*(excerpt from the **Physical Setting / Earth Science Core Curriculum**, pages 3-7,*
THE STATE EDUCATION DEPARTMENT THE UNIVERSITY OF THE STATE OF NEW YORK http://www.nysed.gov*)*

Laboratory Requirements: Critical to understanding science concepts is the use of scientific inquiry to develop explanations of natural phenomena. Therefore, as a pre-requisite for admission to the Regents examination in Physical Setting/Earth Science, students must have successfully completed 1200 minutes of laboratory experience with satisfactory written reports for each laboratory investigation.

It is expected that laboratory experiences will provide the opportunity for students to develop the scientific inquiry techniques in Standard 1, Standard 2, and the intercon-nectedness of content and skills, and the problem-solving approaches in Standards 6 and 7.

PROCESS SKILLS
BASED ON STANDARDS 1, 2, 6, AND 7

Science process skills should be based on a series of discoveries. Students learn most effectively when they have a central role in the discovery process. To that end, Standards 1, 2, 6, and 7 incorporate in the Physical Setting/Earth Science Core Curriculum *a student-centered, problem-solving approach to Earth Science. The following is a sample of Earth Science process skills. This list is not intended to be an all-inclusive list of the content or skills, but rather a sample of the types of activities that teachers are expected to incorporate into their curriculum. It should be a goal of the instructor to encourage science process skills that will provide students with background and curiosity to investigate important issues in the world around them.*

STANDARD 1—Analysis, Inquiry, and Design
Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

STANDARD 1 **Analysis, Inquiry, and Design** **MATHEMATICAL ANALYSIS:**	*Key Idea 1:* Abstraction and symbolic representation are used to communicate mathematically. For example: • use eccentricity, rate, gradient, standard error of measurement, and density in context *Key Idea 2:* Deductive and inductive reasoning are used to reach mathematical conclusions. For example: • determine the relationships among: velocity, slope, sediment size, channel shape, and volume of a stream • understand the relationships among: the planets' distance from the Sun, gravitational force, period of revolution, and speed of revolution *Key Idea 3:* Critical thinking skills are used in the solution of mathematical problems. For example: • in a field, use isolines to determine a source of pollution

STANDARD 1 **Analysis, Inquiry, and Design** **SCIENTIFIC INQUIRY:**	*Key Idea 1:* The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process. For example: • show how our observation of celestial motions supports the idea of stars moving around a stationary Earth (the geocentric model), but further investigation has led scientists to understand that most of these changes are a result of Earth's motion around the Sun (the heliocentric model) *Key Idea 2:* Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity. For example: • test sediment properties and the rate of deposition *Key Idea 3:* The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena. For example: • determine the changing length of a shadow based on the motion of the Sun

STANDARD 1 Analysis, Inquiry, and Design ENGINEERING DESIGN:	*Key Idea 1:* Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints); this process is used to develop technological solutions to problems within given constraints. For example: • after experimenting with conduction of heat (using calorimeters and aluminum bars), make recommendations to create a more efficient system of heat transfer • determine patterns of topography and drainage around your school and design solutions to effectively deal with runoff

STANDARD 2

Students will access, generate, process, and transfer information, using appropriate technologies.

STANDARD 2 INFORMATION SYSTEMS:	*Key Idea 1:* Information technology is used to retrieve, process, and communicate information as a tool to enhance learning. For example: • analyze weather maps to predict future weather events • use library or electronic references to obtain information to support a laboratory conclusion *Key Idea 2:* Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use. For example: • obtain printed or electronic materials which exemplify miscommunication and/or misconceptions of current commonly accepted scientific knowledge *Key Idea 3:* Information technology can have positive and negative impacts on society, depending upon how it is used. For example: • discuss how early warning systems can protect society and the environment from natural disasters such as hurricanes, tornadoes, earthquakes, tsunamis, floods, and volcanoes

STANDARD 6—Interconnectedness: Common Themes

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 6 Interconnectedness: Common Themes SYSTEMS THINKING:	*Key Idea 1:* Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions. For example: • analyze a depositional-erosional system of a stream

STANDARD 6 Interconnectedness: Common Themes MODELS:	*Key Idea 2:* Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design. For example: • draw a simple contour map of a model landform • design a 3-D landscape model from a contour map • construct and interpret a profile based on an isoline map • use flowcharts to identify rocks and minerals

STANDARD 6 Interconnectedness: Common Themes MAGNITUDE AND SCALE:	*Key Idea 3:* The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems. For example: • develop a scale model to represent planet size and/or distance • develop a scale model of units of geologic time • use topographical maps to determine distances and elevations

STANDARD 6 Interconnectedness: Common Themes EQUILIBRIUM AND STABILITY:	*Key Idea 4:* Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium). For example: • analyze the interrelationship between gravity and inertia and its effects on the orbit of planets or satellites

STANDARD 6 Interconnectedness: Common Themes PATTERNS OF CHANGE:	*Key Idea 5:* Identifying patterns of change is necessary for making predictions about future behavior and conditions. For example: • graph and interpret the nature of cyclic change such as sunspots, tides, and atmospheric carbon dioxide • based on present data of plate movement, determine past and future positions of land masses • using given weather data, identify the interface between air masses, such as cold fronts, warm fronts, and stationary fronts

STANDARD 6 Interconnectedness: Common Themes OPTIMIZATION:	*Key Idea 6:* In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs. For example: • debate the effect of human activities as they relate to quality of life on Earth systems (global warming, land use, preservation of natural resources, pollution)

STANDARD 7—Interdisciplinary Problem Solving

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

STANDARD 7 Interdisciplinary Problem Solving CONNECTIONS:	*Key Idea 1:* The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena. For example: • analyze the issues related to local energy needs and develop a viable energy generation plan for the community • investigate two similar fossils to determine if they represent a developmental change over time • investigate the political, economic, and environmental impact of global distribution and use of mineral resources and fossil fuels • consider environmental and social implications of various solutions to an environmental Earth resources problem

STANDARD 7 Interdisciplinary Problem Solving STRATEGIES:	*Key Idea 2:* Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results. For example: • collect, collate, and process data concerning potential natural disasters (tornadoes, thunderstorms, blizzards, earthquakes, tsunamis, floods, volcanic eruptions, asteroid impacts, etc.) in an area and develop an emergency action plan • using a topographic map, determine the safest and most efficient route for rescue purposes