School District of Marshfield
Course Syllabus

Course Name: Regular Physics
Length of Course: Year
Credits: 1
PREREQUISITE: Algebra I (205) or Algebra I Honors (206). Concurrent enrollment in Geometry (211) or Algebra II (207).

Course Description:
Discover the physical laws of nature including: motion, dynamics, energy, heat, waves, sound, light, and optics. Also study interactions among science, technology and society. If you are pursuing a liberal arts program in college or a vocational school or nursing program you may find this course helpful.

Learning Targets:

- Understand the scientific method and apply it to laboratory investigations and problems.
- Develop problem solving skills.
- Analyze and interpret graphs to understand the significance of slope, area under the curve, and relationship between variables.
- Learn of misconceptions given in today's media and understand the true meaning behind these principles and concepts.
- Solve linear and quadratic equations to determine the motion of objects through space.
- Understand wave mechanics, including sound and light.
- Understand optics with mirrors and lenses in being able to determine the position of the image formed and what it looks like.

First Quarter – 9 weeks

1. Introduction to Physics – 1 week
   A. Syllabus and class requirements overview
   B. Paper tower project
2. Math Review and Velocity – 3 weeks
   A. Solving algebraic equations, dimension analysis, SI units with conversions

   B. Graph interpretations, slope calculations
   C. Velocity equation and distance/time graphs
3. Acceleration and Gravity – 3 weeks
   A. Velocity-time graphs
   B. Acceleration (kinematics) equations
   C. Gravity
4. Vectors – 3 weeks
   A. Scalars versus vectors
   B. Vector addition and resolution
   C. Application problems

Second Quarter – 9 weeks
5. Projectile Motion – 3 weeks
   A. Horizontal projectile motion
   B. Projectiles at angles
6. Newton's Laws of Motion and Forces – 4 weeks
   A. Newton's 3 laws of motion with application
   B. Friction
   C. Free body diagrams
   D. Net force equations
   E. Hanging and connected object problems
7. Spaghetti Bridge Project and Semester Final – 2 weeks
   A. 1st semester summation project of content
   B. Review for and take semester final

Third Quarter – 9 weeks
8. Simple Harmonic Motion – 3 weeks
   A. Circular motion
   B. Pendulum and spring motion
   C. Satellite Motion
9. Work, Power, and Energy – 3 weeks
   A. Work and the work-energy theorem
   B. Kinetic, gravitational potential, and elastic potential energy
   C. Power applications to energy savings
10. Momentum and Collisions – 3 weeks
   A. Law of conservation of momentum
   B. Elastic and inelastic collisions
   C. Impulse, including egg drop project

Fourth Quarter
11. Waves – 4 weeks
   A. Types and parts of waves, wave mechanics
   B. Sound and its properties
   C. Resonance and interference

D. Doppler effect

12. Light and Optics – 4 weeks
    A. Electromagnetic radiation
    B. Refraction and reflection
    C. Ray diagrams
    D. Optic equations
13. Heat and semester final – 2 weeks
    A. Conduction, convection, and radiation
    B. Calorimetry
    C. Review for and take semester final

Required Core Resources:

- Textbook: Conceptual Physics; Addison-Wesley, 3rd Ed.
- Textbook: Active Physics; It's About Time, 1st Ed.
- Laboratory: Physics with Computers; Vernier
- Interactive Physics Simulations; Addison-Wesley