Physics
Applications of Newton's Laws

This unit will allow each student to:

a. gain a better understanding of Newton's three laws of motion and forces in explaining motion
b. continue making proper scientific measurements and calculations
c. define and properly use all vocabulary
d. properly apply all terms and concepts in describing/explaining real world examples
e. continue making and interpreting scientific graphs
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 force, mass, acceleration, and pressure
2. recognize a force, mass, acceleration, and pressure by the units only
3. apply Newton's laws of motion to actual situations
4. distinguish between mass and weight
5. recognize and provide examples of forces
6. relate gravitational force to object mass and distance between objects
7. identify the difference in gravity on earth and on the moon
8. perform calculations using proper problem solving techniques to determine acceleration, weight, mass, pressure, centripetal force, linear (tangential) speed, and rotational speed
9. identify the different forms of friction
10. define and differentiate between static and dynamic equilibrium
11. distinguish between pressure and force
12. give examples of the pressure produced by various objects
13. distinguish between freefall and non-freefall
14. relate terminal velocity to the effect of air resistance and balanced forces
15. compare and contrast centripetal and centrifugal forces
16. distinguish between rotation and revolution
17. distinguish between rotational speed and linear (tangential) speed
18. identify the source of the centripetal force causing rotational motion

Textbook Reference – Physics (HMH)

Chapters/Sections	**4.4**	**7.1**	**7.2**	**8.2**

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

mass, force, **normal force, sliding friction, static friction**, static equilibrium, dynamic equilibrium, gravity, gravitational field, **air resistance, weightlessness, terminal velocity,** fluid**, centripetal force,** centrifugal force, weight, **pressure, linear (tangential) speed, rotational speed**

Applications of Newton's Laws Review – Answer on a separate sheet of paper

A. What is the weight of a 20 kg bag of dirt? Solve in Newtons first, then convert to pounds.

B. What is friction? Explain the difference between sliding and static friction.

C. What is terminal velocity? How is it achieved?

D. What is the acceleration of an object that has reached terminal velocity?

E. In the absence of air resistance, which will hit the ground first if dropped from the same height, a feather or a brick?

F. In the presence of air resistance, which will hit the ground first if dropped from the same height, a feather or a brick?

G. How is pressure related to force? How is pressure related to area? What is the equation for pressure?

H. What is the pressure resulting from 500 N acting over 1 m^2? Would the pressure increase or decrease if the area were reduced? What are the SI units of pressure called?

I. What is the difference between linear speed and rotational speed?

J. When you whirl a can at the end of a string in a circular path, what is the direction of the force that acts on the can? What causes that force? What is that circular force called

K. The passenger in a car is thrown against the door when the car makes a sharp left turn. Identify the force on the passenger due to that turn. What is the direction of the force?

L. What quantity is observed to cause a gravitational force?

M. What happens to the size of the gravitational force between two objects when the objects move farther apart?

N. Which produces more gravitational force on your textbook: you or the earth? Explain why.

O. Would you weigh more on the earth or on the moon? Explain.