SCIENCE OF SPEED 2 pdf

1: The Porsche GT2 RS and the Science of Speed - Motor Trend Canada

We are the authority on CO2 dragsters! We have everything from supplies and tools to instructions and STEM connections.

Kim Reynolds October 27, When I think of the Porsche , the mental snapshot that flutters out of my memory is a snow-white car with red and blue stripes sliding vertically through my field of view. Frankly, I reckoned the first half of my cornering assault had gone rather well. Not Peter Gregg caliber, maybe, but The warp-speed movie in the windshield was suddenly in rewind. You have no idea how long it takes to stop while traveling backward at 90 mph. As I jolted to a stop, the back of my head rapped off the headrest and a hail of grime caught up and peppered my face one must remember to nonchalantly close the windows in these situations. I wiped my eyes and slumped back in the tight, form-fitting seat. How is this done correctly? We try to be responsible folks when we tear around corners and sometimes spin quarter-million-dollar, horsepower Porsches, so all this was taking place on a goof-proof, cone-marked bend created at an intersection of runways at the old El Toro, California, airbase. Via an array of instrumentation, we turned this foot elbow of asphalt into a giant microscope slide. What do we see when we draw the image into focus? Let me try that corner again, and as I hurtle through it as fast as my modest skills allow, take a magnified look at the spreadsheet of data we recorded. The -- and specifically, this mightiest of them all with turbo horsepower, rear drive, and a classic manual shifter -- is a car with a devil on one shoulder and a sorcerer on the other. Meanwhile, the sorcerer is conjuring the next fast corner into a physics-defying, life-changing encounter. But how do you get a corner right in a ? The elapsed time between my pistoning the brake pedal and blistering out of the corner was about 8 seconds. Watched in real time, it was a keening of the brakes, a quick rotation, a wag by the rear, a wiggle at the front, and an afterburner exhaust whoosh that made the photographers instinctively lean back. Our crack video crew captured it with a high-speed camera. Watching it slowed way down is like studying slo-mo footage of Fred Astaire dancing. Suddenly you see the straining muscles and the beads of sweat.

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2: Physics for Kids: Speed and Velocity

Science of Speed 2: Design for Speed STEM Unit Design for Speed is a six-week unit that challenges students to apply STEM knowledge and design skills. Students engage in competitive engineering with the goal of creating the fastest and most eye-pleasing balsa wood or basswood dragster.

Use the video provided in the project in the WeDo 2. Introductory video Here are some suggested talking points for the video: Cars allow us to move from one point to another faster. But there was once a time when cars were slower than horses. Engineers looked at all parts of the car to design stronger engines and mechanisms. Engineers improved the wheels and tires and changed the size and materials. Questions for discussion What are some ways that cars have been improved to become faster? There are many factors that can influence the speed of a car. Size of the wheels, motor power, gears, aerodynamics, and weight would be the most common ones. The color of the car, brand, or driver experience should not be considered as potential elements for study. What elements can influence the time required for a car to travel a certain distance as fast as possible? This answer should provide prior knowledge regarding comprehension of the content. However, by the end of the lesson, students should be able to provide an accurate answer to the question. What can you infer about the relationship between wheel size and the time it takes the car to move a distance? The bigger the size of the wheel is, the faster the car will travel the distance, if all the other parameters are kept constant. One of the pulley configurations makes the car go faster and the other reduces the speed of the car. How can you measure the speed of an object? Speed is measured by dividing the time required to travel a distance by the measure of that distance. A unit of speed is always distance for a specific period of time. Have your students collect their answers with text or pictures in the Documentation tool. These types of vehicles are optimized to go as fast as possible. Build a race car. The drive module used in this project uses a pulley. This pulley system can be assembled in two different positions: Program the race car to calculate time. Students need to have a hand in front of the race car before the start of the program. This program will start by displaying no. When your students remove their hands, the program will turn the motor on, go to maximum power, and repeat, adding no. The loop will repeat until it reaches the end of the race. Then the motor will turn off. Important For this program, students need to put their hands in front of the car before they execute the program string. When they remove their hands, the car will start its race. Important For this investigation, it is crucial that you have the same setup throughout the test. It is the only way students can isolate one element at a time: The start line should always be at the same distance from the finish line, which is a wall or a box. The distance between the start and finish line is greater than 2. Investigate speed factors From this model, students should be able to test different factors, one at a time. They should test a distance greater than 2. When running this test, students should record the number on the display. They should repeat the test three times to make sure it is consistent. If the value in one of the three tests is disproportionate, repeat the test for a fourth time. This value is the approximate number of seconds it took for the race car to travel the distance. Run the race with BIG wheels at motor power By changing the wheels, the race car should take less time to travel the same distance, and therefore, have a greater speed. Repeating the test three times will make sure it is consistent. If the value of one of the three tests is disproportionate, repeat the test for a fourth time. Suggestion Other options could be considered to reach a more precise result, including increasing the number of trials or finding the average. Predict the time it will take to travel twice the distance. When the distance doubles and the motor power level and size of tires are the same as the previous test, the number of seconds should also double. With the same race car model and the same setup, students can hypothesize and test other factors that may influence the speed of the car. Change the motor power. Changing the motor power level from no. Change the drive mechanism pulley configuration. Changing the drive mechanism from the normal position to the reduced speed position will make the race car take more time to travel the same distance. Have students do the test based on another factor they think could influence the speed of the race car: Collaboration suggestion Allow your students time to design and build their own ultimate race cars so that they can apply their findings and make them as fast as possible. Get the teams back together, organize a race, and see whose car is the fastest.

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Ask them to take a screen capture of their results. Get them to compare these images with real-life images. Invite students to record a video of them describing their project to the class. Suggestions Students may collect data in a chart format or on a spreadsheet. Students may also graph the results of their tests. Conclusions should reflect the fact that larger tires, stronger motors, and greater motor power generate much higher speeds. Ask them to put their explanation in context. Ask them to analyze situations in real life in which they have observed speed as an element. Discuss the connection among their findings and these particular situations. Explore phase During the Explore phase, make sure the student is actively involved in the discussions and asking and answering questions and can describe factors that affect speed in cars. The student is unable to adequately provide answers to questions or participate in discussions or describe factors that affect speed. The student is able, with prompting, to adequately provide answers to questions or participate in discussions or, with help, describe factors that affect speed. The student is able to provide adequate answers to questions and participate in class discussions or describe the factors that affect speed, though not in detail. The student is able to extend the explanations in discussions or describe in detail the factors that affect speed. Create phase During the Create phase, make sure the student is able to work as part of a team, test one factor at a time to determine its influence on speed, and use the information collected in the Explore phase. The student is unable to work well on a team and complete the testing of each factor affecting speed in order to use the information. The student is able to work in a team and complete the testing, with help, of each factor affecting speed in order to use the information. The student is able to work on a team, contribute to the team discussions, and complete the testing of each factor in order to use the information. The student is able to work on a team, serve as the leader, and extend the testing of factors affecting speed beyond the required elements. Share phase During the Share phase, make sure the student can engage in discussions about the investigation, explain their findings, and use important information from their project to create a final report. The student is unable to engage in discussions about the investigation and use the information to create a final project. The student is able, with prompting, to engage in discussions about the investigation and use limited information to create a basic final project. The student is able to engage in discussions about the investigation and use the information gathered to produce a final project. The student is able to engage extensively in class discussions about the topic and use the information gathered to create a final project that includes additional required elements. Create phase During the Create phase, make sure the student makes appropriate choices i. The student fails to document findings throughout the investigation. The student adequately documents findings for each component of the investigation and makes appropriate choices in selections. The student uses a variety of appropriate methods for documentation and exceeds the established expectations. The student does not follow established guidelines. Established guidelines are generally followed but may be lacking in one or more areas. Explain how to conduct an investigation. Define factors your students will focus on, such as the size of wheels, motor power, or type of pulley setting. Also, be specific in establishing expectations for students to present and document their findings. Investigate more As an added challenge, allow extra time to investigate with student-created designs and programs. This will allow them to explore additional factors that influence speed. A common misconception held by learners is the idea that if speed is constant, then acceleration is also constant. Speed and acceleration are two different concepts that are linked to each other, but if there is no change in the speed, then there is no acceleration or deceleration.

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3: Warp drive - Wikipedia

ScienceofSpeed applauds Acura and the Acura dealerships that are supporting the campaign to update the / NSX fuel tanks and thermostats. ScienceofSpeed Sport Downpipes transform the sound of the Second Generation NSX while improving performance.

Transwarp[edit] Transwarp generally refers to speeds and technologies that are beyond conventional warp drives. The warp drive has a natural physical or economical limit beyond which higher speeds are no longer possible. The reference work Star Trek Fact Files indicates this limit at warp factor 9. This is the highest conventional warp speed mentioned for a spaceship Borg cube. Also in the episode Threshold Star Trek Voyager the warp factor 9. This is the last warp factor mentioned before the leap takes place in the transwarp state. In the book Star Trek: Finally, we had to create a back door for various powerful aliens like Q who got the knack of hurling the ship through the room for millions of light years during a commercial break. The Transwarp concept itself is not tied to any particular technology or speed limit. The Search for Spock. The principle of this drive is not explained. Later, in Star Trek VI: In Star Trek Fact Files it is stated that the experiment was a failure and the spaceship was converted to a normal warp drive. To get home faster, a shuttle is modified with novel dilithium crystals. The crew is trying to break the transwarp threshold. This threshold is between warp factor 9. The shuttle allegedly found itself at all points in the universe at the same time during the flight. However, the pilot suffers genetic mutations after the flight, so it is not repeated. The entire experiment is described in the reference work Star Trek Fact Files. Some episodes later, fictionalized a few months later, the crew of USS Voyager encounters a species called Voth. This species has spaceships with transwarp drive. However, this drive does not work on the base of transwarp conduits, as the transwarp drive of the Borg, but is a further development of the conventional warp drive. The mention of a second Transwarp technology took place in the episode Descent of the series Star Trek: A group of renegade Borg used transwarp conduits. These are wormhole-like tunnels through the subspace. It was said in the dialogue that the flight through these tunnels was 20 times faster than the flight with maximum warp speed of the Enterprise. The flight itself was described as follows: There were two ways to use these conduits outside these hubs. In TNG, the Enterprise was able to open such a channel with a precisely modulated tachyon impulse, traveling 65 light-years. However, when the USS Voyager tried the same thing in Day of Honor , the attempt failed and almost destroyed the ship. The second possibility is the use of the transwarp coil. In episode Dark Frontier the crew of Voyager steals such a coil from the Borg and is able to shorten their journey home by 15 years, before the coil burns out. This creates a subspace tunnel, which is projected ahead of the vessel. Once a ship has entered this tunnel, the forces inside propel it at incredible speed. To maintain the slipstream, a ship has to constantly modify the quantum field with its deflector dish. The speed of the drive is inversely proportional to the time and distance. When the crew enters the Dauntless in episode Hope and Fear for the first time and accidentally activates the propulsion system, the spaceship flies a flight of 15 light-years over a period of about 10 seconds. Thats equivalent with approximately 50 Million times the speed of light. After realizing that they would have to leave Voyager forever to get home with the Dauntless, the crew tries to match the drive of the USS Voyager to the parameters of the Dauntless. The modified Voyager is able to cover a distance of light years with the slipstream modification before the system becomes unstable. The way back to Earth is stated in a fake message, created by Arturis, with 7 months aboard the Dauntless. For this period, the stocks are filled. At a residual distance of 60, light years at this time, this would correspond to a speed of about , times the speed of light or times slower than a short slipstream jump. However, in the episode " Timeless ", the technology proved to be dangerously unstable, resulting in the loss of all hands of the Voyager in an alternate timeline. Due to a phase variance, the Slipstream tunnel, produced by a replica slipstream drive of the Voyager, collapsed during the flight and the ship crashed on a planet near the border on the edge of the Delta Quadrant. Harry Kim and Chakotay survived, because they used the Deltaflyer, which flew ahead of the Voyager, reached the Earth safely. They used some years after this event a temporal communication device to change the timeline and rescue the ship and the crew. Folding space[edit] In addition to the possibility to let a

spaceship glide through space in a warp field, there is also space folding in Star Trek. Spatial folding means that two points of space-time are directly connected and an instantaneous change takes place. The space between is simply folded into a higher-dimensional hyperspace or subspace. In the episode That Which Survives of the original series, the Enterprise encountered the remains of people called Kalandans. These are able to instantaneously teleport spaceships as well as people over long distances. In the episode Contagion of the series Star Trek: These people were able to instantaneously teleport people over long distances with the help of Iconian Gateways. To ensure the gateway did not fall into the wrong hands, Captain Picard destroyed it. However, this caused progressive physical harm to people during transport; multiple use almost always ended in death. The USS Voyager came in touch with this technology several times on their way home. This wraps an object in a kind of subspace bubble, and teleports it to another location using spatial folding. The range was 40, light-years. However, the technology was not compatible with the warp core and almost destroyed Voyager when it was used. This also used spatial folding for locomotion. But the system was very unstable and if there is a fault in the drive it could cause a tear in the space-time continuum. A replica of the drive was only tested in a shuttle and never used for the Voyager. Last but not least, spatial folding appeared as a geodesic fold in the episode Inside Man. A geodesic fold occurs when a Verteron beam is fired at the atmosphere of a giant star at two different locations. This connects both points in space and creates a short lived passage. However, this was not usable because of deadly radiation that occurred during flight. However, the Ferengi only wanted to get the Borg technology aboard Voyager and would have let the crew die. At the last moment, travel through the passage was aborted. Fictional history[edit] The episode " Metamorphosis ", from The Original Series, establishes a backstory for the invention of warp drive on Earth, in which Zefram Cochrane discovered the "space warp". Cochrane is repeatedly referred to afterwards, but the exact details of the first warp trials were not shown until the second Star Trek: The Next Generation movie, Star Trek: The movie depicts Cochrane as having first operated a warp drive on Earth in This successful first trial led directly to first contact with the Vulcans. It was also established that many other civilizations had warp drive before humans; First Contact co-writer Ronald D. The procedure involves traveling at a high warp velocity in the direction of a star, on a precisely calculated "slingshot" path; if successful, it causes a ship to enter a time warp, leading to the past or future. The same technique is used in the episode " Assignment: Earth " for historic research. The term "time warp" was first used in " The Naked Time " when a previously untried cold-start intermix of matter and antimatter threw the Enterprise back three days in time. The term was later used in Star Trek IV in describing the slingshot effect. The technique was mentioned as a viable method of time travel in the TNG episode " Time Squared " This "slingshot" effect has been explored in theoretical physics: Warp core[edit] A primary component of the warp drive method of propulsion in the Star Trek universe is the "gravimetric field displacement manifold", more commonly referred to as a warp core. Starship warp cores generally also serve as powerplants for other primary ship systems. When matter and antimatter come into contact, they annihilate â€”both matter and antimatter are converted directly and entirely into enormous quantities of energy, in the form of subnuclear particles and electromagnetic radiation specifically, mesons and gamma rays. In the Star Trek universe, fictional " dilithium crystals " are used to regulate this reaction. These crystals are described as being non-reactive to anti-matter when bombarded with high levels of radiation. Usually, the reactants are deuterium , which is an isotope of hydrogen , and antideuterium its antimatter counterpart. The reaction chamber is surrounded by powerful magnetic fields to contain the anti-matter. If the containment fields ever fail, the subsequent interaction of the antimatter fuel with the container walls would result in a catastrophic release of energy, with the resultant explosion capable of utterly destroying the ship. Such "warp core breaches" are used as plot devices in many Star Trek episodes. An intentional warp core breach can also be deliberately created, as one of the methods by which a starship can be made to self-destruct. Warp requirements for 10m OD sphere. Real-world theories and science[edit] In , physicist Miguel Alcubierre formulated a theoretical solution, called the Alcubierre drive , for faster-than-light travel which models the warp drive concept. Calculations found that such a model would require prohibitive amounts of negative energy or mass. NASA engineers have begun preliminary research into such technology.

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4: The Porsche GT2 RS and the Science of Speed - Motor Trend

Science of Speed 2 is an engaging, challenging, and competitive CO2 dragster activity sure to get students excited as they design, build, and modify their cars while also learning about.

The titanium exhaust weighs 15 pounds less. Front trunklid, front fenders, front wheel arch vents, exterior mirror covers, rear intake vents, and parts of the rear fascia are made from carbon fiber. The engine cover is also carbon fiber, with carbon-fiber hinges. The roof is magnesium, which saves 2. The front and rear fascias are made of a lightweight polyurethane with tiny hollow glass spheres in it. The intercooler supports made from handlaid carbon fiber, and although the intercoolers are bigger, each assembly is 3. Glass is lightweight Gorilla Glass, similar to that developed for mobile phones, lighter than the polycarbonate previously used on special s, and legal for road use in the U. Inside, lightweight carpets save 6. The cable harness 1. The magnesium roof panel is replaced with one made of carbon. A titanium roll cageâ€”not available in the U. Made from forged magnesium, the wheels save a hefty New stabilizer bars and coupling rods that are made from carbon fiber, saving But the key difference between the two engines is the size of the turbochargers. Although the Turbo S turbos have 2. The Turbo S turbo can support maybe hp, but then it runs out of revs and runs out of boost. The intercoolers are 15 percent bigger and sit lower in the car, and a system that sprays water on the intercooler matrix when intake air temperatures exceed degrees F, with 90 percent throttle openings, can reduce intake air temperature by as much as 68 degrees. If it does run dry, the engine management system simply dials back the available power. Refilling the tank, which is mounted in the trunk and easily accessible, is as easy as buying a bottle of distilled water. Although the GT3 RS featured big turning vanes on the front control arms to guide cooling air onto the front rotors, on the GT2 RS cooling air enters via NACA ducts on the trunklid and is directed downward onto the rotors. This is a win-win-win situation we are very happy about. Ride height, camber, caster, toe, and stabilizer bar settings are all adjustable. The big change is in the spring rates. The front springs are 2. In road settings, the wing can generate up to pounds of downforce and the splitter pounds. In track settings, those numbers rise to pounds and pounds, respectively. Increasing the downforce involves increasing the angle of attack of the rear wing and removing blanking partsâ€”exactly the same as those used on the Porsche Cup racersâ€”from the splitter. We used nylon cables first, but they kept snapping. Tire development focused on longevity and stability on the track and on improving wet weather grip. It will go quickerâ€” mphâ€”but Preuninger says a tire homologated to cope with that speed would have resulted in too hard a compound for track use. And it reaches this speed very, very quickly.

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5: The Porsche GT2 RS and the Science of Speed

Design for Speed is a six-week unit that challenges students to apply STEM knowledge and design skills. Students engage in competitive engineering with the goal of creating the fastest and most eye-pleasing balsa wood or basswood dragster.

Physics for Kids Speed and Velocity Although speed and velocity are often used interchangeably in everyday life, they represent different quantities in physics. Speed is a measurement of how fast an object moves relative to a reference point. It does not have a direction and is considered a magnitude or scalar quantity. Speed can be figured by the formula: This is the way the speed of a car is typically measured. The measurement of speed can reflect two different scalar quantities. Instantaneous Speed - The speed of an object at a given moment. The car may be travelling at 50 mph at this moment, but it may slow down or speed up during the next hour. Average Speed - The average speed is calculated by the distance that an object traveled over a given interval of time. If a car traveled 50 miles over the course of one hour then its average speed will be 50 mph. It may be that the car traveled at instantaneous speeds of 40 mph and 60 mph during that time, but the average speed is 50 mph. Velocity has a magnitude speed and a direction. Velocity is a vector quantity. Velocity is represented by the formula: What is the difference between speed and velocity? Speed is the magnitude of velocity. Velocity is the speed of an object plus its direction. Speed is called a scalar quantity and velocity is a vector quantity. Speed of Light The fastest possible speed in the universe is the speed of light. The speed of light is ,, meters per second. In physics this number is represented by the letter "c. A speedometer is a great example of instantaneous speed. The speed of light can also be written as , miles per second. The speed of sound in dry air is It is 25, miles per hour. Activities Take a ten question quiz about this page.

6: The Science of Speed - Motor Trend

Science of Speed 2 - Design for Speed Poster. $ (USD) Science of Speed 2 - Let's Get Moving Poster. $ (USD) Previous. Next. Leading education that.

7: Science of Speed: Friction and Heat - Science News Service | National Science Foundation

Speed Sensation: Below are five freeze-frame data readouts taken as the GT2 RS barreled around a medium-speed corner. About all that's missing is the level of adrenaline in the driver's.

8: Science of Speed: Friction and Heat - Science - Video Library

The Science of Speed, produced for the National Science Foundation (NSF) and written and hosted by Diandra Leslie-Pelecky, explains the scientific principles that are so essential to the NASCAR experience. Viewers learn how science makes cars powerful, agile, fast and safe--and how these same.

9: TX FS : Science of Speed Stage 2 Superchar

Science of Speed has the coaches, experience and technology to take you to the next level. VO 2 MAX TESTING. VO2max is the body's maximal ability to uptake oxygen.

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Many difficulties always remain 287 Complications in ophthalmic surgery Works of Lucian of Samosata Pride and prejudice and zombies ebook Mouse numbers letters Evaluating the Feasibility of Developing National Outcome Data Bases to Assist Patients with Making Treat The perfected poultry of America Gender, power, and the Unitarians in England, 1760-1860 Aligning business and IT with metadata Prc board exam answer sheet sample Itext er to ument Land-locked states and international law Holt physical science workbook Jewish Contributions to Civilization (1919) Research for improved diagnosis 31. Working model of heart Spirit of Chinese philosophy FDICs handling of small business asset foreclosures Relativistic cosmology Trapped kevin hearne Natural death and the duration of life, by Jacques Loeb. The limits of history Case Workbook in Human Genetics Places to go with children in Colorado Partes de un buque en ingles A guide to the fonds darchives and collections in the holdings of the York University Archives Great Northern Railway 1945-1970 Photo Archive Volume 2 Social dominance of knights The Engineer battalion in the civil war, by Gilbert Thompson. Haskell 2010 language report Italian Gardens of the Renaissance (Reprint Series) Nyaya theory of knowledge chatterjee Documentary realism and the postwar left Will Straw Project arcade build your own arcade machine Earthbound battle enemy guide Ultimate Nintendo 64: Pocket Power Guide English to kannada dictionary Can i paste in image into a ument In search of an interferon Engineering mathematics 2 book rgpv