THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 8

INTERMEDIATE-LEVEL TEST

SCIENCE

JUNE 2005

FOR TEACHERS ONLY

RATING GUIDE FOR WRITTEN TEST, PART II

This rating guide contains detailed directions for rating student responses to Part II of the written test in Intermediate-Level Science. All raters should become familiar with the detailed directions before beginning to rate student responses.

Appendix A provides a chart that translates final scores into four performance levels. A conversion chart is needed to translate a student's raw score on the written and performance tests to a final score. This chart will be posted on the Department's web site at http://www.emsc.nysed.gov/osa/ on or about Monday, June 6, 2005. Conversion charts provided for previous administrations of this test must *not* be used to determine student's final scores for the 2005 administration of this test.

Appendix B provides several charts that link the individual items on the test to the *Intermediate-Level Science Core Curriculum Grades 5–8*. This core curriculum is based on the *New York State Learning Standards in Mathematics, Science, and Technology*.

Any clarifications or changes to this rating guide will be posted on the NYS Education Department web site at http://www.emsc.nysed.gov/osa/ at the end of the test administration period. Check this web page before starting the rating process and several times during the rating period.

Questions regarding this test should be directed to the Office of Curriculum, Instruction, and Instructional Technology at (518) 474-5922.

Note: Retain this guide for future use. Do *not* return it to SED with the performance test materials.

Detailed Directions for Rating Part II of the Written Test

This guide contains detailed directions and criteria for scoring student responses to the questions in Part II of the written test. Raters should become familiar with the detailed directions and scoring criteria before beginning to score the student responses.

In rating the student responses, follow the procedure outlined below.

1. Familiarize yourself with the system your school is using for processing the answer papers and recording the test scores. For example, scores may be transferred to each student's scannable answer sheet or to the Class Record Sheet.

2. Have a test booklet on hand. Read each Part II question carefully. Note exactly what is required.

3. Carefully read the criteria provided in this guide for scoring each question. Look at the acceptable responses for each point value.

4. When answers appear in **bold**, allow credit for only those answers. In other cases, examples of acceptable responses are provided. Acceptable responses include, but are not limited to, the examples given. Other responses that convey the same general meaning as those given in this guide should also receive credit. Raters must use their judgment to decide if the student's answer meets the criteria. You may find it helpful to discuss questionable student responses with other raters.

5. Discuss with other raters the requirements of each question and the scoring criteria. When you are certain that you clearly understand the requirements and criteria, you are ready to begin scoring the student responses.

6. It is recommended that you score all the student responses to one question before proceeding to the next question. This method helps ensure that the scoring criteria are applied consistently.

7. Students should *not* lose credit for incorrect spelling, grammar, capitalization, or punctuation.

8. In responses to questions where a specific number of answers are required (e.g., identify three materials, give two examples), if the student provides more than the required number of answers, score only the required number, in the order in which they appear.

9. Record the number of credits you allow for each question in the table provided on the back cover of the test booklet. The maximum number of credits for each question appears in the table.

10. When you have finished scoring all the Part II questions, add the credits allowed for each question to obtain the total raw score for Part II.

11. The total raw score for Part II can be transferred to the student's scannable answer sheet. Check to be certain that the student name on the test booklet matches the name on the answer sheet. Scores may also be transferred to the Class Record Sheet if your school uses it.

12. Add the student's raw score for Part II to the raw score for Part I to determine the student's total raw score for the written test. Use the conversion chart to convert the written and performance test raw scores to a final score for the student. This chart will be provided on the Department's web site at http://www.emsc.nysed.gov/osa/T on or about Monday, June 6, 2005.

46 [1] Allow 1 credit for an acceptable hypothesis or statement related to the number of blossoms.

Acceptable responses include, but are not limited to:
— Taller plants will have more blossoms.
— Plant food will make more blossoms.
— Plants that receive plant food will have more blossoms.
— If plant food is given, then the plants will have more blossoms.

47 [1] Allow 1 credit for an acceptable explanation that supports the hypothesis written in question 46, even if the answer to 46 is *incorrect*. Acceptable responses will address the effect of height or plant food and the resulting number of blossoms.

Acceptable responses include, but are not limited to:
— No, because the taller plants had fewer blossoms.
— No, because the number of blossoms did not increase as a result of the plant food.
— No, because the average number of blossoms was the same.
— No, because the smaller plants had 0.1 more blossoms.
— No, because the smaller plant had 18.2 and the taller plant had 18.1.
— No, because the plant with food had 18.1 and the plant without food had 18.2.

Note: Acceptable responses must explain the relationship between the variables. Do *not* allow credit for a simple restatement of the numbers in the chart.

Unacceptable responses include, but are not limited to:
Plant *A* has 18.1 and plant *B* has 18.2. (It does not refer to height or food.)
Plant *A* is taller and plant *B* is shorter. (It does not refer to the number of blossoms.)

48 [1] Allow 1 credit for a response that indicates that only one variable can be tested at a time.

Acceptable responses include, but are not limited to:
— If they were not held constant, you could not tell if the plant food caused the change.
— A well-designed experiment only tests one variable at a time.
— It could influence the outcome of the experiment.
— It could change the number of blossoms.
— If they were not kept the same then the results would be different.
— Other variables would affect the results.
— You can only change one thing.
— Only test the effect of the plant food.
— so these variables would not factor into the experiment
— They are the same, so you can have a controlled experiment.

Note: Do *not* accept general statements such as “it improves the accuracy of the experiment” or “makes the results more valid.”

Unacceptable responses include, but are not limited to:
because they are variables
because the plant would not grow properly
so the experiment would be correct

49 [3] *a* Allow 2 credits for correctly plotting all five **X**s (±0.5 cm) on the graph.

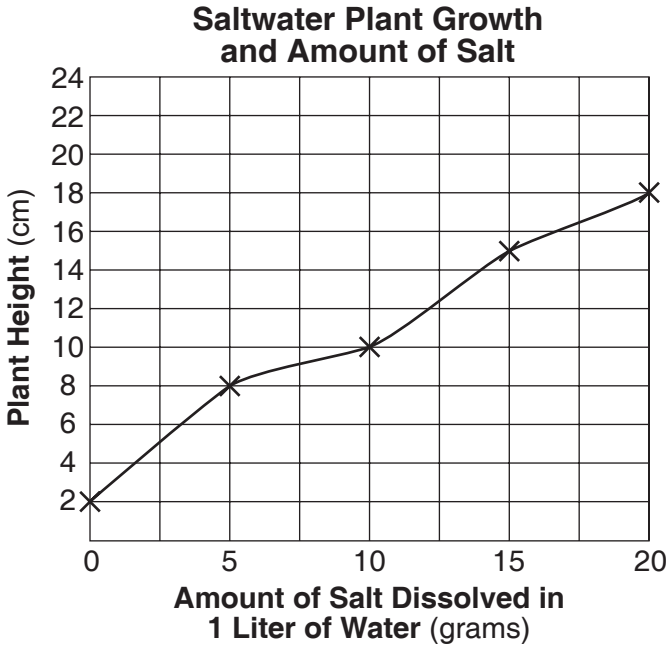
Allow 1 credit for correctly plotting only three or four **X**s (±0.5 cm) on the graph.

Allow 0 credit for correctly plotting fewer than three **X**s (±0.5 cm) on the graph.

Note: Allow credit if the student uses something other than **X**s to plot the points. Do *not* allow credit for a bar graph.

b Allow 1 credit for connecting the student-plotted **X**s with a line. The line can be point-to-point or a line of best fit.

Example of a 3-Credit Graph



50 [1] Allow 1 credit for 5(±1).

Note: If the student's graph was *not* correct in question 49, allow credit for an acceptable response based on the student's graph.

51 [1] Allow 1 credit for an acceptable conclusion.

Acceptable responses include, but are not limited to:
— As more salt was added to the water, the plant grew taller.
— As more salt is added to the water, this saltwater plant grows more quickly.
— This plant grows better in water with higher amounts of salt.
— The amount of salt affects plant growth.

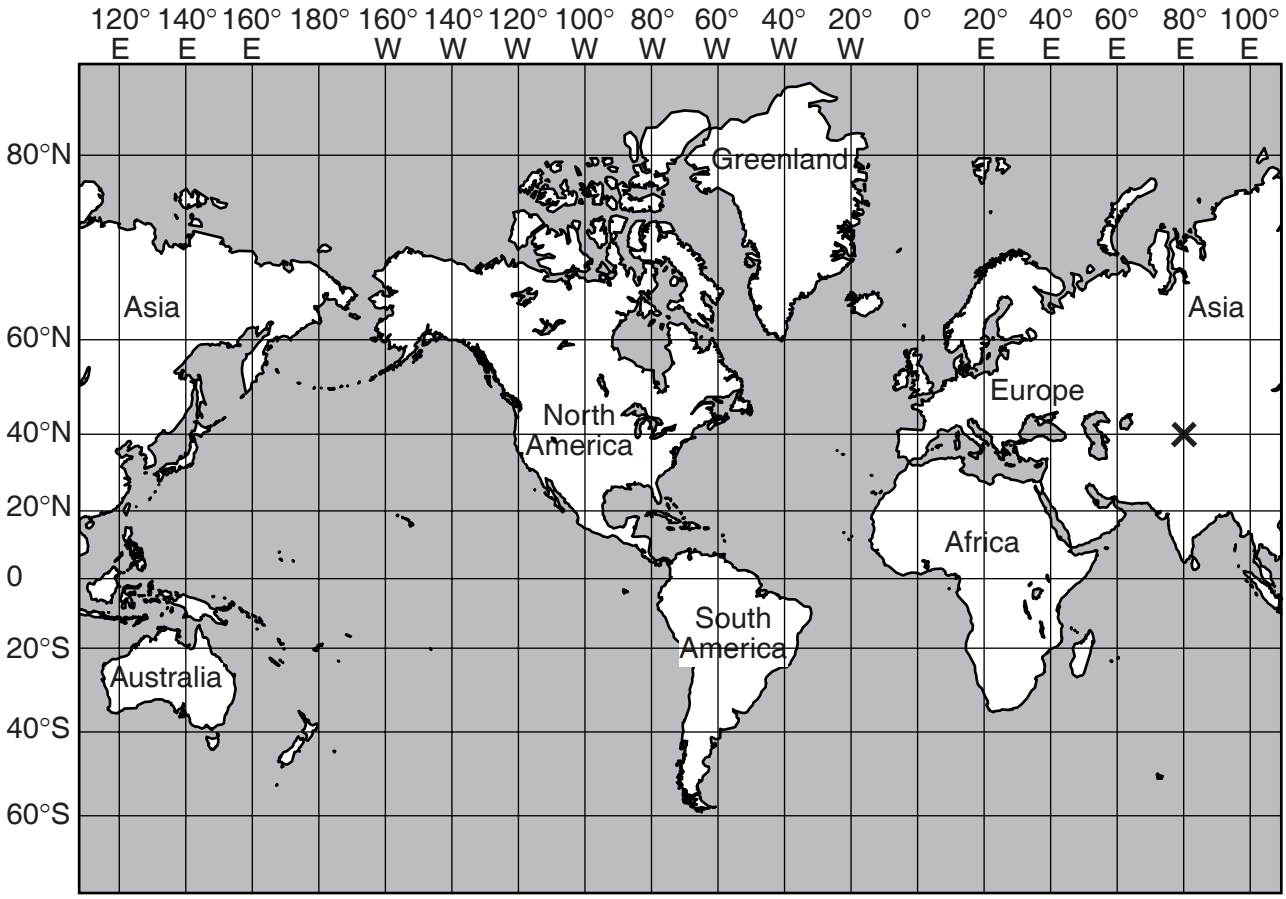
Unacceptable responses include, but are not limited to:
Every time salt is added, the plant grows.
When 5 grams of salt are added, the plant reaches a height of 8 cm (or other similar observations).
As more salt water is added, plant growth increases. (Salt was added, not salt water.)

52 [1] Allow 1 credit for identifying a condition that should have been kept constant.

Acceptable responses include, but are not limited to:
— the length of time for the experiment
— same water temperature for each container
— type of salt
— sunlight
— amount of soil
— oxygen in water
— size/shape/material of the container
— temperature

Unacceptable responses include, but are not limited to:
type of plant
amount of salt
amount of water
same size plant at beginning of the experiment

53 [1] Allow credit for a placing an **X** as indicated on the map below.



Note: Allow credit if the student uses something other than an **X**.

54 [1] Allow 1 credit for a response indicating that the amount of daylight decreases from the Equator to the North Pole.

Acceptable responses include, but are not limited to:
— The amount of daylight decreases.
— There is more daylight at the Equator than at the North Pole.
— There is less daylight at the North Pole than the Equator.
— The Equator has 12 hours of daylight and the North Pole has no daylight.
— It decreases.

Unacceptable responses include, but are not limited to:
It gets darker at the North Pole.

55 [1] Allow 1 credit for winter.

56 [1] Allow 1 credit for an acceptable explanation.

Acceptable responses include, but are not limited to:
— because it is tilted toward the Sun, so even when Earth rotates, it will always receive sunlight
— because Earth is tilted at an angle that allows the South Pole to receive constant sunlight
— Because the way Earth is tilted even when it spins, the South Pole doesn't turn away from the light.
— Because no matter how much Earth spins, the Sun is always shining on it.
— The South Pole receives 24 hours of daylight on this date because the way the axis is tilted exposes the entire South Pole to the Sun. Even if Earth rotates, the whole South Pole will still be exposed.
— because the Sun will continue to shine there through the entire rotation of Earth
— The North Pole is tilted away from the Sun.
— The Sun's direct rays are on the Southern Hemisphere.
— The South Pole is tilted toward the Sun.
— The North Pole is not receiving any daylight.
— The South Pole is closer to the Sun than the North Pole.
— As Earth rotates, the South Pole stays in the Sun's path.

Unacceptable responses include, but are not limited to:
Earth's axis is tilted away from the Sun.
Earth's rotation
the tilt of Earth

57 [1] Allow 1 credit for an acceptable rate of cooling.

Acceptable responses include, but are not limited to:
–5
–5.0
5
5.0
5/1

58 [1] Allow 1 credit for an acceptable description.

Acceptable responses include, but are not limited to:
— The can that was painted black cooled at a faster rate.
— Darker colored cans will cool faster.
— The white can cooled more slowly.
— The black can cooled faster than the white can.
— The black can cooled down by 50, the white only cooled by 25.
— The white can had less cooling than the black can.
— The black can cooled first.
— The black can cooled 25 degrees more than the white can.

59 [1] Allow 1 credit for an acceptable response.

Acceptable responses include, but are not limited to:
— sulfur dioxide *and* nitrogen dioxide
— SO_2 *and* NO_2

Note: Both chemicals must be identified to receive 1 credit.

60 [1] Allow 1 credit for an acceptable description of the role of prevailing winds and/or wind patterns.

Acceptable responses include, but are not limited to:
— because they bring the acid rain to New York
— Weather patterns move west to east in the United States.
— The prevailing winds move from west to east.
— The winds move the rain clouds to different locations.
— The winds transport pollutants.

Unacceptable responses include, but are not limited to*:*
Winds cause the acid rain to be more severe.

61 [1] Allow 1 credit for an acceptable action.

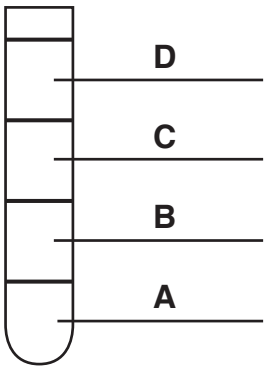
Acceptable responses include, but are not limited to:
— Burn fewer fossil fuels.
— Use pollution control devices in power plants.
— Cut down on the number of power plants in the Midwest.
— Reduce pollution.

Unacceptable responses include, but are not limited to*:*
Change the weather.
recycle

62 [1] Allow 1 credit an acceptable property of the liquids.

Acceptable responses include, but are not limited to:
— density
— solubility
— insolubility

63 [1] Allow 1 credit if all four liquids are in the correct order as shown on the diagram below.



Test tube 5

64 [1] Allow 1 credit for an acceptable term.

Acceptable responses include, but are not limited to:

— freezing
— solidification
— liquid to solid
— crystallization

Note: Do *not* allow credit for "water to ice," since this repeats what is shown in the diagram.

65 [1] Allow 1 credit for an acceptable explanation.

Acceptable responses include, but are not limited to:
— New material was not formed.
— Composition of materials has not changed.
— Although the way the water looks and feels is different, freezing it only changed how the molecules are set, not its actual atoms and characteristics.
— Because although it changes from a liquid to a solid, it's still water.
— It only changed its state and it can be changed back.
— The reason is that the water stayed water but changed form.

Note: Do *not* allow credit for "changing from a liquid to a solid," since this was allowed in question 64.

66 [1] Allow 1 credit for an acceptable explanation.

Acceptable responses include, but are not limited to:
— Water expands when it freezes.
— 100 grams of ice has a greater volume than 100 grams of water because water expands in size when it freezes.
— It has a greater volume because the molecules are close together, and when frozen, they expand.
— When the water freezes the molecules expand, causing it to have a greater volume.
— Ice is less dense than water.

Note: Do *not* allow credit for "it takes up more space," since this is described in the stem. Do *not* allow credit for "solids have more volume than liquids," since this repeats information given in the stem.

67 [1] Allow 1 credit for an acceptable explanation.

Acceptable responses include, but are not limited to:
— Student *B* is positioned higher than student *A.*
— Student *B* has a longer distance to travel.

68 [1] Allow 1 credit for an acceptable explanation.

Acceptable responses include, but are not limited to:
— speed decreased
— The water slowed the student down.
— increased friction
— Some of the energy is converted to other forms (heat, sound, motion of water).
— The water is more dense than air, so it will not let the student pass through as easily.
— Water is thicker than air and it would slow him down.

69 [1] Allow 1 credit for circling **spring scale**.

70 [1] Allow 1 credit for an acceptable change to the setup.

Acceptable responses include, but are not limited to:
— Add mass to the block.
— Add weight to the block.
— Roughen up the surface of the table.
— Roughen up the bottom of the block.
— Drive a nail through the block and into the table.
— Add a pulling force in the opposite direction.
— Increase the surface area of the wood.
— Add an obstacle in the path.

71 [1] Allow 1 credit for an acceptable explanation.

Acceptable responses include, but are not limited to:
— The pencils reduce friction.
— The pencils roll instead of slide.
— Pencils serve as wheels.
— There is more friction between the block of wood and the table than between the pencils and the table.
— The pencils act like a simple machine.

Note: Do *not* allow credit for responses that simply restate the question.

Unacceptable responses include, but are not limited to*:*
It can help move the block.
It will move more easily.

72 [1] Allow 1 credit for an acceptable response identifying a consumer.

Acceptable responses include, but are not limited to:
— deer
— dragonfly/insect
— fish
— frog
— hawk/bird
— human
— rabbit
— tadpoles
— turtles

73 [1] Allow 1 credit for an acceptable response identifying a producer.

Acceptable responses include, but are not limited to:
— pine tree
— grass
— green plants
— trees
— plants
— seaweed

74 [1] Allow 1 credit for an acceptable source of energy.

Acceptable responses include, but are not limited to:
— Sun
— sunlight
— solar energy

75 [1] Allow 1 credit for an acceptable response identifying the sex cells. Students must identify both sex cells correctly to receive credit.

Acceptable responses include, but are not limited to:
— sperm and egg
— sperm and ovum
— male gamete and female gamete

Unacceptable responses include, but are not limited to*:*
rooster and hen
male and female

76 [1] Allow 1 credit for **50**.

77 [1] Allow 1 credit for an acceptable response stating an advantage of sexual reproduction.

Acceptable responses include, but are not limited to:
— The offspring will not all be the same.
— There is less chance for the species to become extinct.
— It allows for a variation, which leads to natural selection.
— Its offspring will carry traits from both parents.
— The species has the opportunity to become more diverse, making it easier to survive.
— more genetic diversity within the species
— This gives us variation of species with different traits and characteristics.
— It allows greater variety within the species since two parents contribute to the offspring's traits. Organisms that reproduce asexually have offspring that are identical to that one parent.

78 [2] Allow a maximum of 2 credits, 1 each for **chloroplast** and **cell wall**.

79 [3] Allow a maximum of 3 credits, 1 for each acceptable function identified for the structure selected.

Acceptable responses include, but are not limited to:

Name of Structure	Function of This Structure in the Cell
nucleus	— contains genetic material — reproduction — control center of the cell — the brain of the cell — It controls everything. — contains information the cell needs to carry out its functions — contains the genetic material to reproduce — controls the entire cell — contains the “blue prints” of human life — contains DNA — contains the operating center of the cell
chloroplast	— necessary for photosynthesis — makes food — contains chlorophyll — contains chlorophyll which helps produce food through photosynthesis — helps absorb sunlight and energy to carry out photosynthesis — converts sunlight into energy for the cell
vacuole	— stores water and other dissolved materials — stores food — stores materials — excretes waste — “cleans” the cell — Food and water are stored here. — the storage room of the cell — Vacuoles store waste and other substances that are temporarily not being used.
cytoplasm	— contains cell organelles such as the nucleus — contains salts and ammonia — where chemical reaction occurs
cell membrane	— transports materials into and out of the cell — protects the cell — allows some molecules to enter or leave the cell while blocking others
cell wall	— separates the cell from the outside — shape and support — protects the cell — the armor to protect the cell — gives the cell its shape

80 [1] Allow 1 credit for an acceptable response relating color to survival.

Acceptable responses include, but are not limited to:
— The dark moth's pattern will help it hide from predators.
— The light moth's color will allow its predators to see it better.
— The dark moth blends in with the tree and helps it hide.
— The dark moth's color/pattern provides camouflage.

Note: The answer must refer to the ability of the moth to hide/survive due to color/pattern.

Appendix A

New York State Grade 8 Intermediate-Level Science Test
June 2005

Performance Levels Chart

The chart on the next page defines the four performance levels for this test. The state-designated level of performance for this test is a final score of 65 or higher (level 3 and 4). Students scoring below 65 (levels 1 and 2) must be provided with academic intervention services according to section 100.2 (ee)(i) of the Regulations of the Commissioner of Education. The chart provides the score intervals and a brief description of student abilities at each level.

The conversion chart will be posted on the Department's website at http://www.emsc.nysed.gov/osa/ on or about Monday June 6, 2005

Note: Conversion charts provided for previous administrations of this test must not be used to determine students' final scores for the 2005 administration.

Performance Levels
Grade 8 Intermediate-Level Science Test

Level	Score Range	Description of Student Performance
4	85 – 100	**Meeting the Standards with Distinction** • Student demonstrates superior understanding of the intermediate-level science content and concepts for each of the learning standards and key ideas assessed. • Student demonstrates superior intermediate-level science skills related to each of the learning standards and key ideas assessed. • Student demonstrates superior understanding of the intermediate-level science content, concepts, and skills required for a secondary academic environment.
3	65 – 84	**Meeting the Standards** • Student demonstrates understanding of the intermediate-level science content and concepts for each of the learning standards and key ideas assessed. • Student demonstrates the science skills required for intermediate-level achievement in each of the learning standards and key ideas assessed. • Student demonstrates understanding of the intermediate-level science content, concepts, and skills required for a secondary academic environment.
2	44 – 64	**Not Fully Meeting the Standards** • Student demonstrates only minimal proficiency in intermediate-level science content and concepts in most of learning standards and key ideas assessed. • Student demonstrates only minimal proficiency in the skills required for intermediate-level achievement in most of the learning standards and key ideas assessed. • Student demonstrates marginal understanding of the science content, concepts, and skills required for a secondary academic environment.
1	0 – 43	**Not Meeting the Standards** • Student is *unable* to demonstrate understanding of the intermediate-level science content and concepts in most of the learning standards and key ideas assessed. • Student is *unable* to demonstrate the science skills required for intermediate-level achievement in most of the learning standards and key ideas assessed. • Student is *unable* to demonstrate evidence of the basic science knowledge and skills required for a secondary academic environment.

Appendix B

New York State Grade 8 Intermediate-Level Science Test
June 2005 Written Test
Performance Test Form A

Reference to ***Intermediate-Level Science Core Curriculum Grades 5-8***

Reference to Process Skills in Core Curriculum

Reference to Core Curriculum for Individual Test Questions on June 2005 Written Test

Reference to Core Curriculum for Individual Test Questions on Performance Test, Form A

Note: Core Curriculum is based on *NYS Learning Standards for Mathematics, Science, and Technology.*

NYS Learning Standards for Mathematics, Science, and Technology **Standard/Area**	***Reference to Intermediate-Level Science Core Curriculum*** **Key Idea or Performance Indicator**	**Performance Test Form A Question Number**			**June 2005 Written Test Question Number**
		Station 1	**Station 2**	**Station 3**	
Standard 1 Scientific Inquiry Key Idea 1 The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	**1.1** Formulate questions independently with the aid of references appropriate for guiding the search for explanations of everyday observations.	2 3			
	1.2 Construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena.		8	4	46
	1.3 Represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others.		7 8	5 6	
	1.4 Seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists.		7		
Standard 1 Scientific Inquiry Key Idea 2 Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	**2.1** Use conventional techniques and those of their own design to make further observations and refine their explanations, guided by a need for more information.	3 4 5 6		1 2	11, 50
	2.2 Develop, present, and defend formal research proposals for testing their own explanations of common phenomena, including ways of obtaining needed observations and ways of conducting simple controlled experiments.	2 3 4			48, 52
	2.3 Carry out their research proposals, recording observations and measurements (e.g., lab notes, audiotape, computer disk, videotape) to help assess the explanation.	1 3 4	1 2 3	1 2 4	
Standard 1 Scientific Inquiry Key Idea 3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	**3.1** Design charts, tables, graphs and other representations of observations in conventional and creative ways to help them address their research question or hypothesis.	1 3 5	2 8		49
	3.2 Interpret the organized data to answer the research question or hypothesis and to gain insight into the problem.	1	4 5 6	4, 5, 6, 7	47, 51
	3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis.			5	
Standard 1 Mathematical Analysis	**1** Abstraction and symbolic representation are used to communicate mathematically.		3 8		57
	2 Deductive and inductive reasoning are used to reach mathematical conclusions.		4, 5, 6, 7		58
	3 Critical thinking skills are used in the solution of mathematical problems.				13

NYS Learning Standards for Mathematics, Science, and Technology **Standard/Area**	***Reference to Intermediate-Level Science Core Curriculum*** **Key Idea or Performance Indicator**	**Performance Test Form A Question Number**			**June 2005 Written Test Question Number**
		Station 1	**Station 2**	**Station 3**	
Standard 1 Engineering Design	**1.1- 1.5** Engineering design is an iterative process involving modeling and optimization to develop technological solutions to problems within given constraints.				
Standard 2 Information Systems	**1.1 - 1.5** Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.				
	2.1 - 2.3 Knowledge of the impacts and limitations of information systems is essential to its effectiveness and ethical use.				
	3.1 - 3.3 Information technology can have positive and negative impacts on society, depending upon how it is used.				
Standard 4 Physical Setting	**1** Earth and celestial phenomena can be described by principles of relative motion and perspective.				1, 2, 19, 53, 54, 55, 56
	2 Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.				3, 4, 5, 6, 7, 8, 16, 17, 18, 23, 60
	3 Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.				9, 10, 12, 14, 62, 63, 64, 65
	4 Energy exists in many forms, and when these forms change energy is conserved.				15, 21, 22, 24, 66, 67, 68
	5 Energy and matter interact through forces that result in changes in motion.				70, 71
Standard 4 Living Environment	**1** Living things are both similar to and different from each other and from nonliving things.				27, 28, 29, 30, 31, 78, 79
	2 Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.				34, 35
	3 Individual organisms and species change over time.				25, 32, 33, 36, 77, 80
	4 The continuity of life is sustained through reproduction and development.				37, 41, 42, 75, 76
	5 Organisms maintain a dynamic equilibrium that sustains life.				26, 40, 72, 73
	6 Plants and animals depend on each other and their physical environment.				39, 43, 74
	7 Human decisions and activities have had a profound impact on the physical and living environment.				44, 45, 59
Standard 6 Interconnectedness: Common Themes	Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.				

NYS Learning Standards for Mathematics, Science, and Technology **Standard/Area**	***Reference to Intermediate-Level Science Core Curriculum*** **Key Idea or Performance Indicator**	**Performance Test Form A Question Number**			**June 2005 Written Test Question Number**
		Station 1	**Station 2**	**Station 3**	
Standard 6 Systems Thinking	**1.1 – 1.4** Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions				
Standard 6 Models	**2.1 – 2.3** Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.	1, 2, 3, 4	3, 8	4	20
Standard 6 Magnitude and Scale	**3.1 – 3.2** The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.				
Standard 6 Equilibrium and Stability	**4.1 - 4.2** Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).				
Standard 6 Patterns of Change	**5.1 - 5.2** Identifying patterns of change is necessary for making predictions about future behavior and conditions.		3, 4, 5, 6, 7	6	
Standard 6 Optimization	**6.1 - 6.2** In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.				
Standard 7 Interdisciplinary Problem Solving	**Connections** The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those related to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.				61
	Strategies Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.				

Intermediate-Level Science Core Curriculum Grades 5-8
Process Skills Based On Standard 4

	Process Skills	Performance Test Form A Question Number			June 2005 Written Test Question Number
		Station 1	Station 2	Station 3	
General Skills	1. follow safety procedures in the classroom and laboratory				53
	2. safely and accurately use the following measurement tools: metric ruler, balance, stopwatch, graduated cylinder, thermometer, spring scale, voltmeter		1		69
	3. use appropriate units for measured or calculated values			1, 2, 3	
	4. recognize and analyze patterns and trends		7, 8		
	5. classify objects according to an established scheme and a student-generated scheme				
	6. develop and use a dichotomous key	1 – 5, 9			
	7. sequence events				
	8. identify cause-and-effect relationships		4, 5, 6	6, 7	
	9. use indicators and interpret results				
Living Environment Skills	1. manipulate a compound microscope to view microscopic objects	6, 8			
	2. determine the size of a microscopic object, using a compound microscope	7			
	3. prepare a wet mount slide				
	4. use appropriate staining techniques				
	5. design and use a Punnett square or a pedigree chart to predict the probability of certain traits				
	6. classify living things according to a student-generated scheme and an established scheme	9			
	7. interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web				40
	8. identify pulse points and pulse rates				
	9. identify structure and function relationships in organisms				
Physical Setting Skills	1. given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map				
	2. using identification tests and a flow chart, identify mineral samples				8
	3. use a diagram of the rock cycle to determine geological processes that led to the formation of a specific rock type				
	4. plot the location of recent earthquake and volcanic activity on a map and identify patterns of distribution				
	5. use a magnetic compass to find cardinal directions				
	6. measure the angular elevation of an object, using appropriate instruments				
	7. generate and interpret field maps including topographic and weather maps				
	8. predict the characteristics of an air mass based on the origin of the air mass				
	9. measure weather variables such as wind speed and direction, relative humidity, barometric pressure, etc.				
	10. determine the density of liquids, and regular- and irregular-shaped solids			3	
	11. determine the volume of a regular- and an irregular-shaped solid, using water displacement				
	12. using the periodic table, identify an element as a metal, nonmetal, or noble gas				
	13. determine the identity of an unknown element, using physical and chemical properties				
	14. using appropriate resources, separate the parts of a mixture				
	15. determine the electrical conductivity of a material, using a simple circuit				
	16. determine the speed and acceleration of a moving object				

Grade 8 Intermediate-Level Science
Reference to Core Curriculum for Individual Test Questions on Written Test – June 2005

Question Number	MST Learning Standard	Area within Standard 4 (PS or LE)	Key Idea or Major Understanding	Other Standards, Key Ideas, or Major Understandings	Process Skills Based on Standard 4
1	4	PS	1.1a		
2	4	PS	1.1g	St 1 S 3.2f; St 6 KI 5.2	
3	4	PS	2.2r		
4	4	PS	2.1d		
5	4	PS	2.2f		
6	4	PS	2.1f		
7	4	PS	2.1j	St 6 KI 2	
8	4	PS	2.1e	St 6 KI 2	PS Skill 2
9	4	PS	3.1g		
10	4	PS	3.1a	St 6 KI 2	
11	1	—	S 2.1d	PS 3.1e	
12	4	PS	3.3c		
13	1	—	M 3	PS 5.2g; 5.2f; St 6 KI 2	
14	4	PS	3.3g		
15	4	PS	4.1b		
16	4	PS	2.1h	St 1 S 1.2; St 6 KI 2	
17	4	PS	2.1i	2.1g; St 6 KI 2	
18	4	PS	2.2c	St 6 KI 2	
19	4	PS	1.1e	St 1 S 3.2h	
20	6	—	KI 2	PS 2.2q	
21	4	PS	4.2a	St 1 S 3.2; St 6 KI 2	
22	4	PS	4.2b	St 1 S 3.2; St 6 KI 2	
23	4	PS	2.2l	St 6 KI 2	
24	4	PS	4.4b	St 6 KI 2	
25	4	LE	3.2c	St 1 S 3.1a; St 6 KI 2	
26	4	LE	5.1g		
27	4	LE	1.2a	1.2g; St 6 KI 2	
28	4	LE	1.2c		
29	4	LE	1.1e		
30	4	LE	1.2g		
31	4	LE	1.2h	St 6 KI 2	
32	4	LE	3.2c		
33	4	LE	3.2b		
34	4	LE	2.2a	2.2b, 2.2c; St 6 KI 2	
35	4	LE	2.2c	St 6 KI 2	
36	4	LE	intro 3	3.1b	
37	4	LE	4.2b		
38	4	LE	1.2j	St 1 S 3.2h	
39	4	LE	6.1b	St 6 KI 2	
40	4	LE	5.1e	St 6 KI 2	LE Skill 7

Grade 8 Intermediate-Level Science
Reference to Core Curriculum for Individual Test Questions on Written Test – June 2005

Question Number	MST Learning Standard	Area within Standard 4 (PS or LE)	Key Idea or Major Understanding	Other Standards, Key Ideas, or Major Understandings	Process Skills Based on Standard 4
41	4	LE	4.4a		
42	4	LE	4.3d	St 6 KI 2	
43	4	LE	6.2a		
44	4	LE	7.1a		
45	4	LE	7.2b		
46	1	—	S 1.2a	LE 5.2	
47	1	—	S 3.2c	LE 5.2	
48	1	—	S 2.2d	LE	
49	1	—	S 3.1a	LE	
50	1	—	M 2.1a	LE	
51	1	—	S 3.2d	LE	
52	1	—	S 2.2d	LE	
53	4	PS	1.1f	St 6 KI 2	General Skill 1
54	4	PS	1.1i	St 1 M 2.1b; St 6 KI 2	
55	4	PS	1.1i	St 6 KI 2	
56	4	PS	1.1i	St 6 KI 2	
57	1	—	M 1.1c	PS 3.1a	
58	1	—	M 2.1	PS 3.1a	
59	4	LE	7.2d	St 6 KI 4	
60	4	PS	2.2n	St 1 S1	
61	7	—	1.3	LE 7.2d	
62	4	PS	3.1h	St 1 S 1.2c	
63	4	PS	3.1i	St 1 S 2.1d, S 1.2c	
64	4	PS	3.2a	4.2c; St 6 KI 2	
65	4	PS	3.2a	St 6 KI 2	
66	4	PS	4.2d	St 6 KI 2	
67	4	PS	4.1e	St 6 KI 2	
68	4	PS	4.1e	4.1d	
69	4	PS	General Skill 2	St 6 KI 2	General Skill 2
70	4	PS	5.2d	5.2e; St 6 KI 2	
71	4	PS	5.2d	5.2e; St 6 KI 2	
72	4	LE	5.1d	5.1e; St 6 KI 2	
73	4	LE	5.1d	5.1e; St 6 KI 2	
74	4	LE	6.1a	St 6 KI 2	
75	4	LE	4.2a	St 6 KI 2	
76	4	LE	4.2b		
77	4	LE	3.1a	3.1b	
78	4	LE	1.1c	St 6 KI 2	
79	4	LE	1.1b	1.1a, 1.1c; St 6 KI 2	
80	4	LE	3.1b	1.2, 7.1b; St 1 S 1.2	

Grade 8 Intermediate-Level Science
Reference to Core Curriculum for Individual Test Questions on Performance Test Form A

Station	item #	pts	Reference to Grade 8 Intermediate-Level Science Core Curriculum		
			MST Standard 1 (Mathematical Analysis, Scientific Inquiry and Engineering Design) Key Idea/Performance Indicator	MST Standard 6 Interconnected/ Common Themes	Process Skills Based on MST Standard 4
1	1	3	S 2.3, S 3.1, S 3.2	KI 2	General Skill 6
	2	2	S 1.1, S 2.2	KI 2	General Skill 6
	3	2	S 1.1, S 2.1, S 2.2, S 2.3, S 3.1	KI 2	General Skill 6
	4	2	S 2.1, S 2.2, S 2.3	KI 2	General Skill 6
	5	2	S 2.1, S 3.1		General Skill 6
	6	1	S 2.1		LE Skill 1
	7	1			LE Skill 2
	8	1			LE Skill 1
	9	1			General Skill 6 LE Skill 6
2	1	5	S 2.3		General Skill 2
	2	3	S 2.3, S 3.1		
	3	1	S 2.3 M 1	KI 2 KI 5	
	4	1	S 3.2 M 2	KI 5	General Skill 8
	5	1	S 3.2 M 2	KI 5	General Skill 8
	6	1	S 3.2 M 2	KI 5	General Skill 8
	7	2	S 1.3, S 1.4 M 2	KI 5	General Skill 4
	8	3	S 1.2, S 1.3, S 3.1 M 1	KI 2	General Skill 4
3	1	3	S 2.1, S 2.3		General Skill 3
	2	4	S 2.1, S 2.3		General Skill 3
	3	4			General Skill 3
	4	1	S 1.2, S 2.3, S 3.2	KI 2	
	5	2	S 1.3, S 3.2, S 3.3		
	6	2	S 1.3, S 3.2	KI 5	General Skill 8
	7	2	S 3.2		General Skill 8