

**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: MST**

**Standard 1:** Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

**Standard 2:** Students will access, generate, process, and transfer information using appropriate technologies.

**Standard 5:** Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

**Standard 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.

**Standard 7:** Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

**National Standards:**

Standard 1: Students will develop an understanding of the characteristics and scope of technology.

Standard 2: Students will develop an understanding of the core concepts of technology.

Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

Standard 4: Students will develop an understanding of the cultural, social, economic, and political effects of technology.

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 6: Students will develop an understanding of the role of society in the development and use of technology.

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop abilities to apply the design process.

Standard 12: Students will develop abilities to use and maintain technological products and systems.

Standard 13: Students will develop abilities to assess the impact of products and systems.

Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Standard 17: Students will develop an understanding of and be able to select and use information and communication technologies.

**Performance Indicators:**

Define and analyze the forms of energy.

Analyze energy conversion systems and conversion efficiencies.

List major energy resources, their past and present contributions and projected supplies.

Discuss the impacts of energy resources on future living conditions.

List events leading up to the energy crisis of the 1970's and implications for the future.

Describe how energy is used in our society.

Identify the energy forms, quantities, and end uses in the residential, commercial, industrial, and transportation sectors.

Describe the basic principles of solar, wind, water, biological, and ocean energy.

Describe, construct, and evaluate passive, active, and hybrid solar energy heating and cooling systems.

Describe how a photovoltaic cell converts sunlight to electrical energy.

<b>Assessment:</b>	<b>Acceptable Performance Level</b>
Local Technology Exams	Score of 70% or higher
Projects	Score of 70% or higher

**Scope:** This course is intended to acquaint students with the sources and forms of energy available now and what may be available in the future. Students will learn that there are often choices to be made about the most appropriate energy form to use. The course stresses the importance of identifying the issues and problems associated with use of each energy form. Identifying the consequences of choices is also an important aspect of the course.

**Sequence:**

**I: INTRODUCTION TO ENERGY**

**A. Energy Sources and Supplies**

1. Forms of Energy
2. Energy Conversion
3. Types of Resources and Projected Availability
4. Energy Crises

**B. Energy Use**

1. How Energy is Used
2. Energy use Sectors

**II: EXPLORING ENERGY TECHNOLOGIES**

**A: Solar Energy**

1. The Nature of Solar Energy
2. Solar Heating and Cooling
3. Photovoltaics
4. Social Issues, Economic/Environmental Impacts, and Future Projections
5. Career Information

**B: Other Renewable Energies**

1. Wind Energy

2. Water Power
3. Bioconversion Energy
4. Ocean Energy Resources
5. Social Issues, Economic/Environmental Impacts, and Future Projections
6. Career Information

#### C: Fossil Fuels

1. Petroleum and Natural Gas
2. Coal
3. Storage and Distribution of Fossil Fuels
4. Social Issues, Economic/Environmental Impacts, and Future Projections
5. Career Information

#### D: Nuclear Fission

1. Development
2. Atomic Theory
3. Uranium Mining, Fuel Processing and Fabrication
4. Reactor Types
5. Safety
6. Waste Disposals Spent Fuel Storage and Reprocessing
7. Social Issues, Economic/Environmental Impacts, and Future Projections
8. Career Information

#### E: Nuclear Fusion

1. Nuclear Fusion Theory
2. Containment Designs
3. Social Issues, Economic/Environmental Impacts, and Future Projections
4. Career Information

#### F: Geothermal Energy

1. Geothermal Energy Development
2. Geothermal Reservoirs
3. Extraction Techniques
4. Conversion Technologies
5. Social Issues, Economic/Environmental Impacts, and Future Projections
6. Career Information

### III: TYPES OF ENERGY CONVERSION SYSTEMS

1. 1st and 2nd Laws of Thermodynamics
2. Fuel Conversion
3. Generation of Electricity
4. Other Methods of Producing Electricity

### IV: ENERGY CONSERVATION

1. Definition, Terms, and Importance
2. Energy Conscious Design
3. Residential, Commercial, Industrial, and Transportation
4. Personal Commitment

**Methodology:** 75% Hands on and visual learning. Remaining learning will take place through instruction and discussion.