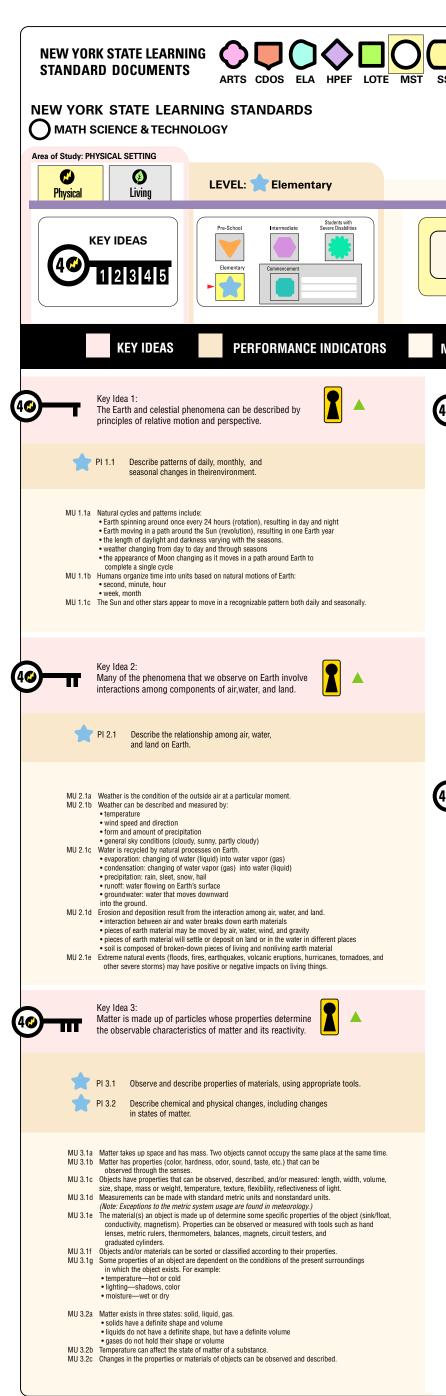
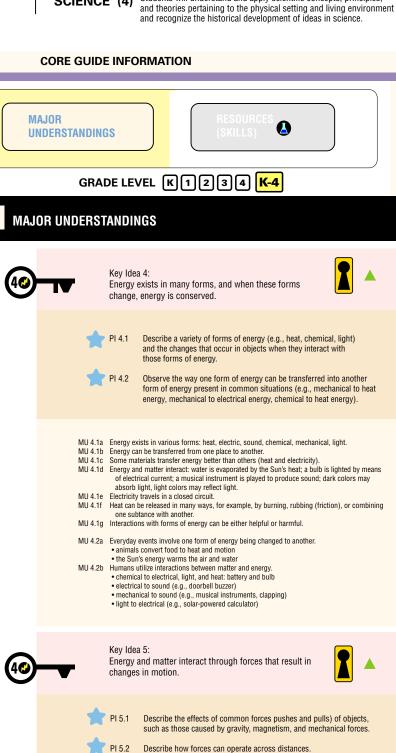
SCIENCE (4) Students will understand and apply scientific concepts, principles,

Content Standard







MU 5.1a The position of an object can be described by locating it relative to another object or the background (e.g., on top of, next to, over, under, etc.).

MU 5.1b The position or direction of motion of an object can be changed by pushing or pulling.

MU 5.1c The force of gravity pulls objects toward the center of Earth.
MU 5.1d The amount of change in the motion of an object is affected by friction.
MU 5.1f Magnetism is a force that may attract or repel certain materials.
MU 5.1f Mechanical energy may cause change in motion through the application of force and

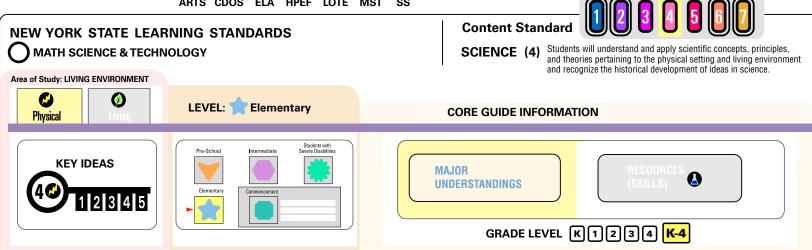
through the use of simple machines such as pulleys, levers, and inclined planes.

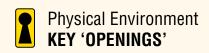
MU 5.2a The forces of gravity and magnetism can affect objects through gases, liquids and solids.

MU 5.2b The force of magnetism on objects decreases as distance increases.

STANDARD DOCUMENTS









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

The universe is made up of many different objects. Students should observe and describe the motions of the Sun Moon, and stars. The movement of these objects through space can be traced and measured over various time segments. By keeping daily records, students will learn to identify sequences of changes and look for patterns; this skill will be useful throughout their study of the natural world. Younger students should draw what they see. Older students should be encouraged to keep journals and use instruments to measure and record their observations.

Note: Students at this age are concrete thinkers; therefore, only the effects of gravity

they can directly observe should be discussed. Drawing models that show size and position and discussing phenomena based on gravity are too abstract and may lead to misconceptions. Note: the use of e.g. denotes examples which may be used for in-depth study. The terms for example and such as denote material which is testable. Items in paranthesis denote further definition of the word(s) preceding the item and are testable.

Describe patterns of daily, monthly, and seasonal changes in their environment.



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

The water cycle, weather, erosion, deposition, and extreme natural events involve interactions among air, water, and land. Students should observe and describe naturally occurring changes in their world involving these phenomena. They can also investigate these phenomena in classroom experiments.

Younger students should be engaged in observation of their immediate surroundings with emphasis on recognizing change around them. As students mature, they can begin to recognize cycles and identify the processes and natural events which are causing the changes they are observing.





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

Students should describe, categorize, compare, and measure observable physical properties of matter and objects. Students' initial efforts in performing these processes may yield simple descriptions and sketches, which may lead to increasingly more detailed drawings and richer verbal descriptions. Things can be done to

materials to change their properties, but not all materials respond in the same way to what is done to them. Younger students emphasize physical properties while older students will recognize chemical changes. Appropriate tools can aid students in their efforts.





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

> in a variety of forms. Students should observe the results of simple energy transformations from one form to another in their physical environment. The safe use and respect of various energy forms should be stressed in the

difference from temperature is too abstract a concept for elementary students. Energy is a subject that is difficult for students to understand Students cannot hold it in their hands and, with the exception of light, they cannot see it.





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

Students should be able to observe and describe relative positions between objects in their world. Exploring the observable effects of gravity and magnetism may help students develop an understanding of the reason for the direction of an object's motion. Manipulation and application of simple tools and machines may help students learn about the relationships between forces and motion.



Physical Environment SAMPLE TASKS

conduct a long-term weather investigation, such as running a weather station or collecting weather data

keep a journal of the phases of the moon over a one-month period. This information is collected for several different one-month periods

observe a puddle of water outdoors after a rainstorm. On a return visit after the puddle has disappeared, students describe where the water came from and possible locations for it now

assemble rock and mineral collections based on characteristics such as erosional features or crystal size features.

compare the appearance of materials when seen with and without the aid of a magnifying glass.

> investigate simple physical and chemical reactions and the chemistry of household products, e.g. freezing, melting and evaporating; a comparison of new and rusty nails; the role of baking soda in cooking.

investigate the interactions of liquids and powders that result in chemical reaction (e.g., vinegar and baking soda) compared to interactions that do not (e.g., water and sugar).

> in order to demonstrate the transformation of chemical to electrical energy, construct electrical cells from objects, such as lemons or potatoes, using pennies and aluminum foil inserted in slits at each end of fruits or vegetables; the penny and aluminum are attached by wires to a milliammeter. Students can compare the success of a variety of these electrical cells.

investigate simple machines and use them to perform tasks.

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