Subject Area ___ Physics _____Grade Level___12____

Mission Statement: It is the mission of the Elba Central School District to actualize the phrase "Elba Equals Educational Excellence for Everyone." We are committed to providing both quality and equity. Every student will have the opportunity to develop to the best of his/her ability.

Elba Standards: In addition to the knowledge and basic skills they need in order to participate in society, graduates of Elba Central School will develop:

1. Empowering skills: decision making, goal setting, creative thinking and problem solving abilities;
2. Communication and social interaction skills;
3. Technological literacy;
4. Total wellness (social, physical, emotional health and self-esteem);
5. The values necessary to participate in society.

As a result of achieving these outcomes, our students will embrace lifelong learning.

New York State Standards: The New York State Standards in Math, Science and Technology are as Follows:

1. Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.
2. Students will access, generate, process, and transfer information using appropriate technologies.
3. Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.
4. Students will understand and apply scientific concepts, principals, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.
5. Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.
6. Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.
7. Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

Scope: This course covers all material outlined in the New York State Core Curriculum guide, with emphasis placed on material which has frequently and recently been found in question form on the State Assessment.

Sequence:

1. Background skills
    - Scalars and Vectors
    - Distance and Displacement
    - Vector Addition by Components / Graphs
2. Mechanics
    - Motion Diagrams
    - Vector Diagrams
    - Free Falling Objects
    - Kinematics
    - Equations
3. Work and Energy
    - Power and Horse Power
    - Kinetic and Potential Energy
    - Force and Displacement
4. Motion in a Plane
    - Projectile Motion / Straightline and Angles
    - Two Dimensional Motion and Trajectory
5. Internal Energy
    - Momentum and Impulse
    - Pendulum and Roller Coaster
    - Springs / Hooke's Law
6. Electricity and Magnetism
    - Series and Parallel Circuits
    - Ohm's Law / Voltage, Resistance, and Amperage
    - Coulomb's Law
    - Electric Fields / Potential / Hand Rules
7. Sound
    - Mechanical Waves
    - Doppler Effect
    - Refraction / Diffraction
8. Waves
    - Wave Characteristics
    - Refraction / Diffraction
9. Optics
    - Snell's Law
    - Index of Refraction
    - Laws of Reflection and Refraction
10. Nuclear Energy
    - Nature of Light
    - Atomic Models
    - Atomic Spectra

Methodology:

- Weekly vocabulary quizzes to improve student ability to comprehend assessment questions.
- Weekly notes quizzes to asses student understanding of smaller amounts of information
- Chapter tests to assess student understanding of major topics covered in the course.
- Written lab reports so students have hands on experience with material covered in class.
- An attempt is made to make sure that labs have a direct connection with material currently being discussed in class.
- Use of appropriate video clips to give visual reinforcement to ideas and theories covered in class.

Performance Indicators: Description of the levels of student achievement pertaining to standard.

- ***Use and understand scientific terminology and vocabulary.***
- Use appropriate mathematical formulas and equations to pose and answer scientific questions.
- Recognize mathematical relationships when presented in a graphic model.
- Be able to recognize vector and scalar quantities.
- Use scaled diagrams to represent vector quantities.
- Construct graphs of real world data.
- Use dimensional analysis.
- Interpret graphs.
- Use various means of representing and organizing observations.
- Construct and interpret graphs of position, velocity, or acceleration versus time.
- Determine and interpret slopes and areas of motion graphs.
- Determine the acceleration due to gravity near the earth's surface.
- Determine the resultant of two or more vectors graphically and algebraically.
- Draw scaled force diagrams using a ruler and protractor.
- Resolve a vector into perpendicular components both graphically and algebraically.
- Sketch the patch of a projectile.
- Use vector diagrams to analyze mechanical systems.
- Verify Newton's Second Law for linear motion.
- Determine the coefficient of friction for two surfaces.
- Verify Newton's Second Law for uniform circular motion.
- Verify conservation of momentum.
- Determine a spring constant.
- Describe and explain potential energy, kinetic energy, and internal energy for simple mechanical systems such as a pendulum, roller coaster, a spring, and free falling objects.

- Predict velocities, heights, and spring compressions based on energy conservation.
- Determine the energy stored in a spring.
- Determine the factors that effect the period of a pendulum.
- Observe and explain energy conversions.
- Recognize and describe conversions pertaining to devices such as a motor, generator, and battery.
- Compare the power developed when work is done at different rates.
- Measure current and voltage in a circuit.
- Determine the resistance of a circuit: series and parallel.
- Interpret graphs of voltage versus current.
- Measure and compare the resistance of conductors of various lengths and cross sections.
- Construct series and parallel circuits.
- Draw and interpret circuit diagrams.
- Predict the behavior of light bulbs in series and parallel circuits.
- Map magnetic fields.
- Compare characteristics of waves such as amplitude, frequency, wavelength, speed, period, and phase.
- Be able to draw various wave forms.
- Identify nodes and anti-nodes in waves.
- Differentiate between transverse and longitudinal waves.
- Determine the speed of sound.
- Predict the superposition of two waves.
- Observe, sketch, and interpret the behavior of waves as they reflect, refract, and diffract.
- Draw ray diagrams.
- Determine index of refraction.
- Interpret energy level diagrams.

- Correlate spectral lines with energy level diagrams.

Assessment:	**Acceptable Performance Level**
New York State Regents Exam	Minimum Passing = 65% Goal = 85% for 100% of students who regularly attend class
Various in class unit tests, vocabulary quizzes, notes quizzes and laboratory reports.	Minimum Passing = 70% Expectation = 85% for 100% of students