LAB-AIDS CORRELATION TO NEW YORK INQUIRY & SCIENCE STANDARDS

INTERMEDIATE LEVEL -- GRADES 6-8

With Assessment Guidelines information

SEPUP Middle Level Programs 2nd Edition

Materials from the Science Education for Public Understanding Program (SEPUP) are developed at the Lawrence Hall of Science, at the University of California, Berkeley, and distributed nationally by LAB-AIDS, Inc. SEPUP materials are supported by grants from the National Science Foundation. All other materials developed by LAB-AIDS. This correlation is intended to show selected locations in SEPUP programs that support the New York Science Framework. It is not an exhaustive list; other locations may exist that are not listed here.

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Key to SEPUP Core Science Programs:

SEPUP programs are available as full year courses, or separately, as units, each taking 3-9 weeks to complete, as listed below.

MIDDLE SCHOOL

Issues and Earth Science, Second Edition (IAES)

Unit Title	**Activity Number**
Studying Soil Scientifically	1-11
Rocks and Minerals	12-23
Erosion and Deposition	24-35
Plate Tectonics	36-49
Weather and Atmosphere	50-70
The Earth in Space	71-84
Exploring Space	85-98

Issues and Life Science, Second Edition (IALS)

Unit Title	**Activity Number**
Experimental Design: Studying People Scientifically	1-10
Body Works	11-29
Cell Biology and Disease	30-53
Genetics	54-71
Ecology	72-88
Evolution	89-101
Bioengineering	102-109

Issues and Physical Science, Second Edition (IAPS)

Unit Title	**Activity Number**
Studying Materials Scientifically	1-11
The Chemistry of Materials	12-29
Water	30-52
Energy	53-72
Force and Motion	73-88
Waves	89-99

Each of the full year programs begins with a "starter" unit sequence on the scientific method in the context of each particular discipline. For example, the Issues and Life Science (IALS) course contains a ten- activity unit called "Experimental Design: Studying People Scientifically," which uses the science behind clinical trials on human subjects, to frame the study of the life sciences. These are listed first in each course.

Recommended Scope and Sequence

Since the NYS Science Standards are presented in grade range bands (elementary, intermediate, commencement), specific grade-based recommendations are not possible. We recommend the following sequence if a subject-based program is desired:

- Grade 6 Issues and Earth Science
- Grade 7 Issues and Life Science
- Grade 8 Issues and Physical Science

If an integrated or interdisciplinary unit is desired, then schools and districts can build a grade level integrated unit using at least four course mega-modules of their own choosing. A sample follows:

- Grade 6 Weather, Erosion and Deposition, Ecology
- Grade 7 Rocks and Minerals, Plate Tectonics, Investigating Materials, Body Works
- Grade 8 Our Genes Our Selves, Evolution, Earth in Space/Earth and the Solar System

Each of the courses contain a 10-unit sequence on how scientists work (IAES-Studying Soils Scientifically, IALS-Studying People Scientifically, IAPS-Studying Materials Scientifically) and it is suggested that these units be distributed over each grade level and serve as the introduction to the year.

For New York City, please see the adopted scope and sequence for grades 7-8: http://nyc.lab-aids.com/

SEPUP Course	*Main Unit Issue*
IAES *Issues and Earth Science*	
Studying Soils Scientifically	Why don't plants grow in the school garden?
Rocks and Minerals	How do diamonds made in a lab compare to diamonds mined from the earth?
Erosion and Deposition	Where should Boomtown construct the new buildings?
Plate Tectonics	Which site would you recommend for storing nuclear waste?
Weather and Atmosphere	Is the growth of Sunbeam City affecting its weather, atmosphere, and water availability?
The Earth in Space	Why are there many different calendars?
Earth and the Solar System	What kinds of future space missions should we conduct?
IALS *Issues and Life Science*	
Studying People Scientifically	Which proposals have an experimental design worth funding?
Body Works	How can you convince people to make choices that reduce their level of heart disease risk?
Cell Biology and Disease	How is an emerging disease spread? What can you do to stop it?
Genetics	What are the ethical issues involved in using genetic information?
Ecology	What are the trade-offs of introducing a species into a new environment?
Evolution	What are the trade-offs in deciding whether to save an endangered species or to re-create an extinct one?
Bioengineering	How are new solutions to problems in life science developed?
IAPS *Issues and Physical Science*	
Studying Materials Scientifically	How should unidentified materials be handled?
The Chemistry of Materials	When you buy a new product, do you think about what materials it is made of? What will happen to it when you no longer have a use for it?
Water	What does your community do to make its water safe to drink? Whose responsibility is it?
Energy	Can you help a family decide what energy improvements they should invest in?
Force and Motion	Should noncommercial vehicles be more alike?
Waves	Are there situations in which some waves are harmful to your health?

Key to SEPUP Assessment System:

SEPUP materials include research-based assessment system developed by SEPUP and the Berkeley Evaluation and Assessment Research Group (BEAR) in the University of California Graduate School of Education. Forming the core of the SEPUP Assessment System are the **assessment variables** (content and process skills to be assessed), **assessment questions or tasks** used to gather evidence and **scoring guides** for interpreting students' responses (correspond to assessment variables).

The seven assessment variables are:

Designing Investigations (DI)
Organizing Data (OD)
Analyzing Data (AD)
Understanding Concepts (UC)
Evidence and Trade-offs (ET)
Communication Skills (CS)
Group Interaction (GI)

Types of assessment:

Quick Checks (✓) present opportunities for informal formative assessment and may be used prior to instruction to find out what students know or think. They may also be used to help teachers track students' knowledge of key information or progress in understanding a concept.

Some embedded questions and tasks and all item bank questions are all suitable for summative assessment. Analysis questions are included at the end of each activity.

Citations included in the correlation document are as follows:

IAES 40, 41, 42	40 Q1, 3, 4
IALS 2, 3, 37	41 Q3 UC; [IB] D2
IAPS 1, 2, 3	42 [IB] D4, 6, 8-10, 16

IAES 40, 41, 42 **40 Q1, 3, 4**
41 Q3 UC; [IB] D2
42 [IB] D4, 6, 8-10, 16

means that the standard or benchmark may be assessed using Issues and Earth Science Activity 40 Analysis Question 1, 3 and 4, IAES Activity 43 Analysis Question 3 using Understanding Concepts scoring guide and Item Bank Question D2 from Unit D Plate Tectonics.

For more information on program assessment and using SEPUP rubrics, consult the Teacher's Guide, TR part III Assessment section.

SEPUP Support for Engineering Design

The Next Generation Science Frameworks (NGSF) notes that science and engineering are somewhat parallel practices and have many similar elements. Scientists ask questions, make observations, and collect and analyze data, in an attempt to make sense of the natural world. Similarly, engineers create, test, and redesign as they respond with solutions to human needs. And just as we use scaffolds in teaching of scientific inquiry to improve student learning and practice, so do we use scaffolds in teaching about engineering for our students. The NGSF emphasizes three major phases of the engineering design process.

- DESIGN: Creates design, prototype or plan, noting constraints of proposed use
- TEST: Tests design, prototype or plan, collecting qualitative or quantitative data
- REDESIGN: Evaluates prototype, design or plan, suggests further changes as needed

In addition, the NGSF emphasizes the role of design in solving human problems, and of designers in developing criteria for solutions, evaluating solutions, and determining the tradeoffs involved in a design or solution.

The table below shows SEPUP activities that support major elements of engineering design. Some support the initial stages of design, criteria development, and evaluation that precede the full design cycle by suggesting or evaluating scientific or technological solutions to real-world problems. Others involve students in one or all steps of the design cycle as they build, test, and/or redesign prototypes.

Engineering and Design Practices in SEPUP

Course activity with description	**Students suggest or evaluate a solution**	**Students engage in the engineering process**		
		Design	Test	Re-design
IAES11: Recommend a soil improvement plan	X			
IAES 32: Design a coastal breakwater		X	X	X
IAES 35: Recommend a site plan for housing development		X		
IAES 49: Evaluate sites for nuclear waste disposal	X			
IAES 67: Design/build wind vane/ anemometer		X	X	X

IAES 98: Recommend a space mission	X			
IALS 48: Design an improved hand-washing procedure		X	X	X
IALS 88: Suggest a plan for preventing zebra mussel spread	X			
IALS 104: Design artificial heart valve		X		
IALS 105: Design an artificial bone		X	X	X
IALS 107: Design an energy bar		X	X	X
IALS 108: Design a prosthetic limb		X	X	X
IAPS 12: Recommend a material for a drink container	X			
IAPS 13: Construct a product life cycle for a drink container	X			
IAPS 29: Evaluate options to recommend a “green” computer	X			
IAPS 60: Design an ice preservation chamber		X	X	X
IAPS 63: Improve a calorimeter design			X	X
IAPS 69: Design a better solar collector		X	X	X
IAPS 70: Design a warm & cool home		X		
IAPS 72: Recommend an energy-improvement plan for a home	X	X	X	X
IAPS 73: Evaluate vehicle safety features		X		
IAPS 85: Design a crash test dummy		X		

INQUIRY

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
Key Idea 1. The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.		
S1.1 Formulate questions independently with the aid of references appropriate for guiding the search for explanations of everyday observations.	All "Lab" and "Investigation" type activities	
S1.1a formulate questions about natural phenomena	IALS 8, 14… IAES 16… IAPS 3, 32…	**8** [IB] A11-16 **16** [IB] B7-11 **3** [IB] A2
S1.1b identify appropriated references to investigate a question	IALS 8, 14… IAES 16… IAPS 3, 32…	**8** [IB] A11-16 **16** [IB] B7-11 **3** [IB] A2
S1.1c Refine and clarify questions so that they are subject to scientific investigation	IALS 8, 14… IAES 16… IAPS 3, 32…	**8** [IB] A11-16 **16** [IB] B7-11 **3** [IB] A2
S1.2 Construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena.		
S1.2a Independently formulate a hypothesis	IAPS 2, 8, 25... IAES 2, 6, 13… IALS 5, 8, 14…	**2** AQ3 RE **6** AQ1 AD [IB] A3, A4 **5** [IB] A11-14
S1.2b Propose a model of a natural phenomena	IAPS 17, 19, 20, 26…	**17** [IB] B 9, 10 **4** [IB] A-15

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
	IAES 4, 9, 21, 22… IALS 18, 25, 41, 51…	**18** [IB] B9, B17-18, B29
S1.3c Differentiate among observations, inferences, predications and explanations	IAPS 3, 6, 11… IAES 20, 24, 26… IALS 18, 25, 41, 51…	**3** [IB] A2 **24** [IB] B14-16 **18** [IB] B9, B17-18, B29
S1.3 Represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others.		
S1.4 Seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists.		
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.		
S2.1Use conventional techniques and those of their own design to make further observations and refine their explanations, guided by a need for more information.		
S2.1a demonstrate appropriate safety techniques	All SEPUP activities have detailed safety notes	
S2.1b conduct an experiment designed by others	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14…	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
S2.1c design and conduct an experiment to	IAPS 3, 10, 18, 27…	**3** [IB] A2

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
test a hypothesis	IAES 16, 20, 32… IALS 5, 8, 14…	**16** [IB] B7-11 **5** [IB] A11-14
S2.1d use appropriate tools and conventional techniques to solve problems about the natural world, including: • measuring • observing • describing • classifying • sequencing	IAES 3, 4, 6, 10… IAPS 6-11… IALS 5, 8, 14…	**3** [IB] A2 **6** AQ3 AD, [IB] A8-9 **5** [IB] A11-14
S2.2 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.		
S2.2a include appropriate safety procedures	Throughout SEPUP	
S2.2b design scientific investigations (e.g., observing, describing, and comparing; collecting samples; seeking more information, conducting a controlled experiment; discovering new objects or phenomena; making models)	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14…	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
S2.2c design a simple controlled experiment	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14…	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
S2.2d identify independent variables (manipulated), dependent variables (responding), and constants in a simple controlled experiment	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14..	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
S2.2e choose appropriate sample size and number of trials	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14..	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
S2.3 Carry out their research proposals, recording observations and measurements (e.g., lab notes, audio tape, computer disk, video tape) to help assess the explanation.		
S2.3a use appropriate safety procedures	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14, 17	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
S2.3b conduct a scientific investigation	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14, 17	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
S2.3c collect quantitative and qualitative data	IAPS 3, 10, 18, 27… IAES 16, 20, 32… IALS 5, 8, 14, 17	**3** [IB] A2 **16** [IB] B7-11 **5** [IB] A11-14
Key Idea 3. The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.		
S3.1 Design charts, tables, graphs, and other representations of observations in conventional and creative ways to help them address their research question or hypothesis.		
S3.1a organize results, using appropriate graphs, diagrams, data tables, and other models to show relationships	IAES 2, 6, 7, 10 IAPS 6-10 IALS 14, 17…	**2** AQ2 UC **6** AQ3 AD, [IB] A8-9 **14** [IB] B16

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
S3.1b generate and use scales, create legends, and appropriately label axes	IAES 2, 6, 7, 10… IAPS 6-10… IALS 14, 17…	**2** AQ2 UC **6** AQ3 AD, [IB] A8-9 **14** [IB] B16
S3.2 Interpret the organized data to answer the research question or hypothesis and to gain insight into the problem.		
S3.2a accurately describe the procedures used and the data gathered	IAPS 1, 2, 6-11… IAES 2, 4, 6-10… IALS 5, 8, 14…	**2** AQ2 UC **6** AQ3 AD, [IB] A8-9 **5** [IB] A11-14
S3.2b identify sources of error and the limitations of data collected	IAES 21, 28, 31, 32… IAPS 20, 36, 39, 74, 77… IALS 51, 62, 74, 83…	**28** Proc GI; [IB] C2, C7 **36** AQ8 UC **51** AQ4 UC, [IB] C28
S3.2c evaluate the original hypothesis in light of the data.	IAES 5, 7, 10, 11… IAPS 6-10, 29… IALS 5, 8, 14…	**5** AQ5 UC; [IB] A3-4 **6** AQ1 AD [IB] A3, A4 **5** [IB] A11-14
S3.2d formulate and defend explanations and conclusions as they relate to scientific phenomena.	IAES 5, 7, 10, 11… IAPS 6-10, 29… IALS 51, 62, 74, 83…	**5** AQ5 UC; [IB] A3-4 **6** AQ1 AD [IB] A3, A4 **51** AQ4 UC, [IB] C28
S3.2e form and defend a logical argument about cause-and-effect relationships in an investigation	IAES 5, 7, 10, 11… IAPS 6-10, 29… IALS 51, 62, 74,	**5** AQ5 UC; [IB] A3-4 **6** AQ1 AD [IB] A3, A4

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
	83…	**51** AQ4 UC, [IB] C28
S3.2f make predictions based on experimental data	IAES 5, 7, 10, 11… IAPS 6-10, 29… IALS 51, 62, 74, 83…	**5** AQ5 UC; [IB] A3-4 **6** AQ1 AD [IB] A3, A4 **51** AQ4 UC, [IB] C28
S3.2g suggest improvements and recommendations for further studying	IAPS 20, 36, 39, 77, 82, 85… IAES 21, 28, 31, 32… IALS 14, 17, 61, 65…	**36** AQ8 UC **28** Proc GI; [IB] C2, C7 **14** [IB] B16
S3.2h use and interpret graphs and data tables	IAES 2, 6, 7, 10 IAPS 6-10 IALS 14, 17, 61, 65…	**2** AQ3 RE **6** AQ1 AD [IB] A3, A4 **14** [IB] B16
S3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis.		

STANDARD 4: The Physical Setting

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
Key Idea 1. The Earth and celestial phenomena can be described by principles of relative motion and perspective.		
PI 1.1 Explain daily, monthly, and seasonal changes on earth.		
1.1a Earth's Sun is an average-sized star. The Sun is more than a million times greater in volume than Earth.	IAES 92	**92** [IB] G2, G11
1.1b Other stars are like the Sun but are so far away that they look like points of light. Distances between stars are vast compared to distances within our solar system.	IAES 92	**92** [IB] G2, G11
1.1c The Sun and the planets that revolve around it are the major bodies in the solar system. Other members include comets, moons, and asteroids. Earth's orbit is nearly circular.	IAES 88	**88** AQ2 UC, [IB] G3, G13, G17
1.1d Gravity is the force that keeps planets in orbit around the Sun and the Moon in orbit around the Earth.	IAES 95, 96	**95** AQ4 AD; [IB] G10, 12 **96** [IB] G 4, 7, 19
1.1e Most objects in the solar system have a regular and predictable motion. These motions explain such phenomena as a day, a year, phases of the Moon, eclipses, tides, meteor showers, and comets.	IAES 79, 80, 82, 94	**79** [IB] F10-12, F14-16 **80** [IB] F4-9 **82** AQ5 UC, [IB] F5, F8
1.1f The latitude/longitude coordinate system and our system of time are based on celestial observations.	NC	
1.1g Moons are seen by reflected light. Our Moon orbits Earth, while Earth orbits the Sun. The Moon's phases as observed from Earth	IAES 80, 81	**80** [IB] F4-9 **81** AQ5 UC; [IB] F5,

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
are the result of seeing different portions of the lighted area of the Moon's surface. The phases repeat in a cyclic pattern in about one month.		F8
1.1h The apparent motions of the Sun, Moon, planets, and stars across the sky can be explained by Earth's rotation and revolution. Earth's rotation causes the length of one day to be approximately 24 hours. This rotation also causes the Sun and Moon to appear to rise along the eastern horizon and to set along the western horizon. Earth's revolution around the Sun defines the length of the year as 365 1/4 days.	IAES 73, 74	**73** AQ1 UC **74** [IB] F1-2
1.1i The tilt of Earth's axis of rotation and the revolution of Earth around the Sun cause seasons on Earth. The length of daylight varies depending on latitude and season.	IAES 77, 78	**77** [IB] F10-12 **78** AQ2 UC
1.1j The shape of Earth, the other planets, and stars is nearly spherical.	IAES 88, 90	**88** AQ2 UC, [IB] G3, G13, G17 **90** [IB] G9, 16, 18
Key Idea 2. Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.		
PI 2.1 Explain how the atmosphere (air), hydrosphere (water), and lithosphere (land) interact, evolve, and change.		
2.1a Nearly all the atmosphere is confined to a thin shell surrounding Earth. The atmosphere is a mixture of gases, including nitrogen and oxygen with small amounts of water vapor, carbon dioxide, and other trace gases. The atmosphere is stratified into layers, each having distinct properties. Nearly all weather occurs in the lowest layer of the	IAES 64, 65, 66	**64** [IB] E5 **66** AQ2 UC; [IB] E12-13

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
atmosphere.		
2.1b As altitude increases, air pressure decreases.	IAES 64, 66	**64** [IB] E5 **66** AQ2 UC; [IB] E12-13
2.1c The rock at Earth's surface forms a nearly continuous shell around Earth called the lithosphere.	IAES 38	**38** AQ5 UC; [IB] D1, D15
2.1d The majority of the lithosphere is covered by a relatively thin layer of water called the hydrosphere.	IAES 54	
2.1e Rocks are composed of minerals. Only a few rock-forming minerals make up most of the rocks of Earth. Minerals are identified on the basis of physical properties such as streak, hardness, and reaction to acid.	IAES 16, 17	**17** [IB] B 9, 10
2.1f Fossils are usually found in sedimentary rocks. Fossils can be used to study past climates and environments.	IAES 19	
2.1g The dynamic processes that wear away Earth's surface include weathering and erosion.	IAES 28, 29	**28** Proc GI; [IB] C2, C7 **29** AQ2 UC; [IB] C1, C3
2.1h The process of weathering breaks down rocks to form sediment. Soil consists of sediment, organic material, water, and air.	IAES 29	**29** AQ2 UC; [IB] C1, C3
2.1i Erosion is the transport of sediment. Gravity is the driving force behind erosion. Gravity can act directly or through agents such as moving water, wind, and glaciers.	IAES 29	**29** AQ2 UC; [IB] C1, C3
2.1j Water circulates through the atmosphere, lithosphere, and hydrosphere in what is known as the water cycle.	IAES 60, 62	**60** [IB] E3, E8-9 **62** AQ4 SI; [IB] E3, 9, 11, 15

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
PI 2.2 Describe volcano and earthquake patterns, the rock cycle, and weather and climate changes.		
2.2a The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth's crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins.	IAES 37, 38, 47, 48	**38** AQ5 UC; [IB] D1, D15 **47** [IB] D16 **48** AQ4 UC; [IB] D14, D16
2.2b Analysis of earthquake wave data (vibrational disturbances) leads to the conclusion that there are layers within Earth. These layers—the crust, mantle, outer core, and inner core—have distinct properties.	IAES 38	**38** AQ5 UC; [IB] D1, D15
2.2c Folded, tilted, faulted, and displaced rock layers suggest past crustal movement.	IAES 45, 47	**45** [IB] D3, D11-12, D16 **47** [IB] D16
2.2d Continents fitting together like puzzle parts and fossil correlations provided initial evidence that continents were once together.	IAES 40, 41	**41** AQ3 UC; [IB] D2
2.2e The Theory of Plate Tectonics explains how the "solid" lithosphere consists of a series of plates that "float" on the partially molten section of the mantle. Convection cells within the mantle may be the driving force for the movement of the plates.	IAES 42	**42** [IB] D4, 6, 8-10, 16
2.2f Plates may collide, move apart, or slide past one another. Most volcanic activity and mountain building occur at the boundaries of these plates, often resulting in earthquakes.	IAES 45	**45** [IB] D3, D11-12, D16
2.2g Rocks are classified according to their method of formation. The three classes of rocks are sedimentary, metamorphic, and igneous. Most rocks show characteristics that	IAES 19	

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
give clues to their formation conditions.		
2.2hThe rock cycle model shows how types of rock or rock material may be transformed from one type of rock to another.	IAES 22	**22** AQ7 UC; [IB] B4-6, B11
2.2i Weather describes the conditions of the atmosphere at a given location for a short period of time.	IAES 53	**53** [IB] E2, E7
2.2j Climate is the characteristic weather that prevails from season to season and year to year.	IAES 53	**53** [IB] E2, E7
2.2k The uneven heating of Earth's surface is the cause of weather.	IAES 55	**55** Proc DI
2.2l Air masses form when air remains nearly stationary over a large section of Earth's surface and takes on the conditions of temperature and humidity from that location. Weather conditions at a location are determined primarily by temperature, humidity, and pressure of air masses over that location.	IAES 66, 69	**66** AQ2 UC; [IB] E12-13 **69** Proc CS; [IB] E14
2.2m Most local weather condition changes are caused by movement of air masses.	IAES 66, 69	**66** AQ2 UC; [IB] E12-13 **69** Proc CS; [IB] E14
2.2n The movement of air masses is determined by prevailing winds and upper air currents.	IAES 68	
2.2o Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries.	IAES 69	**69** Proc CS; [IB] E14
2.2p High-pressure systems generally bring fair weather. Low-pressure systems usually bring cloudy, unstable conditions. The general movement of highs and lows is from west to	IAES 69	**69** Proc CS; [IB] E14

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
east across the United States.		
2.2q Hazardous weather conditions include thunderstorms, tornadoes, hurricanes, ice storms, and blizzards. Humans can prepare for and respond to these conditions if given sufficient warning.	IAES 52	
2.2r Substances enter the atmosphere naturally and from human activity. Some of these substances include dust from volcanic eruptions and greenhouse gases such as carbon dioxide, methane, and water vapor. These substances can affect weather, climate, and living things.	IAES 70	**70** AQ3 ET, [IB] E16
3. *Key Idea 3.* Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.		
PI 3.1 Observe and describe properties of materials, such as density, conductivity, and solubility.	IAPS 10, 14	**10** AQ1 AD, Proc DI; [IB] A10-12 **14** [IB] B4-6
3.1a Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.	IAPS 10, 14	**10** AQ1 AD, Proc DI; [IB] A10-12 **14** [IB] B4-6
3.1b Solubility can be affected by the nature of the solute and solvent, temperature, and pressure. The rate of solution can be affected by the size of the particles, stirring, temperature, and the amount of solute already dissolved.	IAPS 37, 38	**37** AQ2 AD; [IB] C1 **38** AQ 1-3 AD [IB] C2
3.1c The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. The phase in which matter exists depends on the	IAPS 35	**35** AQ1 AD

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
attractive forces among its particles.		
3.1d Gases have neither a determined shape nor a definite volume. Gases assume the shape and volume of a closed container.	IAPS 35	**35** AQ1 AD
3.1e A liquid has definite volume, but takes the shape of a container.	IAPS 35	**35** AQ1 AD
3.1f A solid has definite shape and volume. Particles resist a change in position.	IAPS 35	**35** AQ1 AD
3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components. For example, iron can be removed from a mixture by means of a magnet. An insoluble substance can be separated from a soluble substance by such processes as filtration, settling, and evaporation.	IAPS 5	**5** Proc GI
3.1h Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser.	IAPS 9	**9** AQ3 UC, [IB] A10-12
3.1i Buoyancy is determined by comparative densities.	NC	
PI 3.2 Distinguish between chemical and physical changes.		
3.2a During a physical change a substance keeps its chemical composition and properties. Examples of physical changes include freezing, melting, condensation, boiling, evaporation, tearing, and crushing.	IAPS 14, 19	**14** [IB] B4-6 **19** [IB] B12-14
3.2b Mixtures are physical combinations of materials and can be separated by physical means.	IAPS 5	**5** Proc GI

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
3.2c During a chemical change, substances react in characteristic ways to form new substances with different physical and chemical properties. Examples of chemical changes include burning of wood, cooking of an egg, rusting of iron, and souring of milk.	IAPS 19	**19** [IB] B12-14
3.2d Substances are often placed in categories if they react in similar ways. Examples include metals, nonmetals, and noble gases.	IAPS 15, 16	**15** AQ5 UC [IB] B7-11
3.2e The Law of Conservation of Mass states that during an ordinary chemical reaction matter cannot be created or destroyed. In chemical reactions, the total mass of the reactants equals the total mass of the products.	IAPS 25	
PI 3.3 Develop their own mental models to explain common chemical reactions and changes in states of matter.		
3.3a All matter is made up of atoms. Atoms are far too small to see with a light microscope.	IAPS 16	**16** [IB] B7-11
3.3b Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.	IAPS 16	**16** [IB] B7-11
3.3c Atoms may join together in well-defined molecules or may be arranged in regular geometric patterns.	IAPS 17	**17** AQ6 UC
3.3d Interactions among atoms and/or molecules result in chemical reactions.	IAPS 17	**17** AQ6 UC
3.3e The atoms of any one element are different from the atoms of other elements.	IAPS 16	**16** [IB] B7-11
3.3f There are more than 100 elements. Elements combine in a multitude of ways to	IAPS 16	**16** [IB] B7-11

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
produce compounds that account for all living and nonliving substances. Few elements are found in their pure form.		
3.3g The periodic table is one useful model for classifying elements. The periodic table can be used to predict properties of elements (metals, nonmetals, noble gases).	IAPS 15, 16	**15** AQ5 UC [IB] B7-11 **16** [IB] B7-11
Key Idea 4. Energy exists in many forms, and when these forms change energy is conserved.		
PI 4.1 Describe the sources and identify the transformations of energy observed in everyday life.		
4.1a The Sun is a major source of energy for Earth. Other sources of energy include nuclear and geothermal energy.	IAPS 69, 70	**69** [IB] D11, D15, D18 **70** Proc GI; [IB] D12, D-15
4.1b Fossil fuels contain stored solar energy and are considered nonrenewable resources. They are a major source of energy in the United States. Solar energy, wind, moving water, and biomass are some examples of renewable energy resources.	IAPS 64	AQ4 AD, [IB] D7
4.1c Most activities in everyday life involve one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy, in the form of heat, is almost always one of the products of energy transformations.	IAPS 58	**58** AQ2 UC, [IB] D4-5, D8
4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways.	IAPS 57	**57** AQ3 UC, [IB] D2-3
4.1e Energy can be considered to be either	IAPS 54, 55	**54** Proc DI; [IB] D1

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
kinetic energy, which is the energy of motion, or potential energy, which depends on relative position.		**55** AQ1 UC [IB] D1
PI 4.2 Observe and describe heating and cooling events.		
4.2a Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.	IAPS 59, 60, 61	**59** [IB] D9 **61** [IB] D10
4.2b Heat can be transferred through matter by the collisions of atoms and/or molecules (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).	IAPS 61	**61** [IB] D10
4.2c During a phase change, heat energy is absorbed or released. Energy is absorbed when a solid changes to a liquid and when a liquid changes to a gas. Energy is released when a gas changes to a liquid and when a liquid changes to a solid.	IAPS 62	**62** [IB] D6, D19, D20
4.2d Most substances expand when heated and contract when cooled. Water is an exception, expanding when changing to ice.	NC	
4.2e Temperature affects the solubility of some substances in water.	NC	
PI 4.3 Observe and describe energy changes as related to chemical reactions.		
4.3a In chemical reactions, energy is transferred into or out of a system. Light, electricity, or mechanical motion may be involved in such transfers in addition to heat.	IAPS 19	**19** [IB] B12-14
PI 4.4 Observe and describe the properties of sound, light, magnetism, and electricity.		
4.4a Different forms of electromagnetic energy have different wavelengths. Some	IAPS 93-96	**94** AQ4

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
examples of electromagnetic energy are microwaves, infrared light, visible light, ultraviolet light, X-rays, and gamma rays.		**96** AQ3, 4
4.4b Light passes through some materials, sometimes refracting in the process. Materials absorb and reflect light, and may transmit light. To see an object, light from that object, emitted by or reflected from it, must enter the eye.	IAPS 94-95, 97-99	**94** AQ6 **95** AQ3 **97** AQ4
4.4c Vibrations in materials set up wave-like disturbances that spread away from the source. Sound waves are an example. Vibrational waves move at different speeds in different materials. Sound cannot travel in a vacuum.	IAPS 90-93	**90** AQ5 **93** AQ1-3
4.4d Electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy.	IAPS 64, 65, 68	**64** AQ3 ET, AQ4 AD, [IB] D7 **65** Proc DI; D13 **68** PROC DI, [IB] D18
4.4e Electrical circuits provide a means of transferring electrical energy.	IAPS 65, 66	**65** **66** Proc DI; [IB] D16
4.4f Without touching them, material that has been electrically charged attracts uncharged material, and may either attract or repel other charged material.	IAPS 65A	**65A** AQ3
4.4g Without direct contact, a magnet attracts certain materials and either attracts or repels other magnets. The attractive force of a magnet is greatest at its poles.	IAPS 65A	**65A** AQ3
PI 4.5 Describe situations that support the conservation of energy		

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
4.5a Energy cannot be created or destroyed, but only changed from one form into another.	IAPS 57	**57** AQ3 UC, [IB] D2-3
4.5b Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.	IAPS 58	**58** AQ2 UC, [IB] D4-5, D8
Key Idea 5. Energy and matter interact through forces that result in changes in motion.		
PI 5.1 Describe different patterns of motion of objects.		
5.1a The motion of an object is always judged with respect to some other object or point. The idea of absolute motion or rest is misleading.	IAPS 80	
5.1b The motion of an object can be described by its position, direction of motion, and speed.	IAPS 74, 75	**74** Proc DI; [IB] E1-2, 5-6 **75** AQ2 UC, [IB] E2, 4-6, 7, 14
5.1c An object's motion is the result of the combined effect of all forces acting on the object. A moving object that is not subjected to a force will continue to move at a constant speed in a straight line. An object at rest will remain at rest.	IAPS 80	**80** AQ2; [IB] E2, 3, 11, 20
5.1d Force is directly related to an object's mass and acceleration. The greater the force, the greater the change in motion.	IAPS 78, 80	**78** [IB] E2, 3, 8 **80** AQ2; [IB] E2, 3, 11, 20
5.1e For every action there is an equal and opposite reaction.	IAPS 80	**80** AQ2; [IB] E2, 3, 11, 20
PI 5.2 Observe, describe, and compare effects of forces (gravity, electric current, and		

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
magnetism) on the motion of objects.		
5.2a Every object exerts gravitational force on every other object. Gravitational force depends on how much mass the objects have and on how far apart they are. Gravity is one of the forces acting on orbiting objects and projectiles.	IAES 95, 96	**95** AQ4 AD; [IB] G10, 12 **96** [IB] G 4, 7, 19
5.2b Electric currents and magnets can exert a force on each other.	IAPS 65A	
5.2c Machines transfer mechanical energy from one object to another.	ASC 214 Simple Machines	
5.2d Friction is a force that opposes motion.	IAPS 82	**82** AQ3 RE; [IB] E3, 9, 12
5.2e A machine can be made more efficient by reducing friction. Some common ways of reducing friction include lubricating or waxing surfaces.	NC (Friction discussed in terms of vehicle motion)	
5.2f Machines can change the direction or amount of force, or the distance or speed of force required to do work.	NC	
5.2g Simple machines include a lever, a pulley, a wheel and axle, and an inclined plane. A complex machine uses a combination of interacting simple machines, e.g., a bicycle.	ASC 214 Simple Machines ASC 212 Motion of a Pendulum	

STANDARD 4: The Living Environment

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
Key Idea 1. Living things are both similar to and different from each other and nonliving things.		
PI 1.1 Compare and contrast the parts of plants, animals, and one-celled organisms.		
1.1a Living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Cells are usually microscopic in size.	IALS 42	**42** [IB] D3, D7, D16-10, C23
1.1b The way in which cells function is similar in all living things. Cells grow and divide, producing more cells. Cells take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.	IALS 42	**42** [IB] D3, D7, D16-10, C23
1.1c Most cells have cell membranes, genetic material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus.	IALS 42, 82	**42** [IB] D3, D7, D16-10, C23 **82** [IB] E5, E13-14, E17
1.1d Some organisms are single cells; others, including humans, are multi-cellular.	IALS 42	**42** [IB] D3, D7, D16-10, C23
1.1e Cells are organized for more effective functioning in multi-cellular organisms. Levels of organization for structure and function of a multi-cellular organism include cells, tissues, organs, and organ systems.	IALS 42	**42** [IB] D3, D7, D16-10, C23
1.1f Many plants have roots, stems, leaves, and reproductive structures. These organized groups of tissues are responsible for a plant's life activities.	IALS 81, 82	**81** AQ5 UC, [IB] E2, 3, E5, E13-14 **82** [IB] E5, E13-14, E17
1.1g Multi-cellular animals often have	IALS 42	**42** [IB] D3, D7,

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
similar organs and specialized systems for carrying out major life activities.		D16-10, C23
1.1h Living things are classified by shared characteristics on the cellular and organism level. In classifying organisms, biologists consider details of internal and external structures. Biological classification systems are arranged from general (kingdom) to specific (species).	IALS 75, 76	**75** [IB] E4, E36
PI 1.2 Explain the functioning of the major human organ systems and their interactions.		
1.2a Each system is composed of organs and tissues which perform specific functions and interact with each other, e.g., digestion, gas exchange, excretion, circulation, locomotion, control, coordination, reproduction, and protection from disease.	IALS 12	**12** [IB] B12, B15
1.2b Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.	IALS 12, 18	**12** [IB] B12, B15 **18** [IB] B9, B17-18, B29
1.2c The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells.	IALS 12, 14	**12** [IB] B12, B15 **14** [IB] B16
1.2d During respiration, cells use oxygen to release the energy stored in food. The respiratory system supplies oxygen and removes carbon dioxide (gas exchange).	IALS 17	**17** [IB] B1, B8, B21
1.2e The excretory system functions in the disposal of dissolved waste molecules, the elimination of liquid and gaseous wastes, and the removal of excess heat energy.	IALS 12, 18	**12** [IB] B12, B15 **18** [IB] B9, B17-18, B29
1.2f The circulatory system moves	IALS 24	**24** AQ 2 UC, [IB]

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
substances to and from cells, where they are needed or produced, responding to changing demands.		B22, B24
1.2g Locomotion, necessary to escape danger, obtain food and shelter, and reproduce, is accomplished by the interaction of the skeletal and muscular systems, and coordinated by the nervous system.	IALS 16	**16** AQ4 UC, [IB] B6
1.2h The nervous and endocrine systems interact to control and coordinate the body's responses to changes in the environment, and to regulate growth, development, and reproduction. Hormones are chemicals produced by the endocrine system; hormones regulate many body functions.	IALS 5-7 (nervous system; endocrine system NC)	**5** Proc GI **6** AQ1 AD [IB] A3, A4 **7** AQ 1 AD, AQ1 UC, [IB] A5, A7, A8
1.2i The male and female reproductive systems are responsible for producing sex cells necessary for the production of offspring.	IALS 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
1.2j Disease breaks down the structures or functions of an organism. Some diseases are the result of failures of the system. Other diseases are the result of damage by infection from other organisms (germ theory). Specialized cells protect the body from infectious disease. The chemicals they produce identify and destroy microbes that enter the body.	IALS 37	**37** Act UC, [IB] C14
Key Idea 2. Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.		
PI 2.1 Describe sexual and asexual mechanisms for passing genetic materials from generation to generation.		

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
2.1a Hereditary information is contained in genes. Genes are composed of DNA that makes up the chromosomes of cells.	IALS 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
2.1b Each gene carries a single unit of information. A single inherited trait of an individual can be determined by one pair or by many pairs of genes. A human cell contains thousands of different genes.	IALS 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
2.1c Each human cell contains a copy of all the genes needed to produce a human being.	IALS 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
2.1d In asexual reproduction, all the genes come from a single parent. Asexually produced offspring are genetically identical to the parent.	IALS 57	
2.1e In sexual reproduction typically half of the genes come from each parent. Sexually produced offspring are not identical to either parent.	IALS 57	
PI 2.2 Describe simple mechanisms related to the inheritance of some physical traits in offspring.		
2.2a In all organisms, genetic traits are passed on from generation to generation.	IALS 57, 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
2.2b Some genes are dominant and some are recessive. Some traits are inherited by mechanisms other than dominance and recessiveness.	IALS 60, 65	**60** AQ1 DCI [IB] D2 **65** AQ8 UC
2.2c The probability of traits being expressed can be determined using models of genetic inheritance. Some models of prediction are pedigree charts and Punnett squares.	IALS 61	**61** [IB] D5, D12-16
Key Idea 3. Individual organisms and species		

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
change over time.		
PI 3.1 Describe sources of variation in organisms and their structures and relate the variations to survival.		
3.1a The processes of sexual reproduction and mutation have given rise to a variety of traits within a species.	IALS 63, 89	**63** [IB] D1, D2-5, D8-11, D18, D22-24 **89** AQ4 ET, [IB] F1-4, F29
3.1b Changes in environmental conditions can affect the survival of individual organisms with a particular trait. Small differences between parents and offspring can accumulate in successive generations so that descendants are very different from their ancestors. Individual organisms with certain traits are more likely to survive and have offspring than individuals without those traits.	IALS 89, 96, 97	**89** AQ4 ET, [IB] F1-4, F29 **96** AQ2 DCI
3.1c Human activities such as selective breeding and advances in genetic engineering may affect the variations of species.	IALS 101	
PI 3.2 Describe factors responsible for competition within species and the significance of that competition.		
3.2a In all environments, organisms with similar needs may compete with one another for resources.	IALS 89, 101	**89** AQ4 ET, [IB] F1-4, F29
3.2b Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to permit its survival. Extinction of species is common. Fossils are evidence that a great variety of species existed in the past.	IALS 89, 92, 98	**89** AQ4 ET, [IB] F1-4, F29 **92** [IB] F6-7, F17 **98** [IB] F32-33
3.2c Many thousands of layers of	IALS 93	**93** AQ4 UC, [IB] F8-

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
sedimentary rock provide evidence for the long history of Earth and for the long history of changing life forms whose remains are found in the rocks. Recently deposited rock layers are more likely to contain fossils resembling existing species.		11
3.2d Although the time needed for change in a species is usually great, some species of insects and bacteria have undergone significant change in just a few years.	IALS 100, 101	
Key Idea 4. The continuity of life is sustained through reproduction and development.		
PI 4.1 Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction.		
4.1a Some organisms reproduce asexually. Other organisms reproduce sexually. Some organisms can reproduce both sexually and asexually.	IALS 57	
4.1b There are many methods of asexual reproduction, including division of a cell into two cells, or separation of part of an animal or plant from the parent, resulting in the growth of another individual.	IALS 57	
4.1c Methods of sexual reproduction depend upon the species. All methods involve the merging of sex cells to begin the development of a new individual. In many species, including plants and humans, eggs and sperm are produced.	IALS 57	
4.1d Fertilization and/or development in organisms may be internal or external.	IALS 57	
PI 4.2 Explain the role of sperm and egg cells in sexual reproduction.		

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
4.2a The male sex cell is the sperm. The female sex cell is the egg. The fertilization of an egg by a sperm results in a fertilized egg.	IALS 57	
4.2b In sexual repro-duction, sperm and egg each carry one-half of the genetic information for the new individual. Therefore, the fertilized egg contains genetic information from each parent.	IALS 57	
PI 4.3 Observe and describe developmental patterns in selected plants and animals (e.g., insects, frogs, humans, seed-bearing plants.		
4.3a Multicellular organisms exhibit complex changes in development, which begin after fertilization. The fertilized egg undergoes numerous cellular divisions that will result in a multicellular organism, with each cell having identical genetic information.	IALS 57	
4.3b In humans, the fertilized egg grows into tissue which develops into organs and organ systems before birth.	IALS 57a (NYC edition)	
4.3c Various body structures and functions change as an organism goes through its life cycle.	IALS 57a (NYC edition)	
4.3d Patterns of development vary among animals. In some species the young resemble the adult, while in others they do not. Some insects and amphibians undergo metamorphosis as they mature.	IALS 57b (NYC edition)	
4.3e Patterns of development vary among plants. In seed-bearing plants, seeds contain stored food for early development. Their later development into adulthood is characterized by varying patterns of growth from species to species.	IALS 57b (NYC edition)	

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
4.3f As an individual organism ages, various body structures and functions change.	IALS 57b (NYC edition)	
PI 4.4 Observe and describe cell division at the microscopic level and its macroscopic effects.		
4.4a In multicellular organisms, cell division is responsible for growth, maintenance, and repair. In some one-celled organisms, cell division is a method of asexual reproduction.	IALS 57	
4.4b In one type of cell division, chromosomes are duplicated and then separated into two identical and complete sets to be passed to each of the two resulting cells. In this type of cell division, the hereditary information is identical in all the cells that result.	IALS 57, 65	**65** AQ8 UC
4.4c Another type of cell division accounts for the production of egg and sperm cells in sexually reproducing organisms. The eggs and sperm resulting from this type of cell division contain one-half of the hereditary information.	IALS 57, 65	**65** AQ8 UC
4.4d Cancers are a result of abnormal cell division.	IALS 11	**11** AQ2 ET
Key Idea 5. Organisms maintain a dynamic equilibrium that sustains life.		
PI 5.1 Compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium.		
5.1a Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition.	IALS 57a (NYC edition)	
5.1b An organism's overall body plan and its environment determine the way that the	IALS 57b	

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
organism carries out the life processes.	(NYC edition), 75, 76	
5.1c All organisms require energy to survive. The amount of energy needed and the method for obtaining this energy vary among cells. Some cells use oxygen to release the energy stored in food.	IALS 42	**42** [IB] D3, D7, D16-10, C23
5.1d The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich foods.	IALS 79, 80, 81, 82	**79** AQ1 UC, [IB] E2-3, E7-11 **80** [IB] E2-3, E7-10, E15, E16, E25, E16, E35 **81** AQ5 UC, [IB] E2, 3, E5, E13-14 **82** [IB] E5, E13-14, E17
5.1e Herbivores obtain energy from plants. Carnivores obtain energy from animals. Omnivores obtain energy from both plants and animals. Decomposers, such as bacteria and fungi, obtain energy by consuming wastes and/or dead organisms.	IALS 79, 80	**79** AQ1 UC, [IB] E2-3, E7-11 **80** [IB] E2-3, E7-10, E15, E16, E25, E16, E35
5.1f Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required for survival. Regulation includes a variety of nervous and hormonal feedback systems.	IALS 5, 7	**5** [IB] A11-14 **7** AQ5 DCI & CM, [IB] A4-6
5.1g The survival of an organism depends on its ability to sense and respond to its external environment.	NC	

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
PI 5.2 Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth and explain the need for a constant input of energy for living organisms.		
5.2a Food provides molecules that serve as fuel and building material for all organisms. All living things, including plants, must release energy from their food, using it to carry on their life processes.	IALS 14	**14** [IB] B16
5.2b Foods contain a variety of substances, which include carbohydrates, fats, vitamins, proteins, minerals, and water. Each substance is vital to the survival of the organism.	IALS 14 (see also IALS unit B web extensions)	**14** [IB] B16
5.2c Metabolism is the sum of all chemical reactions in an organism. Metabolism can be influenced by hormones, exercise, diet, and aging.	NC	
5.2d Energy in foods is measured in Calories. The total caloric value of each type of food varies. The number of Calories a person requires varies from person to person.	See IALS unit B web extensions)	
5.2e In order to maintain a balanced state, all organisms have a minimum daily intake of each type of nutrient based on species, size, age, sex, activity, etc. An imbalance in any of the nutrients might result in weight gain, weight loss, or a diseased state.	IALS 107	
5.2f (1) Contraction of infectious disease, and personal behaviors such as use of toxic substances and some dietary habits, may interfere with one's dynamic equilibrium. (2) During pregnancy these conditions may also affect the development of the child. Some effects of these conditions are immediate; others may not appear for many years.	(1) IALS 31 (2) NC	**31** [IB] C8

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
Key Idea 6. Plants and animals depend on each other and their physical environment.		
PI 6.1 Describe the flow of energy and matter through food chains and food webs.		
6.1a Energy flows through ecosystems in one direction, usually from the Sun, through producers to consumers and then to decomposers. This process may be visualized with food chains or energy pyramids.	IALS 80, 81	**80** [IB] E2-3, E7-10, E15, E16, E25 **81** AQ5 UC, [IB] E2, 3, E5, E13-14
6.1b Food webs identify feeding relationships among producers, consumers, and decomposers in an ecosystem.	IALS 80, 81	**80** [IB] E2-3, E7-10, E15, E16, E25 **81** AQ5 UC, [IB] E2, 3, E5, E13-14
6.1c Matter is transferred from one organism to another and between organisms and their physical environment. Water, nitrogen, carbon dioxide, and oxygen are examples of substances cycled between the living and nonliving environment.	NC	
PI 6.2 Provide evidence that green plants make food and explain the significance of this process to other organisms.		
6.2a Photosynthesis is carried on by green plants and other organisms containing chlorophyll. In this process, the Sun's energy is converted into and stored as chemical energy in the form of a sugar. The quantity of sugar molecules increases in green plants during photosynthesis in the presence of sunlight.	IALS 81	**81** AQ5 UC, [IB] E2, 3, E5, E13-14
6.2b The major source of atmospheric oxygen is photosynthesis. Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis.	IALS 81, 82	**81** AQ5 UC, [IB] E2, 3, E5, E13-14 **82** [IB] E5, E13-14, E17

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	ASSESSMENT
6.2c Green plants are the producers of food which is used directly or indirectly by consumers.	IALS 80, 81, 82	**80** [IB] E2-3, E7-10, E15, E16, E25 **81** AQ5 UC, [IB] E2, 3, E5, E13-14 **82** [IB] E5, E13-14, E17
Key Idea 7. Human decisions and activities have had a profound impact on the physical and living environment.		
PI 7.1 Describe how living things, including humans, depend upon the living and nonliving environment for their survival.		
7.1a A population consists of all individuals of a species that are found together at a given place and time. Populations living in one place form a community. The community and the physical factors with which it interacts compose an ecosystem.	IALS 72, 77	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **77** AQ4 DCI, AQ7 DCI
7.1b Given adequate resources and no disease or predators, populations (including humans) increase. Lack of resources, habitat destruction, and other factors such as predation and climate limit the growth of certain populations in the ecosystem.	IALS 72, 73	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 73 **[IB] E1, E12, E24**
7.1c In all environments, organisms interact with one another in many ways. Relationships among organisms may be competitive, harmful, or beneficial. Some species have adapted to be depend-ent upon each other with the result that neither could survive without the other.	IALS 72, 73, 77	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **73** [IB] E1, E12, E24 **77** AQ4 DCI, AQ7 DCI
7.1d Some microorganisms are essential to the survival of other living things.	IALS 45	**45** AQ5 UC, [IB] C2, C4, C29
7.1e The environment may contain dangerous	IAPS 34, 44, 52	**34** AQ4 ET

NYS STANDARD DESCRIPTION	SEPUP	
	LOCATION	**ASSESSMENT**
levels of substances (pollutants) that are harmful to organisms. Therefore, the good health of environments and individuals requires the monitoring of soil, air, and water, and taking steps to keep them safe.		**44** Act GI, [IB] C2, C35 **52** AQ4 UC
PI 7.2 Describe the effects of environmental changes on humans and other populations.		
7.2a In ecosystems, balance is the result of interactions between community members and their environment.	IALS 72, 73, 85, 87, 88	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **73** [IB] E1, E12, E24
7.2b The environment may be altered through the activities of organisms. Alterations are sometimes abrupt. Some species may replace others over time, resulting in long- term gradual changes (ecological succession).	IALS 72, 73	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **73** [IB] E1, E12, E24
7.2c Overpopulation by any species impacts the environment due to the increased use of resources. Human activities can bring about environmental degradation through resource acquisition, urban growth, land-use decisions, waste disposal, etc.	IALS 72, 73, 85, 87, 88	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **73** [IB] E1, E12, E24 **85** AQ1 UC, [IB] E21-23 **87** AQ1 ET **88** AQ3 ET, [IB] E28-32
7.2d Since the Industrial Revolution, human activities have resulted in major pollution of air, water, and soil. Pollution has cumulative ecological effects such as acid rain, global warming, or ozone depletion. The survival of living things on our planet depends on the conservation and protection of Earth's resources.	IAPS 34, 44, 52	**34** AQ4 ET **44** Act GI, [IB] C2, C35 **52** AQ4 UC