



Elementary Science Alignment Guide

Grades K-4

THE UNIVERSITY OF THE STATE OF NEW YORK

THE STATE EDUCATION DEPARTMENT

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Introduction to the Elementary Science Alignment Guide

Purpose

The purpose of the Elementary Science Alignment Guide is to give science educators information about the proposed changes in New York State's elementary-level science test and tools to help them make changes in their curriculum during this transition from a syllabus-based test to a standards-based test. The document consists of descriptions of the current and future elementary science tests, and matrices and a summary chart showing how the current test aligns to the New York State Elementary Science Syllabus and the standards-based Elementary Science Core Curriculum Guide.

When used with the existing science core curriculum guides and test sampler documents, this alignment document is one more tool that can assist school districts in:

- Aligning their K-12 science curriculum, instruction, and assessment practices with the New York State learning standards;
- Identifying and addressing strengths and weaknesses in the science program; and
- Addressing their teachers' professional development needs.

Background

The New York State learning standards describe what all students are expected to know and be able to do at three levels in their academic careers—elementary, intermediate, and commencement. In order to give schools the information they need about how their students are progressing in science, the Education Department is designing a new elementary-level science test to be administered at the end of grade 4. An intermediate-level science test, administered at the end of grade 8, was introduced in 2001. Because these tests are aligned to the same standards as the commencement-level (Regents) science examinations, student results on the elementary and intermediate science tests are good indicators of student success in high school science. Results can also provide indicators of a student's weaknesses; these areas can then be addressed locally through the provision of academic intervention services (AIS).

Before the adoption of the New York State learning standards, the basis for elementary science programs was the New York State Elementary Science Syllabus. The New York State Program Evaluation Test in Science (sometimes referred to in the field as ESPET) is aligned to the Elementary Science Syllabus. The test design, or blueprint, was introduced in 1989 and has remained the same with new sets of questions (forms) introduced every three years. The most recent form of the New York State Program Evaluation Test in Science was first administered in May 2000 (see Appendix A for a detailed description of this test). This form will be in use through May 2003. The New York State Program Evaluation Test in Science was designed to assist schools in evaluating and improving their elementary science program in relation to the science syllabus. Each year, schools are provided with a Guide to Program Evaluation to assist them in local program evaluation activities.

With the introduction of the New York State learning standards, the purpose of the New York State Program Evaluation Test in Science changed somewhat. The data for the performance portion of the test (five hands-on science stations of which each student completes three) is still used for program evaluation. However, the objective portion (45 multiple choice questions) is now also used for individual student evaluation. Beginning in May 2000, students who score below 30 on the objective test need to be provided AIS. This score was arrived at through a standard-setting procedure involving New York State teachers.

Changes

In May 2004, grade 4 students will be required to take the new Grade 4 Elementary-Level Science Test. This individual student test will replace the New York State Program Evaluation Test in Science, which will be given for the last time in May 2003. The new test will measure achievement of the New York State learning standards through its alignment to the Elementary Science Core Curriculum Guide. The test will reflect the content and process skills detailed in this Core. A working draft of the Elementary Science Core Curriculum Guide was distributed to schools in March 2000. The final version can be found on the New York State Education Department website at <http://www.emsc.nysed.gov/ciai/>.

The Grade 4 Elementary-Level Science Test will have a written component and a performance component. The format of the written component will parallel the Grade 8 Intermediate-Level Science Test as well as the Regents science examinations. It will consist of multiple choice questions, constructed response questions, and extended constructed response questions. A test sampler will be distributed to schools in 2003.

The comparison table below provides information about the current New York State Grade 4 Program Evaluation Test in Science and the new Grade 4 Elementary-Level Science Test to be administered in the spring of 2004.

**Comparison Table
Tests in Elementary Science**

Test Description	Test Purpose	Test Alignment	Test Status	Test Format
New York State Program Evaluation Test in Science, Grade 4	Objective Test (Form H) To assess individual student achievement of learning standards in science at the elementary level for the purpose of providing academic intervention services. Objective test is also used for program evaluation.	New York State Elementary Science Syllabus, and the Mathematics, Science, and Technology Learning Standards 1, 3, and 4	Current test administered annually in May from 2000 through 2003	Objective Test, Form H, 45 multiple choice questions
	Performance Test (Form Z) To help districts/schools evaluate effectiveness of elementary science programs. (The Guide to Program Evaluation K-4 is provided for this purpose.)	Mathematics, Science, and Technology Learning Standards 1 and 4		Performance Test, Form Z Five stations (students take three)
Grade 4 Elementary-Level Science Test	Objective Component Performance Component To assess individual student achievement of learning standards in science at the elementary level for the purpose of providing academic intervention services. (A program evaluation guide will not be provided.)	New York State Mathematics, Science, and Technology Learning Standards 1 and 4, as well as 2, 6, and 7 as described in the Elementary Science Core Curriculum Guide	Future test administered for the first time in May 2004	Written test consists of multiple choice, constructed response, and extended constructed response questions Performance Test, Form A Fewer stations; each student will take all stations

Appendix A, included in this document, contains a field memo dated June 1999 from Gerald DeMauro, Coordinator of State Assessment. This memo describes the components of the current New York State Grade 4 Elementary Science Program Evaluation Test. It has been provided as a reference for convenience.

Transitioning to the Elementary Science Core Curriculum

The challenge facing many elementary science educators in the next two years will be transitioning from the syllabus to the Core as a basis for elementary science curriculum. While the Core should be the major focus, the syllabus-based test will remain in use through May 2003. This Elementary Science Alignment Guide is designed to support school districts in transitioning from a syllabus-based curriculum to a standards-based curriculum. School districts are encouraged to use the Elementary Science Core Curriculum Guide and this alignment document to enhance curriculum and professional development in science. The materials provide an alignment of the current New York State Program Evaluation Test in Science (sometimes referred to as ESPET) to both the Elementary Science Syllabus and the Elementary Science Core Curriculum Guide.

Using the Elementary Science Core Curriculum Guide and the Elementary Science Alignment Guide for Curriculum Development and Professional Development

Elementary Science Core Curriculum Guide

- The Elementary Science Core Curriculum Guide provides an additional level of specificity to the learning standards for mathematics, science and technology. The Core covers Standard 4 Physical Setting and Living Environment concepts at the elementary level and appropriate sections of Standards 1, 2, 6, and 7. For each key idea, the performance indicators and major understandings have been elaborated to identify which science concepts are important for elementary students to know and understand.

Matrices and Summary Chart

- Matrix A aligns the Objective Test, Form H, to the science learning standards contained in the Elementary Science Core Curriculum Guide and to the material in the Elementary Science Syllabus.
- Matrix B aligns the Performance Test, Form Z, to the science learning standards contained in the Elementary Science Core Curriculum Guide and to the material in the Elementary Science Syllabus.
- Summary Charts 1 and 2 summarize the information contained in Matrices A and B.

Curriculum Development

At the district level, science curriculum committees should be using the Elementary Science Core Curriculum Guide to develop a district-wide scope and sequence for K-4 science curriculum. Curriculum development should include the articulation of grade-level-appropriate science content and process skills in life science, physical science, and Earth science.

At the district level, science administrators, science curriculum committees, and elementary teachers of science should use the Elementary Science Core Curriculum Guide to help choose and develop appropriate inquiry-centered instructional materials for the K-4 level. Such instructional materials should encourage students to actively engage in the discovery process and provide opportunities to interact with the natural world.

At both district and school levels, information in the matrices and summary charts can help identify areas of strength and weakness in the elementary science program*.

For example, on Matrix A - Objective Form H, test items 1, 3, 4, 6, 12, and 15 address Key Idea 3 in the Living Environment (“individual organisms and species change over time”). More specifically, these test items target Performance Indicator 3.1 (“describe how the structures of plants and animals complement the environment of a plant or animal”).

Test items 3, 4, 12, and 15 address the Living Environment Major Understanding 3.1b (“each plant has different structures that serve different functions in growth, survival, and reproduction”). Since test items 3 and 4 are on the K-2 grade level, and test items 12 and 15 are on the grades 3-4 level, poor performance on these items indicates there may be a need to address instruction in that area at all grade levels. If performance on test items 3 and 4 is satisfactory, but performance on test items 12 and 15 is poor, this may be an indication that the content is being covered well in grades K-2 but not being reinforced in grades 3 and 4.

***NOTE:** The current test, because it was developed to be a test of the content in the syllabus, does not sample all areas of the Core. Teachers will need to use other methods to assess student progress in the areas addressed in the Core. (Items for the new Grade 4 Elementary-Level Science Test will sample material in the Core.)

As another example, according to Summary Chart 1, test items 16, 18, 27, 39, 42, and 43 are correlated to Physical Setting Key Idea 5 (“energy and matter interact through forces that result in change in motion”) and Performance Indicator 5.1 (“describe the effects of common forces of objects such as those caused by gravity, magnetism, and mechanical forces”). If item analysis indicates that students in the district or in a particular school performed poorly on most of these questions, then the district or school might consider adjusting and/or revising the curriculum or programming in this area accordingly.

At the school building level, the information in the matrices can assist principals and elementary teachers of science in the implementation of science curriculum. The matrices can help identify selected topics in science as units of study at each grade level. Units in life, physical, and Earth science are essential in supporting a comprehensive curriculum approach to K-4 science. Classroom teachers are instrumental in the implementation process, and the alignment provided in Matrices A and B can help give teachers a better understanding of how the content and process skills described in the Core are connected to actual test items.

Professional Development

At the district level, professional development targeted for new elementary teachers and/or teachers new to a grade level should focus on the learning standards addressed in the Elementary Science Core Curriculum Guide and the alignment of those standards with items on the current State Elementary-Level Science Test. Grade-level teachers can begin to distinguish responsibility for science content, instructional practices, and assessment practices targeted for their grade level. In addition, teachers are exposed to the Core as it addresses K-4 science and not just a specific grade level in isolation.

At the district level and or school building level, aggregated student test data can be analyzed for both the objective portion of the State test and performance portions of the test. The summary chart can be used to identify specific test items that proved difficult for students. Districts can inform teachers and plan appropriate professional development targeting a specific key idea in the Core, appropriate science content, instructional practices, or assessment practices.

For example, a school's data indicates that several students performed below the State minimum score of 30 for the objective portion of the test and now those students are identified as qualifying for academic intervention services. Individual student data for items 30, 33, 34, and 35 indicated that most of these students did not receive credit. This would indicate a need for the school to focus on Physical Setting Performance Indicator 3.1, which deals with forces acting on objects. Examining Matrix A will indicate that these four items are related to observing and describing properties of materials, using appropriate tools. By examining the syllabus skill level, it can be determined that two of these items are on the K-2 level (items 30 and 34) and two are on the grades 3-4 level (items 34 and 35). This might indicate a need for the school to focus on these areas across all grade levels.

MATRIX A
New York State Program Evaluation Test in Science
Objective Test, Form H

Matrix A aligns the objective component of the test, Form H, to the science learning standards contained in the Elementary Science Core Curriculum Guide. Each test item is correlated to Standard 4 Key Idea, Performance Indicator, and Major Understanding where appropriate. Test items 1-15 align to Standard 4 Living Environment, and test items 16-28 align to Standard 4 Physical Setting. Items 29-45 assess process skills and content correlated to Standard 1 Analysis, Inquiry, and Design, and to Standard 4 Living Environment and Physical Setting. Matrix A also correlates each test item of the objective test to the Elementary Science Syllabus.

Test Item 1-15	MST-Science Standard 4 Living Environment Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Life Science A & B=Life C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
1	3 Individual organisms and species change over time.	3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.	3.1a Each animal has different structures that serve different functions in growth, survival, and reproduction.	IA – Living objects, including plants and animals, live and thrive when their needs are met.	2.1 The parts of animals have functions that help the animal to live and thrive.
2	4 The continuity of life is sustained through reproduction and development.	4.1 Describe the major stages in the life cycles of selected plants and animals.	4.1b Each kind of plant goes through its own stages of growth and development that may include seed, young plant, and mature plant.	IA – Living objects, including plants and animals, live and thrive when their needs are met.	1.4 Each kind of plant goes through its own stages of growth and development during the life span of the plant.
3	3 Individual organisms and species change over time.	3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.	3.1b Each plant has different structures that serve different functions in growth, survival, and reproduction.	IA – Living objects, including plants and animals, live and thrive when their needs are met.	1.1 The parts of plants have functions that help the plant live and thrive.
4	3 Individual organisms and species change over time.	3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.	3.1b Each plant has different structures that serve different functions in growth, survival, and reproduction.	IA – Living objects, including plants and animals, live and thrive when their needs are met.	1.1 The parts of plants have functions that help the plant live and thrive.

Test Item 1-15	MST-Science Standard 4 Living Environment Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Life Science A & B=Life C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
5	4 The continuity of life is sustained through reproduction and development.	4.1 Describe the major stages in the life cycles of selected plants and animals.	4.1g The length of time from an animal's birth to its death is called a life span. Life spans of different animals vary.	IA – Living objects, including plants and animals, live and thrive when their needs are met.	2.4 Each kind of animal goes through its own stages of growth and development during the life span of the animal. The length of time from birth to death of an animal is called a life span.
6	6 Plants and animals depend on each other and their physical environment. 3 Individual organisms and species change over time.	6.1 Describe how plants and animals, including humans, depend upon each other and the nonliving environment. 3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.	3.1c In order to survive in their environment, plants and animals must be adapted to that environment.	IB – Plants and animals are dependent on other plants and animals.	2 Plants benefit from animals.

Test Item 1-15	MST-Science Standard 4 Living Environment Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Life Science A & B=Life C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
7	<p>6 Plants and animals depend on each other and their physical environment.</p> <p>5 Organisms maintain a dynamic equilibrium that sustains life.</p>	<p>6.1 Describe how plants and animals, including humans, depend upon each other and the nonliving environment.</p> <p>5.2 Describe some survival behaviors of common living specimens.</p>	<p>5.2f Some animal behaviors are influenced by environmental conditions. These behaviors may include nest building, hibernating, hunting, migrating, and communicating.</p> <p>5.2g The health, growth, and development of organisms are affected by environmental conditions such as the availability of food, air, water, space, heat, and sunlight.</p>	IB – Plants and animals are dependent on other plants and animals.	1 Animals depend on plants.
8	5 Organisms maintain a dynamic equilibrium that sustains life.	5.2 Describe some survival behaviors of common living specimens.	5.2g The health, growth, and development of organisms are affected by environmental conditions such as the availability of food, air, water, space, heat, and sunlight.	IIA - Each kind of plant or animal continues beyond the life span of the individuals because each kind is able to produce offspring.	2.2 For some types of animals, the young of the new generation are better able to live and thrive because certain kinds of care are provided to them by the adults of the previous generation.

Test Item 1-15	MST-Science Standard 4 Living Environment Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Life Science A & B=Life C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
9	6 Plants and animals depend on each other and their physical environment.	6.1 Describe how plants and animals, including humans, depend upon each other and the nonliving environment.	6.1b All animals depend on plants. Some animals (predators) eat other animals (prey). 6.1e (major) An organism's pattern of behavior is related to the nature of that organism's environment, including kinds and numbers of other organisms present, the availability of food and other resources, and the physical characteristics of the environment.	IIB – The different kinds of plants and animals in an area may be dependent upon each other for food and other needs. The group of plants and animals that are dependent on each other in an area are called a community.	2.1 As the food supply of animal population changes, the animal populations will tend to change.
10	4 The continuity of life is sustained through reproduction and development.	4.1 Describe the major stages in the life cycles of selected plants and animals.	4.1b Each kind of plant goes through its own stages of growth and development that may include seed, young plant, and mature plant.	IIA - Each kind of plant or animal continues beyond the life span of the individuals because each kind is able to produce offspring.	1.4 Structures other than flowers (e.g., runners, tubers, bulbs, leaf and stem cuttings) enable offspring to be produced in some plants.
11	3 Individual organisms and species change over time.			IIA - Each kind of plant or animal continues beyond the life span of the individuals because each kind is able to produce offspring.	2.4 Animals have the potential to produce numerous offspring during their adult stage.
11 Cont.	3 General Summary Throughout time, plants and animals have changed depending on their environment. In learning how organisms have been successful in their habitats, students should observe and record information about plants and animals. Students should recognize how differences among individuals within a species can help an organism or population to survive and how behaviors and physical adaptations allow organisms to survive in their environment.				

Test Item 1-15	MST-Science Standard 4 Living Environment Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Life Science A & B=Life C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
12	3 Individual organisms and species change over time.	3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.	3.1b Each plant has different structures that serve different functions in growth, survival, and reproduction.	IIA - Each kind of plant or animal continues beyond the life span of the individuals because each kind is able to produce offspring.	1.3 Seeds have properties that enable them to survive and develop into new plants.
13	6 Plants and animals depend on each other and their physical environment.	6.1 Describe how plants and animals, including humans, depend upon each other and the nonliving environment.	6.1a Green plants are producers because they provide the basic food supply for themselves and animals. 6.1b All animals depend on plants. Some animals (predators) eat other animals (prey). 6.1c Animals that eat plants for food may in turn become food for other animals. This sequence is called a food chain.	IIB – The different kinds of plants and animals in an area may be dependent upon each other for food and other needs. The group of plants and animals that are dependent on each other in an area is called a community.	1.1 Animals that eat plants for food may in turn become food for other animals. The sequence is called a food chain.

Test Item 1-15	MST-Science Standard 4 Living Environment Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Life Science A & B=Life C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
14	6 Plants and animals depend on each other and their physical environment.	6.1 Describe how plants and animals, including humans, depend upon each other and the nonliving environment.	6.1a Green plants are producers because they provide the basic food supply for themselves and animals. 6.1b All animals depend on plants. Some animals (predators) eat other animals (prey). 6.1c Animals that eat plants for food may in turn become food for other animals. This sequence is called a food chain. 6.1e An organism's pattern of behavior is related to the nature of that organism's environment, including kinds and numbers of other organisms present, the availability of food and resources, and the physical characteristics of the environment.	IIB – The different kinds of plants and animals in an area may be dependent upon each other for food and other needs. The group of plants and animals that are dependent on each other in an area is called a community.	1.2 Dependence among plants and animals can be complex. A particular plant or animal may be eaten by different types of animals which in turn may be eaten by more than one type of animal. This complex network of two or more food chains is called a food web.
15	3 Individual organisms and species change over time.	3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.	3.1b Each plant has different structures that serve different functions in growth, survival, and reproduction.	IIA - Each kind of plant or animal continues beyond the life span of the individuals because each kind is able to produce offspring.	1.2 The flower is the structure in mature flowering plants that enables the offspring to be produced in the form of seeds.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
16	5 Energy and matter interact through forces that result in changes in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	5.1c The force of gravity pulls objects toward the center of the Earth. 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 incline planes.	ID - The properties of an object can be changed by an event in which the object is involved. An event in which the properties of an object are changed is called an interaction.	3.1 Objects on a uniform balance beam may or may not be in balance depending on the location of the support.
17	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1c Objects have properties that can be observed, described and /or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.	IC - Objects and events have distinctive properties.	1.1 Some properties of an object are dependent upon the materials from which the object is made.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
18	5 Energy and matter interact through forces that result in changes in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	5.1b The position or direction of motion of an object can be changed by pushing or pulling. 5.1d (major) The amount of change in the motion of an object is affected by friction. 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 incline planes.	ID - The properties of an object can be changed by an event in which the object is involved. An event in which the properties of an object are changed is called an interaction.	2.3 The amount of change in motion of an object can be affected by the surface of the object and the surface of the material the object touches. The rougher the surface, the greater the push or pull needed to move the object.
19	1 The Earth and celestial phenomena can be described by principles of relative motion and perspective.	1.1 Describe the patterns of daily, monthly, and seasonal changes in the environment.		IC - Objects and events have distinctive properties.	2.4 Two events can mark the passage of time.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
20	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools. 3.2 Describe chemical and physical changes, including changes in states of matter.	3.1c Objects have properties that can be observed, described and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light. 3.2a (major) Matter exists in three states: solid, liquid, gas. 3.2c Changes in the properties or materials of objects can be observed and described.	IC - Objects and events have distinctive properties.	1.1 Some properties of an object are dependent upon the materials from which the object is made.
21	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1g Some properties of an object are dependent on the conditions of the present surroundings in which the object exists. 3.1e The material of an object is made up of specific properties of the object (float/sink, conductivity, magnetism). Properties can be measured with tools such as hand lenses and graduated cylinders.	IC - Objects and events have distinctive properties.	1.5 Some properties of an object are dependent on the conditions of the present surroundings in which the object exists.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
22	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.2 Describe the chemical and physical changes, including changes in states of matter.	3.2a Matter exists in three states: solid, liquid, and gas. 3.2b (major) Temperature can affect the state of matter of a substance. 3.2c Changes in properties of materials of objects can be observed and described.	ID - The properties of an object can be changed by an event in which the object is involved. An event in which the properties of an object are changed is called an interaction.	1.3 Removing heat from a material can form liquids or solids from gases and form solids from liquids.
23	4 Energy exists in many forms, and when these forms change energy is conserved.	4.1 Describe a variety of forms of energy and the changes that occur in objects when they interact with those forms of energy. 4.2 Observe the way one form can be transferred into another form of energy present in common situations (e.g., mechanical to heat energy, mechanical to electrical energy, chemical to heat energy).	4.1a Energy exists in various forms: heat, sound, chemical, mechanical, light. 4.1d Energy and matter interact; a bulb is lighted by means of electrical current. 4.1e Electricity travels through a closed circuit. 4.2b (major) Humans utilize interactions between matter and energy. (Chemical to electrical, light, and heat: battery to bulb)	IID - Within systems the interactions of materials and energy change their forms and properties. A group of interacting objects is called a system.	1 Energy can be changed in form by interactions with materials.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
24	4 Energy exists in many forms, and when these forms change energy is conserved.	4.1 Describe a variety of forms of energy and the changes that occur in objects when they interact with those forms of energy. 4.2 Observe the way one form of energy can be transferred into another form of energy present in common situations.	4.1a (major) Energy exists in various forms: heat, sound, chemical, mechanical, light. 4.2b Humans utilize interactions between matter and energy.	IIC - Energy and material have forms and properties.	2.3 The amount of energy available from a source can vary.
25	4 Energy exists in many forms, and when these forms change energy is conserved.	4.1 Describe a variety of forms of energy and the changes that occur in objects when they interact with those forms of energy.	4.1b Energy can be transferred from one place to another. 4.1f Heat can be released in many ways, for example, by burning, rubbing (friction), or combining one substance with another.	IID - Within systems the interactions of materials and energy change their forms and properties. A group of interacting objects is called a system.	2 Energy in a particular form can be transferred from one object to another in a system.
26	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.2 Describe chemical and physical changes, including changes in states of matter.	3.2b (major) Temperature can affect the state of matter of a substance. 3.2c Changes in properties of materials of objects can be observed and described.	IID - Within systems the interactions of materials and energy change their forms and properties. A group of interacting objects is called a system.	3 When energy interacts with objects in a system, the properties of the objects may be changed.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
27	<p>5 Energy and matter interact through forces that result in changes in motion.</p> <p>3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p>	<p>5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.</p> <p>3.1 Observe and describe properties of materials, using appropriate tools.</p>	<p>5.1b The position or direction of motion of an object can be changed by pushing or pulling.</p> <p>5.1c The force of gravity pulls objects toward the center of the Earth.</p> <p>3.1c Objects have properties that can be observed, described, and /or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.</p> <p>3.1e The material of an object is made up of specific properties of the object (sink/float, conductivity, magnetism). Properties can be measured with tools such as hand lenses and graduated cylinders.</p>	IIC - Energy and material have forms and properties.	1.1 Some properties of an object are determined by the form of the material of which it is composed.

Item 16-28	MST-Science Standard 4 Physical Setting Key Idea	Reference to Elementary Science Core Curriculum Guide Performance Indicator	Reference to Elementary Science Core Curriculum Guide Major Understanding	Reference to NYS Science Syllabus Physical Science C & D=Physical I=K-2, II=3-4	NYS Elementary Science Syllabus Description
28	4 Energy exists in many forms, and when these forms change energy is conserved.	4.1 Describe a variety of forms of energy and the changes that occur in objects when they interact with those forms of energy.	4.1c (major) Some materials transfer energy better than others (heat and electricity). 4.1g Interactions with forms of energy can be either helpful or harmful.	IIC - Energy and material have forms and properties.	2.2 Energy can move from one object to another through materials and through space.

Items 29-45 assess student process and content skills in science. This portion of Matrix A correlates Standard 1 Analysis, Inquiry and Design and Standard 4 Science of the Elementary Science Core Curriculum Guide, and Inquiry Skills from the Elementary Science Syllabus.

Item 29-45	Science Standard 4 Living Environment (LE) Physical Setting (PS) Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M) Key Idea Performance Indicator Major Understanding	NYS Science Syllabus INQUIRY SKILLS Level I (K-2) Level II (3-4)	NYS Science Syllabus INQUIRY SKILLS Description
29	PS 1 1 The Earth and celestial phenomena can be described by principles of relative motion and perspective. 1.1 Describe the patterns of daily, monthly, and seasonal changes in the environment. 1.1b Humans organize time into units based on natural motions of the Earth: second, minute, hour. 1.1c (major) The Sun and other stars appear to move in a recognizable pattern both daily and seasonally.	Level I Inquiry Skills	Using numbers: Applying mathematical rules or formulas to calculate quantities or determine relationships from basic measurements.

Item 29-45	<p style="text-align: center;">Science Standard 4 Living Environment (LE) Physical Setting (PS)</p> <p style="text-align: center;">Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M)</p> <p style="text-align: center;">Key Idea Performance Indicator Major Understanding</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Level I (K-2) Level II (3-4)</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Description</p>
30	<p>PS 3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p>3.1 Observe and describe properties of materials, using appropriate tools.</p> <p>3.1c Objects have properties that can be observed, described, and /or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.</p> <p>3.2 Describe chemical and physical changes, including changes in states of matter.</p> <p>3.2a Matter exists in three different states (liquids do not have a definite shape but have a definite volume.)</p>	Level I Inquiry Skills	Measuring: Making quantitative observations by comparing to a conventional (or non-conventional) standard.
31	<p>LE 1 Living things are both similar to and different from each other and nonliving things.</p> <p>1.1 Describe the characteristics of and variations between living and nonliving things.</p> <p>1.1a Animals need air, water, and food in order to live and thrive.</p>	Level I Inquiry Skills	Making decisions: Identifying alternatives and choosing a course of action from among the alternatives after basing the judgment for the selection on justifiable reasons.
32	<p>LE 5 Organisms maintain a dynamic equilibrium that sustains life.</p> <p>5.2 Describe some survival behaviors of common living specimens.</p> <p>5.2a Plants respond to changes in their environment. For example, the parts of the leaves of some green plants undergo seasonal changes that enable the plant to grow.</p>	Level I Inquiry Skills	Predicting: Making a forecast of future events or conditions expected to exist.

Item 29-45	<p style="text-align: center;">Science Standard 4 Living Environment (LE) Physical Setting (PS)</p> <p style="text-align: center;">Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M)</p> <p style="text-align: center;">Key Idea Performance Indicator Major Understanding</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Level I (K-2) Level II (3-4)</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Description</p>
33	<p>PS 3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p>3.1 Observe and describe properties of materials, using appropriate tools.</p> <p>3.1f Objects and/or materials can be sorted or classified according to their properties.</p> <p>S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions or proposed explanations they have helped formulate.</p> <p>S2.1a Indicate materials to be used and steps to follow to conduct an investigation and describe how data will be recorded (journals, dates, and times, etc.)</p>	Level I Inquiry Skills	Identifying variables: Recognizing the characteristics of objects or factors in events that are constant or change under different conditions.
34	<p>PS 3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p>3.1 Observe and describe properties of materials, using appropriate tools.</p> <p>3.1d Measurements can be made with standard metric units and nonstandard units.</p>	Level II Inquiry Skills	Measuring: Making quantitative observations by comparing to a conventional (or non-conventional) standard.

Item 29-45	<p style="text-align: center;">Science Standard 4 Living Environment (LE) Physical Setting (PS)</p> <p style="text-align: center;">Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M)</p> <p style="text-align: center;">Key Idea Performance Indicator Major Understanding</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Level I (K-2) Level II (3-4)</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Description</p>
35	<p>PS 3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p>3.1 Observe and describe properties of materials, using appropriate tools.</p> <p>3.1e The material of an object is made up of specific properties of the object (float/sink, conductivity, magnetism). Properties can be measured with tools such as hand lenses and graduated cylinders.</p>	Level II Inquiry Skills	Creating models Generalizing
36	<p>LE 4 The continuity of life sustained through reproduction and development.</p> <p>4.1 Describe the major stages in the life cycles of selected plants and animals.</p> <p>4.1e Each generation of animals goes through changes in form from young to adult. This completed sequence of changes in form is called a life cycle.</p>	Level II Inquiry Skills	Creating models: Displaying information by means of graphic illustrations or other multisensory representation.

Item 29-45	<p align="center">Science Standard 4 Living Environment (LE) Physical Setting (PS)</p> <p align="center">Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M)</p> <p align="center">Key Idea Performance Indicator Major Understanding</p>	<p align="center">NYS Science Syllabus INQUIRY SKILLS</p> <p align="center">Level I (K-2) Level II (3-4)</p>	<p align="center">NYS Science Syllabus INQUIRY SKILLS</p> <p align="center">Description</p>
37	<p>PS 2 Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.</p> <p>2.1 Describe the relationship among air, water, and land on Earth.</p> <p>2.1b Weather can be described and measured by temperature.</p> <p>M1 Abstraction and symbolic representation are used to communicate mathematically.</p> <p>M1.1 Use special mathematical notation and symbolism to communicate in mathematics and compare and describe quantities, express relationships, and relate mathematics to their immediate environment.</p> <p>M1.1b Select the appropriate operation to solve mathematical problems.</p>	Level II Inquiry Skills	Using numbers: Applying mathematical rules or formulas to calculate quantities or determine relationships from basic measurements.
38	<p>LE 3 Individual organisms and species change over time.</p> <p>3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.</p> <p>3.1c In order to survive in their environment, plants and animals must adapt to that environment.</p>	Level II Inquiry Skills	<p>Classifying: Arranging or distributing objects, events, or information representing objects or events in classes according to some method.</p> <p>Observing: Becoming aware of an object or event by using any of the senses.</p>

Item 29-45	<p style="text-align: center;">Science Standard 4 Living Environment (LE) Physical Setting (PS)</p> <p style="text-align: center;">Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M)</p> <p style="text-align: center;">Key Idea Performance Indicator Major Understanding</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Level I (K-2) Level II (3-4)</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Description</p>
39	<p>PS 5 Energy and matter interact through forces that result in changes in motion.</p> <p>5.1e Magnetism is a force that may attract and repel certain materials.</p> <p>S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions or proposed explanations they have helped formulate.</p> <p>S2.1a Indicate materials to be used and steps to follow to conduct the investigation and describe how data will be recorded (journals, dates, and times, etc.).</p>	Level II Inquiry Skills	Identifying variables: Recognizing the characteristics of objects or factors in events that are constant or change under different conditions.
40	<p>S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.</p> <p>M2 Deductive and inductive reasoning are used to reach mathematical conclusions.</p> <p>M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships present in the environment assist them in reaching conclusions.</p> <p>M2.1b Explain verbally, graphically, or in writing patterns and relationships observed in the physical and living environment.</p>	Level II Inquiry Skills	<p>Interpreting data: Analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data.</p> <p>Creating models: Displaying information by means of graphic illustrations or other multisensory representation.</p>

Item 29-45	<p style="text-align: center;"> Science Standard 4 Living Environment (LE) Physical Setting (PS) </p> <p style="text-align: center;"> Science Standard 1 Scientific Inquiry (S) </p> <p style="text-align: center;"> Science Standard 1 Mathematical Analysis (M) </p> <p style="text-align: center;"> Key Idea Performance Indicator Major Understanding </p>	<p style="text-align: center;"> NYS Science Syllabus INQUIRY SKILLS </p> <p style="text-align: center;"> Level I (K-2) Level II (3-4) </p>	<p style="text-align: center;"> NYS Science Syllabus INQUIRY SKILLS </p> <p style="text-align: center;"> Description </p>
<p style="text-align: center;">41</p>	<p>S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.</p> <p>S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected.</p> <p>2 Deductive and inductive reasoning are used to reach mathematical conclusions.</p> <p>M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships present in the environment assist them in reaching these conclusions.</p>	<p>Level II Inquiry Skills</p>	<p>Recording data: Collecting bits of information about objects and events which illustrate a specific situation.</p> <p>Interpreting data: Analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data.</p>
<p style="text-align: center;">42</p>	<p>PS 5 Energy and matter interact through forces that result in changes in motion.</p> <p>5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.</p> <p>5.1b The position or direction of motion of an object can be changed by pushing or pulling.</p> <p>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 incline planes.</p> <p>S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.</p>	<p>Level II Inquiry Skills</p>	<p>Interpreting data: Analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data.</p>

Item 29-45	<p style="text-align: center;"> Science Standard 4 Living Environment (LE) Physical Setting (PS) </p> <p style="text-align: center;"> Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M) </p> <p style="text-align: center;"> Key Idea Performance Indicator Major Understanding </p>	<p style="text-align: center;"> NYS Science Syllabus INQUIRY SKILLS </p> <p style="text-align: center;"> Level I (K-2) Level II (3-4) </p>	<p style="text-align: center;"> NYS Science Syllabus INQUIRY SKILLS </p> <p style="text-align: center;">Description</p>
<p style="text-align: center;">43</p>	<p>PS 5 Energy and matter interact through forces that result in changes in motion.</p> <p>5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.</p> <p>5.1e Magnetism is a force that may attract or repel certain materials.</p> <p>S3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insight to phenomena.</p> <p>S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.</p> <p>S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected.</p> <p>M2 Deductive and inductive reasoning are used to reach mathematical conclusions.</p> <p>M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships present in the environment assist them in reaching these conclusions.</p> <p>M2.1b Explain verbally, graphically, or in writing patterns and relationships observed in the physical and living environment.</p>	<p>Level II Inquiry Skills</p>	<p>Generalizing: Drawing general conclusions from particulars.</p> <p>Interpreting data: Analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data.</p>

Item 29-45	<p style="text-align: center;">Science Standard 4 Living Environment (LE) Physical Setting (PS)</p> <p style="text-align: center;">Science Standard 1 Scientific Inquiry (S) Science Standard 1 Mathematical Analysis (M)</p> <p style="text-align: center;">Key Idea Performance Indicator Major Understanding</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Level I (K-2) Level II (3-4)</p>	<p style="text-align: center;">NYS Science Syllabus INQUIRY SKILLS</p> <p style="text-align: center;">Description</p>
44	<p>PS 2 Many phenomena that we observe on Earth involve interactions among components of air, water, and land.</p> <p>2.1 Describe the relationship among air, water, and land on Earth.</p> <p>2.1b Weather can be described and measured by temperature.</p> <p>S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.</p>	Level II Inquiry Skills	Language Arts Creating models: Displaying information by means of graphic illustrations or other multisensory representation.
45	<p>PS 3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p>3.2 Describe chemical and physical changes, including in states of matter.</p> <p>3.2c Changes in the properties or materials of objects can be observed and described.</p>	Level II Inquiry Skills	<p>Communicating information</p> <p>Creating models: Displaying information by means of graphic illustrations or other multisensory representation.</p> <p>Inferring: Making a conclusion based on reasoning to explain an observation.</p>

MATRIX B
New York State Program Evaluation Test in Science
Performance Test, Form Z

Matrix B aligns the performance component of the test, Form Z, to the Science Learning Standard 1 Analysis, Inquiry, and Design and to Science Learning Standard 4 contained in the Elementary Science Core Curriculum Guide. The alignment to the Elementary Science Syllabus is also referenced.

STATION #1 - LIQUIDS

Station #1 - Liquids

Description: Liquids

Students use measuring equipment and their observation skills to determine the physical properties of objects, make inferences about discrepant events, and formulate new questions based on data collected.

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.

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 1 a, b, c, d	Science 2 Beyond the use of reasoning and consensus, scientific inquiry involves testing of the proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	S2.3 Carry out their plans for exploring phenomena through direct observation and through the use of simple instruments that permit measurement of quantities such as length, mass, volume, temperature, and time.		Measuring Manipulating materials
	Math 1 Abstraction and symbolic representation are used to communicate mathematically.	M1.1 Use special mathematical notation and symbolism to communicate in mathematics and to compare and describe quantities, express relationships, and relate mathematics to their immediate environment. M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible.	M 3.1a Use appropriate scientific tools, such as metric rulers, spring scales, pan balances, graph paper, thermometers, and graduated cylinders, to solve problems about the natural world.	

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 2	Science 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	S1.3 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.		Inferring
	Math 2 Deductive and inductive reasoning are used to reach mathematical conclusions.	M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships present in the environment assist them in reaching conclusions.	Math 2.1a Explain verbally, graphically, or in writing the reasoning used to develop mathematical conclusions.	
# 3	Science 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	S1.1 Ask “why” questions in attempts to seek greater understanding concerning objects and events they have observed and heard about.	S1.1b Articulate appropriate questions based on observations.	Questioning

Station # 1 - Liquids

Standard 4: The Physical Setting

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
# 1 a, b, c, d	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1c Objects have properties that can be observed, described, and measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.
			3.1d Measurements can be made with standard or nonstandard units.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
# 2	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools. 5.1 Describe the effects of common forces (pushes or pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	3.1a Matter takes up space and has mass. Two objects cannot occupy the same place at the same time. 5.1a The position of an object can be described by locating it relative to another object or the background (e.g., on top, next to, over, under, etc.).
# 3	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1e The material(s) an object is made up of determine some specific properties of the object (sink/float, conductivity/magnetism). Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers, and graduated cylinders. 3.1c Objects have properties that can be observed, described, and or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.

STATION #2 - GROUPING OBJECTS

Station #2 - Grouping Objects

Description: Grouping, Classifying Properties of Objects

Students sort a set of eight objects into appropriate groups and then create their own classification system by forming subgroups for the objects.

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.

Test Item #	Science /Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 1 & 2	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.	S3.1a Accurately transfer data from a science journal or notes to appropriate graphic organizer.	Classifying; Observing; Manipulating materials
# 3 a, b	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.3 Share their findings with others and actively seek their interpretations and ideas.		Classifying

Station #2 - Grouping Objects

Standard 4: The Physical Setting

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in Science.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
# 1, 2, & 3	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1a Matter takes up space and has mass. Two objects cannot occupy the same place at the same time. 3.1b Matter has properties (color, hardness, odor, sound, taste,...) that can be observed through the senses. 3.1c Objects have properties that can be observed, described, and measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
#1, 2, & 3 cont.			<p>3.1e The material(s) an object is made up of determine some specific properties of the object (sink/float). Properties can be observed or measured with tools....</p> <p>3.1f Objects or materials can be sorted or classified according to properties.</p>
# 2	5 Energy and matter interact through forces that result in a change of motion.	5.1 Describe the effects of common forces (pushes or pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	5.1e Magnetism is a force that may attract or repel certain materials.

STATION #3 –BALL AND RAMP

Station #3 - Ball and Ramp

Description: Ball and Ramp

Two students work together cooperatively at this task, which uses a ball and ramp “game.” The students gather data about problems associated with the development of the game. Students measure the distance and make inferences and predictions on the basis of the data they collect. Each student completes an answer sheet and makes predictions about how to modify the game.

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.

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 1 a, b, c	Math 1 Abstraction and symbolic representation are used to communicate mathematically.	M1.1 Use special mathematical notation and symbolism to communicate in mathematics and to compare and describe quantities, express relationships, and relate mathematics to their immediate environment.	M1.1c Apply mathematical skills to describe the natural world.	Observing Recording data
	Math 3 Critical thinking skills are used in the solution of mathematical problems.	M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible.	M3.1a Use appropriate scientific tools, such as metric rulers, spring scales, pan balances, graph paper, thermometers, and graduated cylinders to solve problems about the natural world.	
	Science 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	S1.1 Ask “why” questions in attempts to seek greater understanding concerning objects and events they have observed and heard about.	S1.1a Observe and discuss objects and events and record observations.	
	Science 2 Beyond the use of reasoning and consensus, scientific inquiry involves testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	S2.3 Carry out their plans for exploring phenomena through direct observation and through the use of simple instruments that permit measurement of quantities such as length, mass, volume, temperature, and time.	S2.3a Use appropriate “inquiry and process skills” to collect data. S2.3b Record observations accurately and concisely.	
	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.	S3.1a Accurately transfer data from a science journal or notes to appropriate graphic organizer.	

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 2	Math 2 Deductive and inductive reasoning are used to reach mathematical conclusions.	M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships present in the environment assist them in reaching these conclusions.	M2.1b Explain verbally, graphically, or in writing patterns and relationships observed in the physical and living environment.	Classifying
	Science 2 Beyond the use of reasoning and consensus, scientific inquiry involves testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	S2.2 Share their research plans with others and revise them based on their suggestions.		
	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships. S3.3 Share their findings with others and actively seek their interpretations and ideas.	S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected. S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretations and ideas.	
# 3	Math 2 Deductive and inductive reasoning are used to reach mathematical conclusions. Math 3 Critical thinking skills are used in the solution of mathematical problems.	M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships present in the environment assist them in reaching these conclusions. M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible.	M2.1a Explain verbally, graphically, or in writing the reasoning used to develop mathematical conclusions. M2.1b Explain verbally, graphically, or in writing patterns and relationships observed in the physical and living environment.	Inferring: Predicting
	Science 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	S1.1 Ask “why” questions in attempts to seek greater understanding concerning objects and events they have observed and heard about.	S1.1a Observe and discuss objects and events and record observations. S1.1b Articulate appropriate questions and observations.	

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
#3 cont.	<p>Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.</p>	<p>S3.3 Share their findings with others and actively seek their interpretations and ideas.</p> <p>S3.4 Adjust their explanations and understandings of objects and events based on their findings and new ideas.</p>	<p>S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretation of ideas.</p>	
# 4	<p>Math 3 Critical thinking skills are used in the solution of mathematical problems.</p> <p>Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.</p>	<p>M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible.</p> <p>S3.4 Adjust their explanations and understandings of objects and events based on their findings and new ideas.</p>	<p>S3.4a State, orally and in writing, any inferences or generalizations indicated by data collection.</p>	<p>Interpreting data: Inferring</p>
# 5	<p>Math 3 Critical thinking skills are used in the solution of mathematical problems.</p> <p>Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.</p>	<p>M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible.</p> <p>S3.3 Share their findings with others and actively seek their interpretations and ideas.</p>	<p>S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretation of ideas.</p>	<p>Interpreting data: Inferring</p>

Station #3 - Ball and Ramp

Standard 4: The Physical Setting

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
# 1 a, b, c	5 Energy and matter interact through forces that result in change in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	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.). 5.1c The force of gravity pulls objects toward the center of the Earth. 5.1f Mechanical energy may cause change in motion through the application of force and through simple machines such as pulleys, levers, and incline planes.
# 2	5 Energy and matter interact through forces that result in change in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	
# 3	5 Energy and matter interact through forces that result in change in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	
# 4	5 Energy and matter interact through forces that result in change in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.	

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
# 5	5 Energy and matter interact through forces that result in change in motion.	5.1 Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces. 3.1 Observe and describe properties of materials, using appropriate tools.	3.1c Objects have properties that can be observed, described, and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.

STATION #4 –MAGNETIC AND ELECTRICAL TESTING

Station #4 - Magnetic and Electrical Testing

Description: Magnetic and Electrical Testing

Students use magnetic and electrical tester to collect data about a set of eight objects. They record their findings and use the data they collect to make inferences and generalizations about the magnetic and electrical properties of the set of objects.

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.

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 1	Math 3 Critical thinking skills are used in the solution of mathematical problems.	M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible.		Recording data: Manipulating materials
#1 cont.	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.	S3.1a Accurately transfer data from a science journal or notes to appropriate graphic organizer.	
# 2	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.	S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected.	Generalizing: Inferring

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
#2 cont.		S3.3 Share their findings with others, and actively seek their interpretations and ideas.	S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretations and ideas.	
# 3	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	M3.1 Explore and solve problems generated from school, home, and community situations, using concrete objects or manipulative materials when possible. S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.	S3.1a Accurately transfer data from a science journal or notes to appropriate graphic organizer.	Recording data: Manipulating materials
# 4	Science 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships. S3.3 Share their findings with others and actively seek their interpretations and ideas.	S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected. S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretations and ideas.	Generalizing: Inferring

Station #4 –Magnetic and Electrical Testing

Standard 4: The Physical Setting

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
# 1	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1c Objects have properties that can be observed, described, and measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light. 3.1f Objects or materials can be sorted or classified according to properties.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
#1 cont.		5.1 Energy and matter interact through forces that result in change in motion.	5.1e Magnetism is a force that may attract or repel certain materials.
# 2			5.1e Magnetism is a force that may attract or repel certain materials.
# 3 &4	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1c Objects have properties that can be observed, described, and measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light. 3.1f Objects and materials can be sorted or classified according to properties.
	4 Energy exists in many forms, and when these forms change energy is conserved.	4.1 Describe a variety of forms of energy (e.g., heat, chemical, light) and the changes that occur in objects when they interact with those forms of energy.	4.1a Energy exists in various forms: heat, electrical, sound, chemical, mechanical, light. 4.1b Energy can be transferred from one place to another. 4.1c Some materials transfer energy better than others (heat and electricity). 4.1d Energy and matter interact; a bulb is lighted by means of an electrical current. 4.1e Electricity travels through a closed circuit. 4.1g Interactions with forms of energy can be either helpful or harmful.

Test Item #	Science Key Idea	Performance Indicator	Major Understandings
#3 & 4 cont.		4.2 Observe the way one form of energy can be transferred into another form of energy present in common situations (e.g., mechanical to heat energy, mechanical to electrical energy, chemical to heat energy).	4.2b Humans utilize interactions between matter and energy.

STATION #5 –UNKNOWN OBJECT

Station #5 - Unknown Object

Description: Unknown Object

Students are given an unknown object and are asked to describe it in a letter so that a scientist might be able to identify it. Students must use their observation skills and nonstandard measurement to describe the object, communicate this information in writing, and ask additional questions of the scientist to further their investigation of the object.

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.

Test Item #	Science/Math Key Idea	Performance Indicator	Major Understandings	Syllabus Reference
# 1	Science 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	S1.1 Ask “why” questions in attempts to seek greater understanding concerning objects and events they have observed and heard about.	S1.1a Observe and discuss objects and events and record observations.	Observing: Communicating Using nonstandard units of measure
	Science 2 Beyond the use of reasoning and consensus, scientific inquiry involves testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	S2.3 Carry out their plans for exploring phenomena through direct observation and through the use of simple instruments that permit measurement of quantities such as length, mass, volume, temperature, and time.	S2.3a Use appropriate “inquiry and process skills” to collect data.	
		S3.3 Share their findings with others and actively seek their interpretations and ideas.	S2.3b Record observations accurately and concisely. 3.3a Explain their findings to others, and actively listen to suggestions for possible interpretations and ideas.	
# 2	Science 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	S1.1 Ask “why” questions in attempts to seek greater understanding concerning objects and events they have observed and heard about. S3.4 Adjust their explanations and understandings of objects and events based on their findings and new ideas.	S1.1b Articulate appropriate questions and observations. 3.4b State, orally and in writing, any new questions that arise from their investigation.	Communicating: Questioning

Station #5 - Unknown Object
Standard 4: The Physical Setting

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Item #	Science Key Idea	Performance Indicator	Major Understandings
# 1	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	3.1 Observe and describe properties of materials, using appropriate tools.	3.1b Matter has properties (color, hardness, odor, sound, taste,...) that can be observed through the senses.
			3.1c Objects have properties that can be observed, described and measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.

Summary Chart 1
New York State Program Evaluation Test in Science
Reference of test items on **Objective Test, Form H**, to the New York State Elementary Science Syllabus and the Elementary Science Core Curriculum Guide

Test Item #	Reference to Elementary Science Core Curriculum			Reference to NYS Elementary Science Syllabus	
	Standard 1 Key Idea	Standard 4 Content Area LE = Living Environment PS = Physical Setting	Standard 4 Key Idea and Performance Indicator	A and B = Life Science C and D = Physical Science I = grades K – 2 II = grades 3 – 4	
1		LE	3.1	IA	2.1
2		LE	4.1	IA	1.4
3		LE	3.1	IA	1.1
4		LE	3.1	IA	1.1
5		LE	4.1	IA	2.4
6		LE	6.1, 3.1	IB	2
7		LE	6.1, 5.2	IB	1
8		LE	5.2	IIA	2.2
9		LE	6.1	IIB	2.1
10		LE	4.1	IIA	1.4
11		LE	3	IIA	2.4
12		LE	3.1	IIA	1.3
13		LE	6.1	IIB	1.1
14		LE	6.1	IIB	1.2
15		LE	3.1	IIA	1.2
16		PS	5.1	ID	3.1
17		PS	3.1	IC	1.1
18		PS	5.1	ID	2.3
19		PS	1.1	IC	2.4
20		PS	3.1, 3.2	IC	1.1
21		PS	3.1	IC	1.5
22		PS	3.2	ID	1.3
23		PS	4.1, 4.2	IID	1
24		PS	4.1, 4.2	IIC	2.3
25		PS	4.1	IID	2
26		PS	3.2	IID	3
27		PS	5.1, 3.1	IIC	1.1
28		PS	4.1	IIC	2.2
29		PS	1.1	I	Inquiry Skill
30		PS	3.1, 3.2	I	Inquiry Skill
31		LE	1.1	I	Inquiry Skill
32		LE	5.2	I	Inquiry Skill
33	S 2.1	PS	3.1	I	Inquiry Skill
34		PS	3.1	II	Inquiry Skill
35		PS	3.1	II	Inquiry Skill
36		LE	4.1	II	Inquiry Skill
37	M 1.1	PS	2.1	II	Inquiry Skill
38		LE	3.1	II	Inquiry Skill
39	S 2.1	PS	5.1	II	Inquiry Skill
40	S 3.2, M 2.1	—	—	II	Inquiry Skill
41	S 3.2, M 2.1	—	—	II	Inquiry Skill
42	S 3.2	PS	5.1	II	Inquiry Skill
43	S 3.2, M 2.1	PS	5.1	II	Inquiry Skill
44	S 3.1	PS	2.1	II	Inquiry Skill
45		PS	3.2	II	Inquiry Skill

Summary Chart 2

New York State Program Evaluation Test in Science

Reference for stations on **Performance Test, Form Z**, to the New York State Elementary Science Syllabus and the Elementary Science Core Curriculum Guide

Station No.	Description	Reference to Elementary Science Core Curriculum		Reference to New York State Elementary Science Syllabus
		MST Standard 1 (Mathematical Analysis, Scientific Inquiry, and Engineering Design) Key Idea/ Performance Indicator	MST Standard 4 The Physical Setting Key Idea/ Performance Indicator	
1	Liquids - Students use measuring equipment and their observation skills to determine the physical properties of objects, make inferences about discrepant events, and formulate new questions on the basis of the data collected.	Mathematical Analysis M 1.1 M 2.1 M 3.1 Scientific Inquiry S 1.1, S 1.3 S 2.3	3.1 5.1	measuring inferring questioning manipulating materials
2	Grouping Objects - Students sort a set of eight objects into appropriate groups and then create their own classification system by forming subgroups for the objects.	Scientific Inquiry S 3.1, S 3.3	3.1 5.1	classifying observing manipulating materials
3	Ball and Ramp Game - Two students work together cooperatively at this task, which uses a ball and ramp “game.” The students gather data about problems associated with the development of the game. Students measure distance and make inferences and predictions on the basis of the data they collect. Each student completes an answer sheet and makes predictions about how to modify the game.	Mathematical Analysis M 1.1 M 2.1 M 3.1 Scientific Inquiry S 1.1 S 2.2, S 2.3 S 3.1, S 3.2, S 3.3, S 3.4	3.1 5.1	classifying observing recording data interpreting data inferring predicting
4	Magnetic and Electrical Testing - Students use a magnet and electrical tester to collect data about a set of eight objects. They record their findings and use the data they collect to make inferences and generalizations about the magnetic and electrical properties of the set of objects.	Mathematical Analysis M 3.1 Scientific Inquiry S 3.1, S 3.2, S 3.3	3.1 4.1 4.2 5.1	recording data inferring generalizing manipulating materials
5	Task 5 – Unknown Object - Students are given an unknown object and are asked to describe it in a letter so that a scientist might be able to identify it. Students must use observation skills and nonstandard measurement to describe the object, communicate this information in writing, and ask additional questions of the scientist to further their investigation of the object.	Scientific Inquiry S 1.1 S 2.3 S 3.3, S 3.4	3.1	observing communicating questioning using nonstandard units of measure

APPENDIX A



THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

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To: District Superintendent of Schools
Superintendents of Public and Nonpublic Schools
Principals of Public Elementary Schools
Principals of Nonpublic Elementary Schools

From: Gerald E. DeMauro, Coordinator of Assessment

Subject: Elementary Science Program Evaluation Test (ESPET)

Date: June 1999

New forms of the Elementary Science Program Evaluation Test (ESPET) will be introduced in May of 2000. A new object test, Form H, will replace Form G. A new performance test, Form Z, will replace the manipulative skills test, Form Y.

The ESPET is designed to assess the content, concepts, and skills contained in New York State's Elementary Science Syllabus, Levels I and II and the New York State Learning Standards for Mathematics, Science, and Technology (Elementary Level). The test is designed to help you evaluate your K-4 science program. The ESPET will continue to consist of two required components, an objective test and a performance test, as well as four optional components. The required components are to be administered to fourth grade students in two separate sessions at the convenience of school personnel during the month of May. All or part of the optional components may be administered any time during the school year.

The object test, Form H, consists of 45 multiple-choice questions. The performance test, Form Z, consists of hands-on tasks set up at five stations. These tasks evaluate a number of inquiry, problem solving, and communication skills. The enclosed test description will provide you with more details about the test format. Please note that the format of performance test Form Z has several features that are different from the format of the manipulative skills test that you have been using for the last several years.

As in the past, workshops on how to implement this new science performance assessment will be offered in your region of the State. These workshops will be organized by your BOCES, Large City Staff & Curriculum Development representatives in cooperation with their Elementary Science Assessment Liaisons (SAL's), or the New York City community school district science coordinators. The workshops will cover preparation for and administration of the test as well as the rating, analyzing, and reporting of the test results. You will receive more information in the fall regarding dates, times, and locations of this training. Specific questions regarding the new forms will be answered at that time.

A list of the materials needed for the new performance test is enclosed. Schools may prepare the performance task materials themselves. As in the past, kits of materials for each station will also be available from commercial vendors and some BOCES.

The ESPET will continue to have the same optional components that you have used in recent years. Science program environment surveys for students, administrators, teachers, and parents/guardians will be included. These surveys may be used to further assess the school's science program.

Further information about ordering, administering, and scoring the examination will be provided during the 1999-2000 school year.



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**New York State Program Evaluation Test in Science, Grade 4
 Objective Test, Form H & Performance Test, Form Z
 First Administration of Current Forms: May 2000
 Last Administration of this Test in Any Form: May 2003**

Test Description

The New York State Program Evaluation Test in Science is designed to assess the content, concepts, and skills contained in New York State's Elementary Science Syllabus, Levels I and II and the New York State Learning Standards for Mathematics, Science, and Technology (Elementary Level). Level I of the syllabus contains content specified for children ages 4–7 (typically grades K–2). Level II contains content specified for children ages 7–9 (typically grades 3–4).

This program evaluation test consists of two required components, an objective test and a performance test, as well as four optional components. The required components are to be administered to fourth grade students in two separate sessions at the convenience of school personnel during the month of May. All or part of the optional components may be administered any time during the school year. All components of the test are described below.

Required Components

The objective test (Form H) consists of 45 multiple-choice questions based on material in New York State's Elementary Science Syllabus and referenced to the New York State Learning Standards for Mathematics, Science, and Technology (Elementary Level). The tables below show the number of questions from each level and section of the syllabus and the number of questions that address each of the four relevant learning standards.

New York State Program Evaluation Test in Science
 Objective Test, Form H

New York State's Elementary Science Syllabus			
Content/Skills	Level I (Ages 4–7)	Level II (Ages 7–9)	Total Questions
Life Science	7	8	15
Physical Science	7	6	13
Skills	5	12	17
Total Questions	19	26	45

New York State Learning Standards for Mathematics, Science, and Technology (Elementary Level)	
Learning Standard	Total Questions
Scientific Inquiry	8
Mathematics	3
Physical Setting	17
Living Environment	17
Total Questions	45

The performance test (Form Z) consists of hands-on tasks set up at five stations. These tasks primarily address NYS Learning Standard 1, Scientific Inquiry. Four of the stations require students to work individually, and one requires students to work cooperatively in pairs. During the testing session, students work for 15 minutes each at three of the five

stations. The administration is set up so that half of the students at a school complete a test booklet containing tasks 1, 2, and 3. The other half of the students complete a test booklet containing tasks 3, 4, and 5. (This means that 50% of the students will respond to tasks 1 and 2, the other 50% will respond to tasks 4 and 5, and 100% of the students will respond to task 3.) The five tasks are described below:

Task 1 –Liquids

Students use measuring equipment and their observation skills to determine the physical properties of objects, make inferences about discrepant events, and formulate new questions on the basis of the data collected.

Task 2 –Grouping Objects

Students sort a set of eight objects into appropriate groups and then create their own classification system by forming subgroups for the objects.

Task 3 –Ball and Ramp Game

Two students work together cooperatively at this task, which uses a ball and ramp “game.” The students gather data about problems associated with the development of the game. Students measure distance and make inferences and predictions based on the data they collect. Each student completes an answer sheet and makes predictions about how to modify the game.

Task 4 –Magnetic and Electrical Testing

Students use a magnet and electrical tester to collect data about a set of eight objects. They record their findings and use the data they collect to make inferences and generalizations about the magnetic and electrical properties of the set of objects.

Task 5 –Unknown Object

Students are given an unknown object and are asked to describe it in a letter so that a scientist might be able to identify it. Students must use observation skills and nonstandard measurement to describe the object, communicate this information in writing, and ask additional questions of the scientist to further their investigation of the object.

Optional Components

The optional components of the Program Evaluation Test in Elementary Science may be used to further assess the school’s science program. These separate environment surveys are designed for use by students, administrators, teachers, or parents/guardians. It is suggested that not all of the surveys be used every year, but that they are rotated over a 3- to 4-year cycle. The availability of adequate time to analyze the responses should dictate how many surveys are used in a given year. The number of items in each survey is listed below.

Student Science Program Environment Survey	25 items
Administrator Science Program Environment Survey	32 items
Teacher Science Program Environment Survey	36 items
Parent/Guardian Science Program Environment Survey	12 items



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New York State Elementary Science Program Evaluation Test

Materials Needed to Administer Performance Test, Form Z

Date of Introduction: May 2000

The New York State Education Department will provide the test booklets, rating guides, and other printed administration materials. Schools are responsible for obtaining the performance task materials. Schools can either prepare the performance task materials or purchase the materials in a complete kit from one of several vendors. Several BOCES produce these kits as well. Schools might want to contact the vendor that has supplied them with kits in the past. A list of materials needed for each of the five stations appears below.

Materials Per Student for State 1 -- Liquids

- 4 bottles -- clear plastic, approx. 125-mL capacity
- 3 screwtops to fit bottles
- 2 Superballs, identical in size and color, sized to fit through the mouths of the bottles
- Bottle #1 -- empty
- 3 clear bottles that must **not** be opened
 - Bottle #2 -- capped, with water inside
 - Bottle #3 -- capped, with water and ball inside
 - Bottle #4 -- capped, with unknown liquid (alcohol) and ball inside
- Large-mouth container of at least 200 mL of fresh water at **room temperature**
- 30-cm metric ruler
- Balance with gram masses (Provide a mix of 20-g, 10-g, 5-g, and 1-g masses that is more than enough for the student to determine the mass of Bottle #1 with 45 mL of water.)
- Measuring cup (size of cup depends on the amount of water to be measured in Bottle #1)
- Celsius thermometer
- Paper towels

Teacher Materials

- Rubbing alcohol
- Fine-line, black permanent marker
- A non-water-soluble glue or glue gun

Materials Per Student for Station 2 -- Grouping Objects

- Bar magnet
- Desktop diagram (see example in Administration Guide)
- Eight objects in a resealable plastic bag:

___	rubber band	___	plastic knife
___	penny	___	nail
___	shoelace	___	paper clip (all metal)
___	object with hole	___	screw (metal or wood screw)

Materials Per TWO Students for Station 3 -- Ball and Ramp Game

- 2 to 3 books or blocks to serve as a ramp support (total height about 6 cm)
- Golf ball in a resealable bag labeled "Golf Ball"
- 30-cm plastic ruler with grooved center
- Game place mat
- Ping-Pong ball in a resealable bag labeled "Ping-Pong Ball"
- Round, transparent plastic container

Teacher Materials

- Scissors or craft knife
- Permanent black marker
- Resealable plastic bags (snack size)
- Round, transparent, plastic containers (e.g., deli container)
- Self-adhesive colored dots (for the top of the cup)
- Duct tape or masking tape
- Game place mat with starting circle and finish line template (8 1/2" x 11" paper)

Materials Per Student for Station 4 -- Magnetic and Electrical Testing

- Electrical tester:
 - ___ 1.5-volt "D" cell battery
 - ___ 1.5-volt bulb and holder
 - ___ Battery holder
 - ___ 3 insulated wires with clips
- Bar magnet (that is familiar to the students), about 7 cm long with "N" and "S" labels
- Resealable plastic bag containing eight objects and labeled "Test Objects":
 - ___ colored ceramic disk magnet
 - ___ nail (metal, must be attracted to a magnet)
 - ___ copper wire (bare, 5-cm piece)
 - ___ aluminum foil, 5-cm square
 - ___ wooden toothpick
 - ___ rubber pencil eraser
 - ___ object with hole
 - ___ penny

Materials Per Student for Station 5 -- Unknown Object

- Unknown object -- whole nutmeg
- 3" x 5" index cards (unlined)