

Summer Reading Honors Physics

The goal of this summer assignment is to provide you with a foundation that we will build upon on the first day of class. This reading will provide you with an overview of motion in one direction. I have designed the assignment so that you do not need your physics text. So you can work on this by the pool as long as you have a wireless internet connection. All readings are from “The Physics classroom” web site. I have provided you with the link below.

The site is a self guided tutorial and is very easy to navigate. The reading that I have assigned is in the “1-D kinematics” section, lessons 1-5. As you read each lesson please complete all “testing your understanding sections”. I obviously will not be able to check if you did this but it is important that you do for this will greatly increase your understanding of the subject as you navigate through each reading.

The questions that I require you to answer are listed below. Please read each section before attempting the questions. The questions must be neat, complete and in order. **The questions must be typed in complete sentences and in a restated matter.** All typed questions must be emailed to me by 9/1/10. Sketches and graphs may be submitted on the first day of class.

One last note.... don't have a fit if you can not figure out all the answers!

My email is Pdrury@lvhs.org

Here is an example of how I want you to answer the questions in a restated manner.

- What is your favorite color?
 - Green Wrong!
 - My favorite color is green. Still wrong!
 - My favorite color is green because it makes me feel all warm and tingly inside. Now you got it!

<http://www.physicsclassroom.com/Class/1DKin/1DKinTOC.html>

Lesson 1

1. What is a vector and what is a scalar? Give examples of each.
2. Differentiate between distance and displacement.
3. What is the displacement and distance of a runner in the 100 meter and also in the 400 m races? (Hint 400m is one time around the track)
4. Differentiate between speed and velocity and give an example of each.
5. What was my average speed if it took me 10 hrs to drive 520 miles? What does this average speed tell you about my speed at 3.5 hrs into my trip?
6. What is instantaneous speed? How can you measure your instantaneous speed while in a car?
7. Ok you just received a speeding ticket. You try to explain to the officer that your average speed was only 50 mph yet he still gives you a ticket. Why?
8. Can you accelerate and yet not change speed? Explain
9. Does a car that is slowing down always have a negative acceleration?
10. The speedometer of a car moving east on Rt. 80 indicates 110 km/hr. It passes another car that is traveling west at 110km/hr.
 - a. Do both cars have the same speed?
 - b. The same velocity?

- c. How fast are they moving relative to the ground and also to each other?
 - d. If they have both traveled for 1 hour, will they travel the same distance?
11. Velocity and acceleration can be positive or negative but can time be positive and negative? Explain.

Lesson 2

12. How can you determine if an object is moving at a constant velocity, is slowing down, or speeding up using a ticker-tape? Explain each situation in detail.
13. How do you indicate an increasing velocity utilizing vector diagrams?
14. Draw the velocity and acceleration vectors of a baseball thrown from you to a friend.

Lesson 3

15. What is the shape of a position time graph of a cart moving at a constant velocity?
16. What is the shape of a position time graph of a cart that has a positive acceleration or changing velocity?
17. The equation for slope is rise over run. What is rising and what is running on a position time graph?
18. Notice that a graph of position and time with a constant slope has a constant velocity and a graph with a changing velocity has a changing slope. What does the slope of a position time graph represent?
19. What is the general relationship between the steepness of the slope and velocity?
20. What does a downward sloped straight line on a position time graph represent?
21. What does a downward curve represent on a position time graph?
22. Sketch a position time graph of a cart that is accelerating for 2 seconds, then moving at a constant velocity for 4 seconds, then slowing down to a stop for 2 seconds, and then stopped for 4 seconds. (yes I know that was a run on sentence!)

Lesson 4

23. What does an upward slope on a velocity time graph represent? A downward sloping line?
24. The slope of a velocity time graph is change in velocity per unit time. What term does this represent?
25. What has happened to an object when the line crosses from the positive region to the negative region on a velocity time graph?
26. Sketch the velocity time graphs for an object speeding up and also slowing down.
27. What does a horizontal line on a velocity time graph tell you about the objects velocity and acceleration?
28. What does the area under a velocity time graph represent?
29. What do you think the area under an acceleration time graph represent?

Lesson 5

30. What is freefall and what do we assume is not acting on an object in freefall?
31. Sketch the position time graphs and the velocity time of a freely falling object.
32. What is the speed and displacement of an object dropped from rest after 1s, 2s, 3s, 4s, & 5s?
33. What falls faster a car or a baseball? Explain your answer.
34. Can an object accelerate if its instantaneous velocity is zero?
35. If a freely falling rock were equipped with a speedometer, by how much would its speed increase each second? How about its acceleration?
36. If the same rock was thrown upward by how much would its speed change per second. How about its acceleration?
37. What is the speed and velocity of a rock at the top of its path when it is thrown straight upward? What is its acceleration?
38. An object that is thrown straight up will fall back to the earth.
 - a. When is the velocity zero?
 - b. Does the velocity change direction?
 - c. Does the acceleration due to gravity have the same sign on the way up as down?
 - d. Assume the velocity of an object is 25m/s on the way up. What would object's velocity be at the same position on the way down?