as follows. Every body continues in its state of rest, or of uniform motion in a straight line unless it is compelled to change that state by forces impressed upon it. The acceleration produced by a particular force acting on a body is directly proportional to the magnitude of the force and inversely proportional to the mass of the body. To every action there is always opposed an equal reaction; or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts. If you are a parent or teacher who wants to introduce your students to Sir Isaac Newton, the following printable worksheets can make a great addition to your study. You might also want to look at resources such as the following books: Isaac Newton and the Laws of Motion - This book is written in graphic-novel format, making it much more appealing to students than a standard textbook. It tells the story of how Isaac Newton developed the laws of motion and the law of universal gravitation. Force and Motion: An Illustrated Guide to Newton's Laws - Author Jason Zimba breaks with the traditional method of teaching the laws of motion by explaining them visually. The book is organized into seventeen brief, well-sequenced lessons that are each followed with problems for students to work. Print the PDF: Newton's Laws of Motion Vocabulary Sheet Help your students begin to familiarize themselves with terms related to Newton's laws of motion with this vocabulary worksheet. Students should use a dictionary or the Internet to look up and define the terms. They will then write each term on the blank line next to its correct definition. Print the PDF: Newton's Laws of Motion Word Search This word search puzzle will make a fun review for students studying the laws of motion. Each related term can be found among the jumbled letters in the puzzle. As they find each word, students should make sure that they remember its definition, referring to their completed vocabulary sheet if necessary. Print the PDF: Newton's Laws of Motion Crossword Puzzle Use this law of motion crossword puzzle as a low-key review for students. Each clue describes a previously-defined term related to Newton's laws of motion. Print the PDF: Newton's Laws of Motion Alphabet Activity Young students can review terms associated with Newton's laws of motion while practicing their alphabetizing skills. Students should write each word from the word bank in correct alphabetical order on the blank lines provided. Print the PDF: Newton's Laws of Motion Challenge Use this challenge worksheet as a simple quiz to see how well students recall what they've learned about Newton's laws of motion. Each description is followed by four multiple choice options. Print the PDF: Newton's Laws of Motion Draw and Write Page Students can use this draw and write page to complete a simple report about Newton's laws of motion. They should draw a picture related to the laws of motion and use the blank lines to write about their drawing. Print the PDF: Sir Isaac Newton's Birthplace Coloring Page Sir Isaac Newton was born in Woolsthorpe, Lincolnshire, England. Use this coloring page to encourage students to research a bit more on the life of this famous physicist. Last updated 5 August 2021 Newton's Laws of Motion worksheet for GCSE Combined Science and GCSE Physics linked to the attached YouTube video. This is a worksheet that can be used along with the associated YouTube video from Mr Walton's Physics Lessons channel either in-class or as homework. I tend to use this as homework and give the video link to support students who need it. I will then use the video to go through the answers at the start of the next lesson. The worksheet can also be used as a stand-alone set of questions for a starter, plenary or GRIT task to review Newton's Laws of Motion or simply for revision with the video used as a back-up. The or search YouTube for Mr Walton's Physics Lessons and Newton's Laws of Motion Creative Commons "Sharealike" Select overall rating (no rating) Your rating is required to reflect your happiness. Write a review Update existing review It's good to leave some feedback. Something went wrong, please try again later. This resource hasn't been reviewed yet To ensure quality for our reviews, only customers who have downloaded this resource can review it Report this resource to let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch.

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