Subject Area ___Earth Science_____ Grade Level ___9____

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.

National Standards:

Science as Inquiry:

- Abilities necessary to do scientific inquiry.

- Understanding about scientific inquiry.

Physical Science:

Grades 5-8

- Properties and changes of properties in matter
- Motions and forces
- Transfer of energy

Grades 9-12

- Structure of atoms
- Structure and properties of matter
- Chemical reactions
- Motions and forces
- Conservation of energy and increase in disorder
- Interactions of energy and matter

Life Science Standards

Grades 5-8

- Structure and function in living systems
- Reproduction and heredity
- Regulation and behavior
- Populations and ecosystems
- Diversity and adaptations of organisms

Grades 9-12

- The cell
- Molecular basis of heredity
- Biological evolution
- Interdependence of organisms
- Matter, energy, and organization in living systems
- Behavior of organisms

Earth and Space Science Standards

Grades 5-8

- Structure of the earth system
- Earth's history
- Earth in the solar system

Grades 9-12

- Energy in the earth system
- Geochemical cycles
- Origin and evolution of the earth system
- Origin and evolution of the universe

Science and Technology Standards

Grades 5-8

- Abilities of technological design
- Understanding about science and technology

Grades 9-12

- Abilities of technological design
- Understanding about science and technology

Science in Personal and Social Perspectives

Grades 5-8

- Personal health
- Populations, resources, and environments
- Natural hazards
- Risks and benefits
- Science and technology in society

Grades 9-12

- Personal and community health
- Population growth
- Natural resources
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national, and global challenges

History and Nature of Science Standards

Grades 5-8

- Science as a human endeavor
- Nature of science
- History of science

Grades 9-12

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

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.
- Understand the concept of density as a ratio of mass to volume as well as how that ratio is related to observations of floating and sinking.
- Understand and be able to show evidence for the size and shape of planet Earth.
- Be able explain how to determine one's location on planet Earth using the coordinate system of latitude and longitude.
- Be able to read a contour map and determine various features on said map.
- Be able to identify various minerals using common tests such as streak, hardness, cleavage and luster.
- Be able to identify igneous, metamorphic and sedimentary rock by the physical features of each.
- Explain how different rock types were formed and a probable environment of formation for each.
- Be able to explain and use in a practical manor the rock cycle as printed in the Earth Science Reference tables provided by New York State.
- Understand and explain the theories of "plate tectonics" and "continental drift" as they relate to geographic features visible at the surface of the Earth. (ie. mountains, fault lines volcanoes etc…)
- Be able to explain how a seismograph works and be able to use the information given by a seismograph to determine the distance to the earthquake, the origin time of the earthquake, and the location of the epicenter of the earthquake.
- Understand and describe the similarities and differences of surface materials based on their porosity, permeability and capillarity.
- Be able to describe the processes involved in the water cycle.

- Be able to name and explain the different types of physical and chemical weathering that act on Earth materials.
- Understand and explain how climate affects weathering and weathering rates.
- Be able to name agents of erosion, areas where each is most prevalent, and the driving force behind them.
- Be able to describe the forces involved in an erosional-depositional system.
- Be able to explain the energy relationships in an erosional-depositional system.
- Be able to identify the dominant force in an erosional-depositional system that is not in equilibrium.
- Describe the physical appearance of a stream at various stages in its life cycle.
- Describe the formation growth and recession of a glacier.
- Be able to identify glacially deposited material and eroded areas.
- Be able to explain how glaciers impacted the geographical features in and around New York State.
- Be able to describe the forces involved in landscape development.
- Be able to explain the effects of local bedrock on regional landscape.
- Demonstrate an understanding of the difference between relative and absolute time.
- Be able to interpret a geological sequence of event given a diagram, photo, or other visual evidence.
- Be able to state theories relevant to determining a geologic sequence of events and be able to explain said theories.
- Be able to explain and use techniques for the correlation of rock strata at various locations given a diagram, photo, or other visual media.
- Be aware of information related to the geologic history of Earth as presented in the New York State Earth Science Reference tables.
- Understand the concept of evolution and the evidence supporter's use in support of the theory.
- Understand the concept of radioactive decay (radioactivity).
- Recognize that the electromagnetic spectrum consists of several types of energies each with its own wavelength and frequency.
- Understand the relationship between the frequency and wavelength of the energies that make up the electromagnetic spectrum.
- Understand and be able to define the three types of energy transfer.
- Be able to write and understand the theory of conservation of energy, the theory of conservation of mass and the differences and relationships between kinetic and potential energy.
- Grasp the concept of energy transformation and the reradiation of energy by the Earth.
- Be able to convert temperatures between the three common temperature scales using the reference tables.

- Be able to determine energy gained or lost, with the aide of the reference tables, as a result of heating, cooling, or the change of phase of several known Earth materials.
- Understand and be able to describe all energy relationships that exist in the atmosphere.
- Understand and be able to describe the relationships between several of the atmospheric variables.
- Be able to describe the processes by which clouds are formed.
- Be able to take information from and apply information to a station model and or a full weather map.
- Be able to explain the difference between a hurricane and a tornado.
- Be able to explain how adiabatic temperature changes occur and why.
- Show on a world map source regions for air masses that effect our area.
- Be able to describe a mid-latitude cyclone in terms of temperature, pressure, precipitation, dew point and various other weather variables at given points around the Low.
- Explain weather conditions associated with the four basic types of fronts.
- Be able to list the different factors that affect insolation.
- Be able to describe the affect each factor has on insolation.
- Describe the affects insolation has on climate.
- Using the reference tables be, able to describe certain characteristics of the atmosphere.
- Explain in detail what the Greenhouse effect is and what causes it.
- Define radiative balance and graph it over time.
- Be able to connect a water budget with a climate ratio and a given climate.
- Compare a water budget with stream discharge information.
- Explain how various geographic features affect climate.
- Explain what a sunspot is.
- Explain the difference between Jovian and terrestrial planets.
- List and describe various celestial bodies in our solar system.
- Explain and give examples of the Doppler effect.
- Understand the significance of the celestial sphere, star paths and other celestial observations.
- Explain the difference and similarities between the geo-centric and helio-centric models of the solar system.
- Explain orbital geometry and gravitation.
- List evidences of the Earth's elliptical orbit and rotation on its axis.
- Describe the difference between apparent solar day and mean solar day.
- Describe the relationships between the Sun, Earth and Moon as it relates to Tides, phases and eclipses.
- Compare types of pollution as well as sources of pollution and the affects of pollution.
- Explain possible solutions to pollution problems as well as why those solutions may or may not work.

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

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
2. Measuring the Earth
3. Minerals and Rocks
4. The Dynamic Crust
5. Water and Surface Processes
6. Glaciers
7. Earth's History
8. Study of the Atmosphere
9. Climates
10. Earth and Space
11. Environmental Awareness

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 asses student understanding of major topics covered in the course.
- Written lab reports so students have a 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.