Honors Physics
Speed and velocity

This unit will allow each student to:

a. gain a better understanding of the concepts of speed and velocity as well as describing them through the use of graphs
b. continue making proper scientific measurements and calculations (K-U-E-S)
c. define and properly use all vocabulary
d. properly apply all terms in describing/explaining real world examples
e. relate these concepts her/his daily activities and behaviors
f. teach someone else the concepts discussed
g. practice proper laboratory safety

This will be accomplished by each student that is able to:

1. recognize and relate SI and USCS units of time, distance, displacement, speed, and velocity
2. recognize a time, distance, displacement, speed, and velocity by the units only
3. describe a moving object with relation to a frame of reference
4. distinguish between distance and displacement
5. distinguish between speed and velocity
6. distinguish between *change in*, *average*, and *constant*: speed and velocity
7. describe the motions of an object with a constant speed but changing velocity
8. interpret (a) distance v. time, (b) position v. time, (c) speed v. time, and (d) velocity v. time graphs
9. construct (a) distance v. time, (b) position v. time, (c) speed v. time, and (d) velocity v. time graphs from given data
10. collect necessary data from a given scenario to construct a position v. time and a velocity v. time graph
11. perform calculations using proper problem solving techniques (K-U-E-S) to determine (a) speed, time, or distance and (b) velocity, displacement, or time
12. experimentally determine various speeds and velocities

Textbook Reference – Physics: Principles and Problems

Chapter 2 – Representing Motion

Key Terms

relative, frame of reference, distance, time, direction, position, rate, instantaneous speed, average speed, displacement, velocity, vector, scalar

Speed and Velocity Review

Answer each question as completely as possible.

1. Why is motion considered relative, and what does that mean?

2. What object is the usual frame of reference for motion here on the earth?

3. Explain how a boulder at rest on the ground can actually be moving at the same time.

4. Define speed. What is the difference between instantaneous and average speed?

5. What is the equation for speed? What are some possible units for speed?

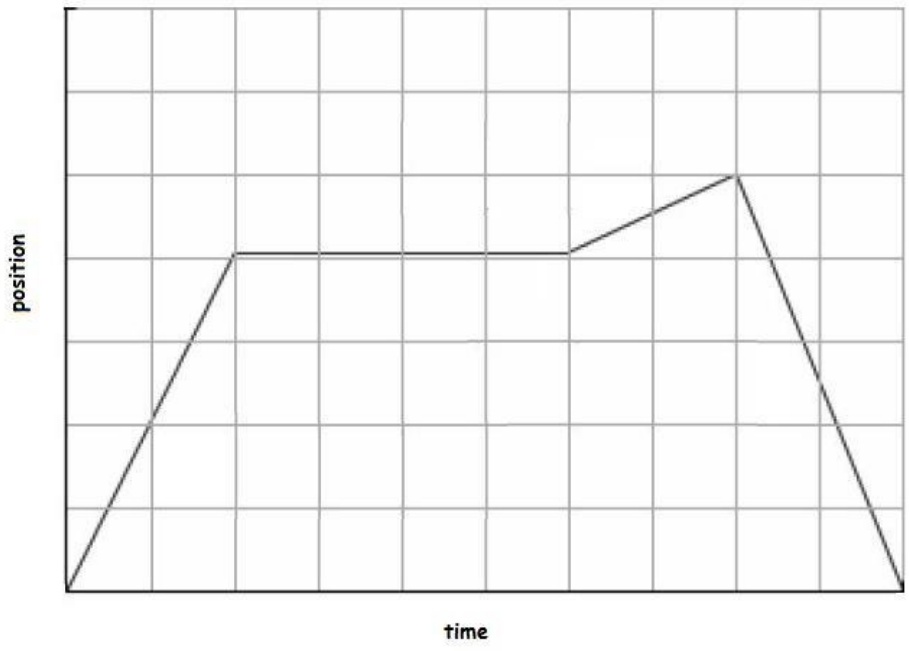
6. Differentiate between speed and velocity.

7. Define constant velocity. When does an object have constant velocity?

8. What is the average speed of a car that travels 200 miles in 2 hours?

9. Sketch a position v. time graph representing the motion of a dog: (a) first with a constant positive velocity, (b) then at rest, and (c) finally a constant negative velocity.

10. Describe in words the motion of the object in the following graph:



Honors Physics
Acceleration and Gravity

This unit will allow each student to:

h. gain a better understanding of the concepts of speed, velocity and acceleration as well as describing them as they apply to free fall and through the use of graphs
i. continue making proper scientific measurements and calculations w/ significant digits
j. define and properly use all vocabulary
k. properly apply all terms in describing/explaining real world examples
l. relate these concepts her/his daily activities and behaviors
m. teach someone else the concepts discussed
n. practice proper laboratory safety

This will be accomplished by each student that is able to:

13. recognize and relate SI and USCS units of time, distance, speed, velocity, and **acceleration**
14. recognize a time, distance, speed, velocity, and **acceleration** by the units only
15. distinguish between *change in*, *average*, and *constant*: acceleration
16. describe the motions of various accelerating objects
17. recognize that acceleration describes a decrease in speed, an increase in speed or a change in direction
18. interpret (a) distance v. time, (b) position v. time, and (c) velocity v. time graphs
19. construct (a) distance v. time, (b) position v. time, and (c) velocity v. time graphs from given data
20. perform calculations using proper problem solving techniques (K-U-E-S) to determine (a) acceleration, change in velocity, or time and (b) speed, distance, and time of an object in freefall
21. completely describe the motion of an object undergoing free fall motion
22. describe how air affects the motion of a falling object
23. experimentally determine various velocities and accelerations
24. experimentally determine the acceleration due to the gravity of the earth
25. recognize that free fall motion is an everyday example of constant acceleration

Textbook Reference – Physics: Principles and Problems

Chapter 3 - Accelerated Motion

Key Terms

distance, time, direction, position, rate, instantaneous speed, average speed, displacement, velocity, acceleration, free fall

Acceleration and Gravity Review

Answer each question as completely as possible.

11. Define acceleration. What is the motion equation for acceleration?

12. How are velocity and acceleration related?

13. Give an example of an object traveling at a constant speed and accelerating.

14. What are the three ways an object can accelerate?

15. If an object travels at the same speed and the same direction, is the object accelerating?

16. Describe the motion of a car with a velocity to the east and an acceleration to the east.

17. Describe the motion of a car with a velocity to the east and an acceleration to the west.

18. What is free fall and how does it relate to gravity?

19. What is the value for the acceleration due to gravity here near the surface of the earth?

20. If a ball is thrown upward at 10 m/s, what will be the speed of the ball when it is caught, back at the original point of the throw?

21. If you throw a ball straight upward, what is the ball's instantaneous speed at the top of its path?

22. If you throw a ball straight upward, what is the ball's acceleration at the top of its path?

23. Calculate the time for a rock to fall 5 m? The rock is at rest to begin with.

24. Calculate the distance a ball falls the first 6 seconds freefall? The ball is at rest to begin with.

25. Sketch two graphs of a car undergoing a constant positive acceleration. The first graph should be position v. time and the second graph is velocity v. time.