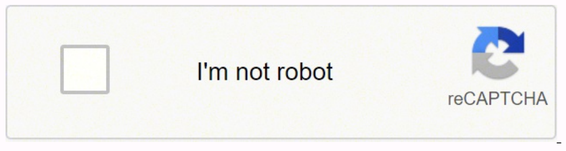

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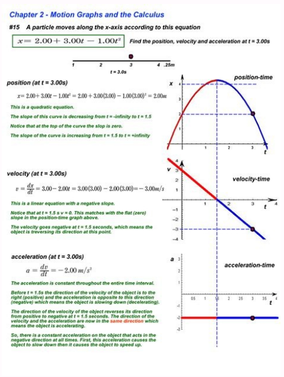
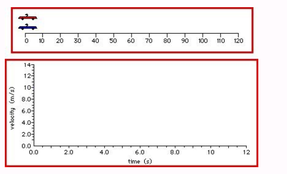
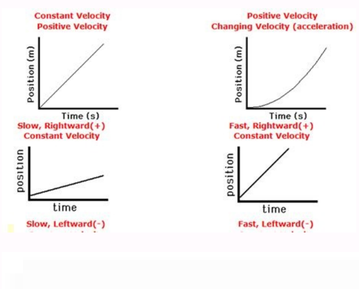
Describing motion with velocity time graphs answers







Describing Motion Verbally with Distance and Displacement

Read from **Lesson 1** of the **1-D Kinematics** chapter at **The Physics Classroom**:

http://www.physicsclassroom.com/Class/1DKin/U1L1a.cfm
http://www.physicsclassroom.com/Class/1DKin/U1L1b.cfm
http://www.physicsclassroom.com/Class/1DKin/U1L1c.cfm

MOP Connection: Kinematic Concepts: sublevels 1 and 2

Motion can be described using words, diagrams, numerical information, equations, and graphs. Using words to describe the motion of objects involves an understanding of such concepts as position, displacement, distance, rate, speed, velocity, and acceleration.

Vectors vs. Scalars

38. Most of the quantities used to describe motion can be categorized as either vectors or scalars. *A vector is a quantity that is fully described by both magnitude and direction. A scalar is a quantity that is fully described by magnitude alone.* Categorize the following quantities by placing them under one of the two column headings.

displacement, distance, speed, velocity, acceleration

Scalars	Vectors
distance speed	displacement velocity acceleration

39. A quantity that is *ignorant of direction* is referred to as a scalar quantity.
a. scalar quantity b. vector quantity

40. A quantity that is *conscious of direction* is referred to as a vector quantity.
a. scalar quantity **b. vector quantity**

Distance vs. Displacement

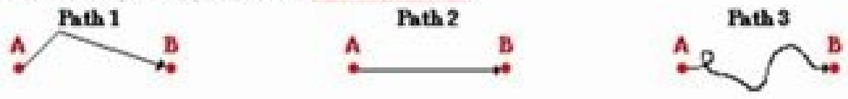
As an object moves, its location undergoes change. There are two quantities that are used to describe the changing location. One quantity - **distance** - accumulates the amount of total change of location over the course of a motion. Distance is the amount of ground that is covered. The second quantity - **displacement** - only concerns itself with the initial and final position of the object. Displacement is the overall change in position of the object from start to finish and does not concern itself with the accumulation of distance traveled during the path from start to finish.

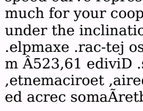
41. True or False: An object can be moving for 10 seconds and still have zero displacement.
a. True b. False

42. If the above statement is true, then describe an example of such a motion. If the above statement is false, then explain why it is false.

If an object somehow turns or curves around and finishes at the starting point, then there is zero displacement. For instance, if a physics teacher starts on one corner of a table and walks all around the table and back to the starting point, then her displacement is zero. She is not out of place.

43. Suppose that you run along three different paths from location A to location B. Along which path(s) would your distance traveled be different than your displacement? Path 1 and Path 3





1-d kinematics describing motion with velocity-time graphs answers.

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The distance and the speed in the day must add up to zero. Then the actual graph would be curved at each end, but Å Å make the same approximation as we did then, anyway. The instant speed at t = 10 s and t = 23 s A© of 3 m/s and 1,5 m/s. The speed we calculate here makes sense if we look at the graph. Divide 2 700 m/30 s = 90 m/s. The instant speed at t = 10 s and t = 23 s A© of 0 m/s and 3 m/s. The time curve A© used to construct a velocity vs. The graph shows a horizontal line indicating that the ball moved with a constant velocity, that it wasn't accelerating. The graph shows a horizontal line indicating that the ball moved with variable speed, this was accelerating. Time charts. [OL] Students should be able to see that if a position graph is not a straight line, then the speed graph will be a horizontal line. You cannot have negative position, speed, and acceleration in a graph that describes the way the object is moving. the chart is not the speed. This process is called dimensional analysis and is one of the best ways to check if your killing makes sense in the music. Again, if we take the slope of the velocity vs. instant velocity at t = 10 s and t = 23 s are 3 m/s and 0 m/s. At the start of the movement, when the car is accelerating, we saw that its position is not a curve, as shown in Figure 2.17. Using the given tangent line, we found that the slope is 1 m/s2. We get 0.5 km/minute ÃÂ Å10. the time graphs that we will see are simple to interpret. 23. Locate the liquid displacement, which we found in part (a) was 2,700 m. At t = 25 s, v = 140 m/s. Locate the liquid displacement, which we found in part (a), was 16.325 m. How is the information portrayed differently? Then it accelerates for 3 seconds, keep ©m speed for 15 seconds, then decreases for 5 seconds until it stops. Locate the total time that for this case is s. As this graphic is an indefinite curve, we have to estimate forms at smaller intervals in order to find the areas. As when we are working with a curved displacement graph, we will need to make a tangent line at the time we are interested. Å € â € and we use it to calculate instantaneous acceleration. This problem is more complicated than the last example. How would more realistic graphics? Add them together to get a liquid displacement of 2,700 m. Now, let's build this information as we look at vs. vs. graphics. We will explore the acceleration later, but it may be interesting to take a look here. The instantaneous speed to T = 30 S, is 240 m / s. Speed is the displacement change rate. [Ol] Students compare this problem and last. The liquid displacement is 45 m and the speed rate is 2.10 m / s. What information you could get looking at a vs. vs. We can see that the method of day for the inverter is "0.5 km / minute. In figure 2.16, we have speed on the time axis time along the x-axis. Figure 2.15 A Versus Position Graph time for the unit to and from school is shown. Calculate the lower rectangle (common to all pieces). Most speed vs. This is because it makes the concept clearer or the calculation more Easy. This is good because you can tell us if we calculate or not all with the right units. [AL] Guide the students to see that the area under the speed curve is actually the Position and inclination represents the rate of change of speed, as well as the inclination of the position line represents the change rate of the position. Acceleration is the rate of speed change; let's discuss the more acceleration in another chapter. The graph shows a horizontal line indicating that the ball moved with a constant speed, this is ©, was accelerating. In this activity, you will REPRES Get a ball in a rartnocne arap odasu res edadicolev ed ocifiÁrg mu edoPÅ Å¢ÃksA .sv edadicolev amu me avon oF&§Åamrofni amugla etsixE .oF&§Åom ad edatem ariemirp a ³Ás ragep Å Å .ederap amu rignita mes lacol odanimreted mu me alob amu ralupinam arap lairotev amargaid mu ¡Árasu ªÃcov ,oF&§Åalumis atseN .ocifiÁrg od sadavired res medop seµÃ§Ãamrofni siauq sonula soa ratnugrep e opmet ed ocifiÁrg .edadicolev ed ocifiÁrg mu rairc arap pans ed oir³Åtarobal omitl°Å on marahnesed euq otnemacolsed ed ocifiÁrg o oÉÃrasu sonula so ,oir³Åtarobal etseN .s/m 84,2 ed ©Ã aid©Ãm edadicolev a e m 75 ed ©Ã odiuqÃl otnemacolsed O .osuoper me etnemlaicini ajetse rodavele o euq ahnopuS .sv oF&§Åisop amu me otnemivom o arap raenil oF&§Åauqe amu rinifed somaÃredop omoc missA .ovitisop evilced mu moc ater ahnil amu sanepa ©Ã euq ,81.2 arugif a airetbo ,essezif o eS .oxie mu me ovitagen opmet moc ocifiÁrg mu rev eved acnun ªÃcoV .latnoziroh edadicolev ed ocifiÁrg mu ¡Árizudorp ele ,odanilcni etnemavitagen uo avitisop ©Ã euq opmetÅ Åater ahnil ed oF&§Åisop ed ocifiÁrg mu somrevit es ,odnugeS .alocse Å megaiv a arap otnemacolsed o ©Ã euq ,mk 5 somet s³Ãn e ,malecnac es sotunim rop sedadinu sA .s/m 66,2 ed ©Ã aid©Ãm edadicolev a e m 75 ed ©Ã odiuqÃl otnemacolsed O .etnemaciroet al-ªÃdnetne masicerp sele e ,oid©Ãm onisne od setnadutse arap rodaifased otiecnoc mu res edop etnegnat ahnil a rartnocnE ?opmet ed socifiÁrg ?ocifiÁrg etse moc odarre ed ¡Ãh euq O]LA[.seµÃ§Ãautis ed edadeirav amu me otnemivom o meger euq siel sa acilpa e ecehnoc etnadutse O .s 52 = t e s 5 = t ,es-agiD .t/d = v euq somebaS .s/m 041 ©Ã arutla e s 03 ©Ã esab ajuc olugn¢Åirt mu ¡Åtse eled amicA .selpmis etnatsab oF&§ solucl¡Ãc sosson so ,ecetnoca ossi odnauQ ?otnemivom od asicerp siam megami a moc airatropmi es ªÃcov odnauQ .ocifiÁrg od ritrap a adil res edop aen¢Ãtnatsni edadicolev a .sv edadicolev ad etrap roiam A .socifiÁrg sessen oF&§Åisop a e edadicolev a ertne oF&§Åaler a mavercsed sonula so euq moc a§ÃaF]LA[]LO[?sv opmet ed ocifiÁrg This slope tells us that the car is not accelerating, or accelerating. It is common in physics, especially in the initial learning stages, for things to be neglected, as we see here. This is shown in two points. The area of a rectangle is Ålength Use the Verify Your Understanding questions to evaluate the achievement of your studentsÃÂ ÅÂ How inaccurate are you not to ignore the non-constant part of the movement? We can learn a few things. Time frame of the car Ås jet movement that takes into account this acceleration phase. For example, if we end up with m s for speed instead of m/s, we know something has gone wrong, and we need to check our killing. Ask students if the speed could actually be constant from rest or shift to negative not quickly. Figure 2.18 The chart shows the speed of a jet-powered car during the period when it is accelerating. If we use a small Algebra to rearrange the equation, we see that d = vÅA Å There are a few other interesting things to notice. In addition, students should come to have an intuitive understanding of the relationship between position and speed graphs. 165 m/sÂ The area of this part, therefore, is 2,100 m. At the end of this session, you will not be able to do the following: Explain the meaning of tilt and angle at speed vs. Use Figure 2.19 to (a) find the approximate offset of the jet car during the time shown, (b) calculate the instant acceleration at t = 30 s, (c) find the instant velocity in 30 s, and (d) calculate the approximate mÃ© day speed during the interval shown. You cannot manipulate the ball directly with the position or by changing its velocity. Most often, these curved graphs occur when something is accelerating, often resting. Approaching this curve with a line, we get a velocity in a day of 202.5 m/s. Just as we can use a position vs. Occasionally, let's look at graphs vs. vs. Can a speed chart be used to find anything thing alob a eS .edadicolev ed aşÃnadum ed axat a edem euq ,oF&§Åareleca a Å ?otnemivom od asicerp somem oF&§Åatneserper amu arap rahlo rereuq airi ªÃcov euq roP ?a§Ãnerefid a ©Ã lauQâratnugreP .s 03 ©Ãta ednetse es euq s/m 02 e 0 ertne olugn¢Åter mu rop atsopmoc ©Ã aer¡Ã a ,osac etseN .s 07 §Å ¢Ã 04 e s 04 §Å ¢Ã 02 ,s 02 §Å ¢Ã 01 ,s 01 §Å ¢Å ¢Ã 0 .m 523.61 ed odiuqÃl otnemacolsed mu retbo arap so-etnecsercA .otunim/mk 5,0 ed ©Ã alocse a ©Ãta osrucrep od aid©Ãm edadicolev A .otnemivom o madum serotaf sesse omoc erolpxE .)alecnac ele ,somezid ,uo(1=mk/mk mu oFÃtne ,soremºÃn so atart euq amrof amsem ad sedadinu sa ratart edop ªÃcoV ?edadrev res eved euq o ,aditrap ed otnop ues euq ragul omsem on etnemataxe abaca e sossap 3 ¡Åd aossep amu eS odºÃetnoc o rev arap euqilC .otnemacolsed o raluclac arap ocifiÁrg ues esU .odnareleca ¡Åtse ele euq me opmet ed olavretni o etnarud otaj a orrac mu ed edadicolev ad osicerp siam ocifiÁrg mu artsom ocifiÁrg O 91.2 arugiF .sv oF&§Åisop amu me euq oF&§Åamrofni amsem a ©ÃratnugreP .sv edadicolev a raredisnoC .sv oF&§Åisop amu airasu ªÃcov omoC .m©Ãbmat ,etsuja mu o erbos ol-¡Ãcoloc edop ªÃcov ,airatsog ªÃcov eS .otnop essen etnegnat ad oF&§Ãanilcni a ©Ã otnop reuqlauq me aen¢Ãtnatsni edadicolev A .oF&§Åareleca e edadicolev ed somret me acifingis ele euq o euqilpxe e ocifiÁrg o avercseD .etnednopserroc oF&§Åisop ed ocifiÁrg o retbo medop sele es ajev e edadicolev ed socifiÁrg snugla ehnesed ,adiuges mE .anep a elav euq oF&§Åamixorpa amu ©Ã ater ed avruc amu ramahc sezev s Ã ,somasicerp euq atsopser ad oF&Åsicerp ad e sotis³Åporp sosson sod odnednepeD ?ªÃuq roP .odartsom olavretni od ognol oa aid©Ãm edadicolev a raluclac)d(e ,s 5 me aen¢Ãtnatsni edadicolev a rad)c(.atlov ed ohnimac o e alocse a arap ohnimac o ,orrac od otnemivom o arap sotnitsid sodoÃrep siod ¡Åh euq rev somedop ,somednerpa euq o odad e ,ocifiÁrg etse arap odnahlO .sariemirp saud sad otnemacolsed o euq roiam ©Ã apate ariecret ad otnemacolsed O laugi otnemacolsed ret meved sapate sªÃrt sA slowed down in the last ³ labor, perhaps due to ramp is too low, so graphic It does not show constant speed. A = = "V" t = 100 m / s 20 echoå € ° / Å½ = = = " instantaneous at = 5 s, as we find in part (b) is only 40 m / s. If students are struggling with a specific goal, the verification of their understanding will help to direct students to the relevant content. Time graphic. Acceleration is given by finding the slope of the velocity graph. Time and vice versa? Acceleration direction of the reference frame of movement of the shortest way of movement 24. 100m / s falls in half the graph and, as is a straight line, we waited about half of the speed To be up and half below. Find the slope. Now we know that the car could not have been resting for a constant speed without accelerating. Ask - Where are the turning points in the movement? The area under a speed curve represents the displacement. Your Graphic Laboratory Graph of Previous Graphic Snap! 1 Piece of graph paper 1 pipis Take your graph from the previous graphics fitting lab! and use it to create a vs. vs. SEÇÃO 1 = 225 m; SEÇÃO 2 = 100 M + 450 M = 550 m; Section 3 = 150 m + 1,300 m = 1,450 m; SEÇÃO 4 = 2,550 m. Thank you very much for your cooperation. The inclination of a VS position. So, the car is not accelerating. The area of a VS position. We assume for our original calculation your father drove with a constant speed of and to school. Time graph shown below a person in an elevator. We will more with such information in a posterior chapter. And if we took the area under the inclination, we return to the displacement. Return to the unit scenario to and from school. Alternatively, provide an example of a vs. vs. The displacement is given when finding the area under the line at vs. vs. Go back to our unit to school and see a graph of versus time as shown in Figure 2.15. The graph shows a horizontal horizontal line .elpmaxe .rac-tej osson od olpmexe o somajeV .otunim/mk Å5,0 a latnoziroh ahnil amu sioped e otunim/mk Å5,0 a latnoziroh ahnil amu ©Ã etnednopserroc edadicolev ed ocifiÁrg o euq rev ed sezapac res oÉÃtne meved sonula sO .amelborp oriemirp o euq od odacilpmoc siam otium ossecorp mu ©Ã etsE s/m Å3324å1 s 07 m Å523,61 s/m Å3324å1 s 07 m Å523,61 ediviD .sv oF&§Åisop amu riurtsnoc arap adasu ©Ã opmet ed avruC .atsopser a etnemavitacifingis ratefa oF&Ãn arap etneicifus o aneuqep ©Ã adaicnegilgen odnes ¡Åtse euq asioc a etnemlamron euqrop anoicnuF .sodanoicaler-retni otium sodot oF&Åtse sotiecnoc sessE .ocifiÁrg etsen otnop adac me aen¢Ãtnatsni edadicolev a ramot ,etnemaciroet ,airedop ªÃcov sam ,ossi rezaf euq met oF&Ãn ªÃcoV .odajaiv latot opmet o moc oF&§Ãarapmoc me aneuqep otium ©Ã oriezurc ed edadicolev aus rignita e rareleca arap avel orrac o euq opmet ed edaditnauq a ,roiretna olpmexe oN .sv d mu ed oF&§Ãanilcni A .arugral Å Å otnemirpmoc ÃÂ Å 5 ,0 ed ©Ã olugn¢Åirt mu ed aer¡Ã A .s/m Å191 ed acrec somaÃretbo ,sodnuges 03 soriemirp son sanepa aid©Ãm edadicolev Å ragehc arap savitamitse sasse rasu somess´Åf eS .amu ,oF&§Åareleca Å laugi ©Ã oF&§Ãanilcni a ,somessid omoC .odnareleca avatse oF&Ãn ,ajes uo ,lev¡Åirav edadicolev amu moc aivom es alob a euq

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