

Subject Area: Physical Science

Grade Level: 8

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:

Key ideas are identified by numbers (1).

Performance indicators are identified by bullets (•).

Sample tasks are identified by triangles (▶).

Physical Setting (Intermediate Level)

1. The Earth and celestial phenomena can be described by principles of relative motion and perspective.

Students:

- explain daily, monthly, and seasonal changes on earth.

This is evident, for example, when students:

- ▶ create models, drawings, or demonstrations describing the arrangement, interaction, and movement of the Earth, moon, and sun.
- ▶ plan and conduct an investigation of the night sky to describe the arrangement, interaction, and movement of celestial bodies.

2. Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Students:

- explain how the atmosphere (air), hydrosphere (water), and lithosphere (land) interact, evolve, and change.
- describe volcano and earthquake patterns, the rock cycle, and weather and climate changes.

This is evident, for example, when students:

- ▶ add heat to and subtract heat from water and graph the temperature changes, including the resulting phase changes.
- ▶ make a record of reported earthquakes and volcanoes and interpret the patterns formed worldwide.

3. Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

Students:

- **observe and describe properties of materials, such as density, conductivity, and solubility.**
- **distinguish between chemical and physical changes.**
- **develop their own mental models to explain common chemical reactions and changes in states of matter.**

This is evident, for example, when students:

- ▶ test and compare the properties (hardness, shape, color, etc.) of an array of materials.
- ▶ observe an ice cube as it begins to melt at temperature and construct an explanation for what happens, including sketches and written descriptions of their ideas.

4. Energy exists in many forms, and when these forms change energy is conserved.

Students:

- **describe the sources and identify the transformations of energy observed in everyday life.**
- **observe and describe heating and cooling events.**
- **observe and describe energy changes as related to chemical reactions.**
- **observe and describe the properties of sound, light, magnetism, and electricity.**
- **describe situations that support the principle of conservation of energy.**

This is evident, for example, when students:

- ▶ design and construct devices to transform/transfer energy.
- ▶ conduct supervised explorations of chemical reactions (not including ammonia and bleach products) for selected household products, such as hot and cold packs used to treat sport injuries.
- ▶ build an electromagnet and investigate the effects of using different types of core materials, varying thicknesses of wire, and different circuit types.

5. Energy and matter interact through forces that result in changes in motion.

Students:

- **describe different patterns of motion of objects.**
- **observe, describe, and compare effects of forces (gravity, electric current, and magnetism) on the motion of objects.**

This is evident, for example, when students:

- ▶ investigate physics in everyday life, such as at an amusement park or a playground.
- ▶ use simple machines made of pulleys and levers to lift objects and describe how each machine transforms the force applied to it.
- ▶ build “Rube Goldberg” type devices and describe the energy transformations evident in them.

National Standards

Physical Science: CONTENT STANDARD B:

As a result of their activities in grade 8, all students should develop an understanding of

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

Physical Setting Skills**8**

1. Given the latitude and longitude of location, indicate its position on a map and determine the latitude and longitude of a given location on a map	
2. Using identification tests and a flow chart, identify mineral samples	
3. Use a diagram of the rock cycle to determine geological processes that led to the formation of a specific rock type	
4. Plot the location of recent earthquake and volcanic activity on a map and identify patterns of distribution	
5. Use a magnetic compass to find cardinal directions	
6. Measure the angular elevation of an object using appropriate instruments	
7. Generate and interpret field maps including topographic and weather maps	

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8. Predict the characteristics of an air mass based on the origin of the air mass	
9. Measure weather variables such as wind speed and direction, relative humidity, barometric pressure, etc.	
10. Determine the density of liquids, and regular and irregular shaped solids	M
11. Determine the volume of a regular and irregular shaped solids using water displacement	M
12. Using the Periodic Table, identify an element as a metal, nonmetal, or noble gas	M
13. Determine the identity of an unknown element using physical and chemical properties	M
14. Using appropriate resources, separate the parts of a mixture	M
15. Determine the electrical conductivity of a material, using a simple circuit	M
16. Determine the speed and acceleration of moving object	M

Key:

M Concept is mastered and benchmarked. Note that a skill may be introduced and benchmarked in one year. In those cases, only an M appears

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

Assessment:	Acceptable Performance Level
1. NYS 8 th grade Science Exam	Level 3 or 4 on 8 th grade assessment as defined by NYS grading rubric for Physical Science questions.
2. Teacher made exams (quizzes, exams, midterms, final) (any kind of test you are giving that is testing the performance indicator - formal or informal)	A passing score of 70 or better
3. homework, labs	A passing score of 70 or better

Scope: Study of Physical Science broken into seven major units. The units are: Physical Science Basics, Energy and Motion, Kinds of Substances, Interactions of Matter, Waves, Light, and Sound, and Electricity and Energy Resources.

Sequence:

I. Physical Science Basics

- A. Standards of Measurement
- B. Scientific Method

II. Energy and Motion

- A. Moving Objects
- B. Acceleration and Momentum
- C. Energy
- D. Using Thermal Energy
- E. Machines

III. The Nature of Matter

- A. Solids, Liquids, and Gases
- B. Classification of Matter
- C. Atomic Structure and the Periodic Table
- D. Chemical Bonds

IV. Kinds of Substances

- A. Elements and Their Properties
- B. Organic and Biological Compounds

V. Interactions of Matter

- A. Solutions
- B. Chemical Reactions
- C. Acids, Bases, and Salts

VI. Waves, Light, and Sound

- A. Waves and Sound
- B. Light
- C. Mirrors and Lenses

VII. Electricity and Energy Resources

- A. Electricity
- B. Magnetism and its uses
- C. Radioactive and Nuclear Reactions

Methodology: Best Practices

- ❖ Use of lecture drawing on teacher and student's previous life experiences to demonstrate scientific concepts and theories.
- ❖ Homework assignments out of book that test for understanding.
- ❖ Incorporate the 6-traits as a method of assessing writing pieces within the scope of the course.
- ❖ Use of Labs to instruct through experience.
Labs include:
 - Density of a Liquid
 - Density of a Solid
 - Measuring Speed
 - Weight and the Force of Gravity
 - Pulleys and Simple Machines
 - Conduction of Heat
 - Chemical Reactions
 - Reflection of Light
 - Tuning Forks
 - Electromagnetism
 - Building Electric Circuits