

On-level Physics

Acceleration

This unit will allow each student to:

- a. 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
- b. continue making proper scientific measurements and calculations w/ significant digits
- 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, speed, velocity, and acceleration
2. recognize a time, distance, speed, velocity, and acceleration by the units only
3. distinguish between *change in*, *average*, and *constant*: acceleration
4. describe the motions of various accelerating objects
5. recognize that acceleration describes a decrease in speed, an increase in speed or a change in direction
6. interpret (a) distance v. time, (b) position v. time, and (c) velocity v. time graphs
7. construct (a) distance v. time, (b) position v. time, and (c) velocity v. time graphs from given data
8. 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
9. completely describe the motion of an object undergoing free fall motion
10. describe how air affects the motion of a falling object
11. experimentally determine various velocities and accelerations
12. experimentally determine the acceleration due to the gravity of the earth
13. recognize that free fall motion is an everyday example of constant acceleration

Textbook Reference – Physics: Principles and Problems

Chapter 3 - Accelerated Motion

Key Terms – *write the definitions of the boldface terms on your own paper, definitions are available at theteterszone.net*

time, direction, instantaneous speed, average speed, constant speed, acceleration, freefall, gravity

Daily Grade: Daily questions/homework/review sheet

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Acceleration Review – due prior to the 20Q on Day 5

Answer each question as completely as possible on your own paper.

- A. Define acceleration. What is the motion equation for acceleration?
- B. What are the three ways an object can accelerate?
- C. Describe how an object can be traveling at a constant speed but also accelerating. Give a specific example.
- D. If an object travels at the same speed and the same direction, is the object accelerating? Explain.
- E. Describe the motion of a car with a velocity to the east and an acceleration to the east.
- F. Describe the motion of a car with a velocity to the east and an acceleration to the west.
- G. What is free fall and how does it relate to gravity?
- H. What is the value for the acceleration due to gravity here near the surface of the earth?
- I. 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?
- J. If you throw a ball straight upward, what is the ball's **instantaneous speed** at the top of its path?
- K. If you throw a ball straight upward, what is the ball's **acceleration** at the top of its path?
- L. Calculate the distance a ball will fall during the first 6 seconds freefall? The ball is at rest to begin with.
- M. 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.