Crosswalk Directions:

1997 MLR to 2007 MLR

1. Use a Y (yes), an N (no), or a P (partially) to indicate the extent to which the standard or performance indicator of the 1997 MLR can be found in the 2007 MLR. If you indicate that the standard or performance indicator is partially found, please explain in the cell of the spreadsheet. If you answer "no", please respond only to question 6, 8, and 9.

2. Use a Y (yes), an N (no), or a P (partially) to indicate the extent to which the concept/idea of the 1997 MLR standard or performance indicator can be found in the 2007 MLR. If you indicate that the idea/concept is partially found, please explain in the cell of the spreadsheet.

3. Use a Y (yes), an N (no), or a P (partially) to indicate the extent to which whether the wording of the 1997 MLR can be found in the 2007 MLR. If you indicate that the wording is partially found, please explain in the cell of the spreadsheet.

4. Indicate where the standard or performance indicator of the 1997 MLR can be found in the standards, performance indicators and/or appropriate descriptors of the 2007 MLR. For example, one might indicate A (standard A), A1 (standard A, performance indicator 1), A1a (standard A, performance indicator 1, descriptor a), A1a, b, and e (standard A, performance indicator 1, descriptors a, b, and e).

5. Indicate with a Y (yes) or an N (no) whether the performance indicator of the 1997 MLR is be found at the same grade span in the 2007 MLR. If "no", indicate the grade span or grade level where the performance indicator is found in the 2007 MLR. As an example, a performance indicator found in 5-8 in the 1997 should be considered to be at a different grade span if it is found at 6-8 in the 2007 MLR.

6. Indicate with a 1, 2, 3, 4, 5 or 6 the level of Bloom's Taxonomy that best represents the cognitive demand of the 1997 MLR. Where more than one level of cognitive demand is indicated please use more that one designation. Please use the attached copy of Bloom to guide your decision about the cognitive demand.

7. Indicate with a 1, 2, 3, 4, 5 or 6 the level of Bloom's Taxonomy that best represents the cognitive demand of the 2007 MLR. Where more than one level of cognitive demand is indicated please use more that one designation. Please use the attached copy of Bloom to guide your decision about the cognitive demand.

	CONTINUITY						
Science and Technology CROSSWALK: 1997 MLR to 2007 MLR	**Is it in the 2007 standards?**	**Is the CONCEPT /IDEA the same?**	**Is the WORDING the same?**	**WHERE is it found? (Standard, PI, Descriptor)**	**Is it at the same grade span or grade level?**	**At what level of Bloom's taxonomy is the COGNITIVE DEMAND in the 1997 MLR?**	**At what level of Bloom's taxonomy is the COGNITIVE DEMAND in the 2007 MLR?**
A. CLASSIFYING LIFE FORMS							

Students will understand that there are similarities within the diversity of all living things. Modern classification systems are based on comparisons of the structure, function, life-cycles, and behavior of organisms.	Y	Y	N	Standard E,	N/A	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2							
1. Identify the differences between living and non-living things.	N						
2. Describe characteristics of different living things.	Y	Y	N	E1, E1a, E1b	Y	2	2
3. Explain, draw, or otherwise demonstrate the life cycle of an organism.	Y	Y	N	E1,E1c	Y	2	2
4. Design and describe a classification system for objects.	N						
ELEMENTARY GRADES 3-4							
1. Group the same organisms in different ways using different characteristics.	Y	Y	N	E2, E1a	Y	3	2,3
2. Design and describe a classification system for organisms.	Y	N	N	E1a	Y	5,2	3
3. Describe the different living things within a given habitat.	Y	N	N	E2b	Y	2	2
4. Compare and contrast the life cycles, behavior, and structure of different organisms.	P - life cycles and structure not behavior	Y	N	E1b	Y	4	2
MIDDLE GRADES 5-8							
1. Compare systems of classifying organisms including systems used by scientists.	P - focus on only the basis for scientific classification	N	N	E1,E1b	Y	4	2
2. Decipher the system for assigning a scientific name to every living thing.	N						
3. Describe some structural and behavioral adaptations that allow organisms to survive in a changing environment.	P- focus on only internal and external structures	Y	N	E1, E1d	Y	2	2
SECONDARY GRADES							
1. Explain the role of DNA in resolving questions of relationship and evolutionary change.	Y	Y	P - 2007 also includes connection to the indentification of species	E1, E1b	Y	2	2

2. Describe similarities and differences among organisms within each level of the taxonomic system for classifying organisms (kingdom through species).	P - no specific mention of kingdoms and taxonomy	Y	N	E1,	Y	2	2
3. Analyze the basic characteristics of living things, including their need for food, water, and gases and the ability to reproduce.	N						
B. ECOLOGY							
Students will understand how living things depend on one another and on non-living aspects of the environment. Balance in ecosystems is based on an intricate web of relationships among populations of living organisms and on non-living factors such as water and temperature. Changes in specific populations or conditions affect other parts of the ecosystem. Individual systems continually change in response to human and other factors.	Partially - the idea of balance is not mentioned in the standard	Y	N	E	N/A	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2							
1. Identify ways that organisms depend upon their environment.	Y	Y	N	E2, E2a	Y	2	2
2. Describe how almost all animals' food can be traced back to plants.	Y	Y	P - 2007 standards include use of food for energy and repair	E2, E2d(3-5)	N (3-5)	2	2
3. Give examples of how one change in a system affects other parts of the system.	Y	Y	Y	A1, A1a(3-5)	N (3-5)	2	2
4. Describe different ecological systems on earth.	P	P - 2007 focuses only on comparing animals and plants from different parts of the world	N	E2, E2a, E2b	Y	2	3
5. Describe a familiar local environment.	P	P	N	E2, E2b	Y	2	2
ELEMENTARY GRADES 3-4							

1. Describe a food web and the relationships within a given ecosystem.	Y	P- 2007 makes no mention of foodwebs, focuses on how organism depend on each other	N	E2, E2c, E2d	Y		2	2
2. Explain the difference between producers (e.g., green plants), consumers (e.g., those that eat green plants), and decomposers (e.g., bacteria that break down the "consumers" when they die), and identify examples of each.	P	focuses on comparing the physical characteristic	P- terms are introduced in E2b(6-8)	E2, E2a,E2b, E2d	N (6-8)		2	1,2,3
3. Compare and contrast physical and living components of different biomes - i.e., regions characterized by their climate and plant life - (e.g., tundra, rain forest, ocean, desert).	Y	makes no mention of biomes	N	E2, E2b(Pk-2)	N(Pk-2)		3	3
4. Investigate the connection between major living and non-living components of a local ecosystem.	Y	Y	N	E2, E2a, E2a(6-8), E2b(6-8)	N(6-8)	UNCLEAR	1, 2	
MIDDLE GRADES 5-8								
1. Describe in general terms the chemical processes of photosynthesis and respiration.	Y	Y	P- there is no reference in the 2007 document to photosynthesis and respiration just the what happens to the transformation of energy and matter.	E2, E2c,E2d, E2d(9-D)	Y		2	2
2. Analyze how the finite resources in an ecosystem limit the types and populations of organisms within it.	Y	Y	N	E2,E2a, E2c(9-D)	N (9-D)		4	2
3. Describe succession and other ways that ecosystems can change over time.	P-no specific mention of succession but a focus on constancy and change over time	P-	N	E2, E2a, E2b, E3, E3a, E3b				

4. Generate examples of the variety of ways that organisms interact (e.g., competition, predator/prey, parasitism/mutualism).	Y	P- 2007 also includes consideration of positive and negative consequences	N	E2, E2b,	Y	1	1,2
5. Describe various mechanisms found in the natural world for transporting living and non-living matter and the results of such movements.	P	P	N	E3, E3a(9-D)	N (9-D)	2	2
SECONDARY GRADES							
1. Illustrate the cycles of matter in the environment and explain their interrelationships.	Y	Y- 2007 standards focus on matter and energy		E2, E2d	Y	2	2
2. Compare the process of photosynthesis and respiration, and describe the factors that effect them.	Y	P- 2007 also focuses on chemical element transformation and conservation laws	N	E2, E2d	Y	2	2
3. Analyze the factors that affect population size (e.g., reproductive and survival rates).	Y	Y	N	E2, E2c	Y	4	2
4. Analyze the impact of human and other activities on the type and pace of change in ecosystems.	Y	P-No mention of pace of change in 2007, 2007 also mentions sustainability	N	C3, C3a	Y	4	2
C. CELLS							
Students will understand that cells are the basic units of life. The functions performed by organelles (specialized structures found in cells) within individual cells are also carried out by the organ system in multi-cellular organisms. This standard requires that students be conversant with magnifying devices, cell structure and function, body systems, and disease causes and the body's defense against them.	Y	Partially - no specific mention in the 2007 standard of magnifying devices or structure and funtion	N	E, E3	N/A	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD

ELEMENTARY GRADES Pre-K-2							
1. Demonstrate that living things are made up of different parts.	Y	P-parts are explored in the context of systems- including living and non-living objects	N	A1, A1a	Y		3	2
2. Demonstrate an understanding that plants and animals need food, water, and gases to survive.	Y	P- 2007 standards also note that the requirements for life do not change with an organisms size.	N	E3, E3b	Y	UNCLEAR	1
3. Explore magnifying devices and how they allow one to see in more detail.	Y	Y	N	E3, E3a	Y	UNCLEAR	1
4. Provide examples of causes of diseases.	N						
ELEMENTARY GRADES 3-4							
1. Demonstrate an understanding that a cell is the basic unit of living organisms.	Y	P- 2007 also focuses on the way cells meet their needs	N	E3	Y	UNCLEAR	1
2. Describe how single-celled organisms exist.	Y	P- 2007 also focuses on the needs of multicelled organisms	N	E3, E3b	Y		2	3
3. Explore how the use of a microscope allows one to see cells in a variety of organisms.	Y	Y	N	B1, B1c	Y	UnCLEAR	3
4. Describe the functions of the major human organ systems.	Y	Y	N	E3c(6-8)	N (6-8)		2	2
MIDDLE GRADES 5-8							
1. Compare and contrast human organ systems with those of other species.	Y	Y	N	E3, E3c	Y		3	3
2. Prepare and examine microscope slides of single-celled and multi-celled organisms.	Y	Y	N	B1, B1c	y		3	3
3. Describe the structure and function of major organs in human systems.	Y	P- No specific mention of	Y				

4. Identify the causes and effects of diseases, explain their transmission, and identify prevention strategies.	P- no specific mention of disease or disease prevention in 2007 MLR	P	N	E3, E3c, E4, E4b	Y	1	3
5. Describe how body systems work together.	Y	Y	N - the 2007 performance indicator makes the idea applicable to single and multicelled organisms and to parts of systems in general	E3c, E3b, A1a	Y	2	2,3
SECONDARY GRADES							
1. Relate the parts of a cell to its function.	Y	P- 2007 specifies functions to focus on. At 6-8 the 2007 standards require students to know that getting energy from food and eliminating wastes is carried out by cells.	N	E3a	Y	2	3
2. Illustrate how cells replicate and transmit information, including the roles of DNA and RNA.	Y	Y	N	E3b	Y	1	2
3. Discuss the function of the important "molecules of life" - proteins (including enzymes and hormones), carbohydrates, lipids, and nucleic acids.	Y	P- 2007 does not mention carbohydrates and lipids	N	A3b,A3f	Y	2	2
4. Explain how the human body protects itself against disease and how the body might lose that ability.	N						

5. Analyze and debate basic principles of genetic engineering: how it is done, its uses, and some ethical implications.	Y	Y- 2007 frame the issue in the larger context of science, technology and society and gets more specific by considering factors that influence the use of science and technology and how those decisions influence people and the environment.	N	C3, C3b, C3c	Y	5	2
D. CONTINUITY AND CHANGE						
Students will understand the basis for all life and that all living things change over time. Fossils show past life, extinct species, and environmental changes over time. Organisms change and new species may arise due to genetically coded adaptations.	Y	Y	N	D2, E4, E5	Y	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2						
1. Explain how fossils show the existence of past life.	Y	Y	N- No specific mention of the word fossil in 2007	E5,E5a,E5b(3-5)	Y	2	2
2. Identify characteristics that help organisms live in their environment.	Y	Y	Y	E1, E1b		
3. Draw or describe ways in which an organism can change over its lifetime, sometimes in predictable ways (e.g., butterfly, frog).	Y	Y - and 2007 MLR also makes the connection of likeness to parent	N	E4, E4a	Y	2	2,1

4. Describe ways in which individuals of the same species are alike and different.	Y	P- students asked to explain what a species is	N	E1, E1a, E1c,E5, E5a	N	2	2
ELEMENTARY GRADES 3-4							
1. Identify present day organisms that have not always existed, and past life forms that have become extinct.	Y	P- 2007 also asks students to compare within each category	N	E5,E5b	Y	1	2
2. Describe how fossils form.	Y	P- 2007 requires that students know how what causes rocks to form and transform. No specific mention of fossils.	N	D2, D2b	N (6-8)	2	2
3. Explain how adaptations, in response to change over time, may increase a species' chances of survival.	Y	Y	N	E5, E5c	N(6-8)	2	2
4. Describe ways in which organisms may be similar to and different from their parents and explore the possible reasons for this.	Y	P- 2007 MLR does not require students to explore reasons for differences, only to note them.	N	E4, E4a,	y	2	1
MIDDLE GRADES 5-8							
1. Describe how fossils can be used by scientists to trace the history of a species.	Y	Y	N- 2007 focuses on the role of fossils in tracing the history of the Earth and changing life.	E5, E5c	Y	2	2

2. Explain how scientists use fossils to prove that life forms, climate, environment, and geologic features in a certain location are not the same now as they were in the past.	Y	Y	focuses on the role of fossils in tracing the	E5, E5a	Y	2	2
3. Provide examples of the concept of natural and artificial selection and its role in species changes over time.	Y	Y	N	E5b(9-D)	N (9-D)	3	2
4. Compare how sexually and asexually reproducing species transfer genetic information to offspring.	Y	Y	N	E4, E4a, E4b	Y	3	2
SECONDARY GRADES							
1. Explain how mutations can be caused by gene mutation or chromosomal alteration and describe the possible results of such mutations on individuals or populations.	Y	Y	Y	E4, E4a, E4c	Y	2	2
2. Describe why the offspring of sexually reproducing species have different survival rates than those of asexually reproducing species under a variety of conditions. Describe the advantages and disadvantages of each.	Y	broader idea which includes the diversity of	N	E1, E1a,E4, E4a	Y	2	2
3. Explain and document the importance of relatively short-term changes (e.g., one generation) on a species' survival.	Y	Y	N	E5, E5d	Y	2	2
4. Describe how genetic manipulation can cause unusually rapid changes in species.	Y	P- no mention of time in 2007, the focus is on the cause and effect	N	E4c	Y	2	2
5. Compare and contrast fertilization, zygote formation, and embryo development in humans and other species.	Y	Y	N	E3, E3c(6-8), E3c, E4, E4a(6-8), E4b	N some at 6-8	3	2
6. Analyze a theory scientists use to explain the origin of life.	Y	Y	N	E5,E5a, E5b	Y	5	2

7. Explain both the evidence used to develop the geologic time scale and why an awareness of geologic time is important to an understanding of the process of change in the universe as well as on earth.	Y	P-2007 also requires that students understand biological and geological influences on Earth system and has no mention of universe snd does not ask that students be able to explain the geological time scale	N	D2, D2c	Y	2	2
E. STRUCTURE OF MATTER							
Students will understand the structure of matter and the changes it can undergo. Matter is made of atoms, each with characteristic properties, which can combine to form all substances in the universe. The state and properties of matter may differ when it experiences chemical, physical, and nuclear changes.	Y	P- ideas are contained in the performance indicator D3	N	D, D3	N/A	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2							
1. Show that large things are made up of smaller pieces.	Y	Y	N	A, A1a	Y	1,2	2
2. Describe some physical properties of objects.	Y	Y - 2007 also focuses on describing changes in objects	Y	D3, D3a, D3b	Y	2	2
3. Group objects based on observable characteristics (e.g., color, size, texture).	N						
ELEMENTARY GRADES 3-4							

1. Describe how the physical properties of objects sometimes change when one object chemically combines with another.	Y	P - there is no mention of chemical changes specifically in 2007 just a focus on describing physical changes especially related to heating and cooling and water.	N	D3, D3b	Y	2	2
2. Explain how matter changes in both chemical and physical ways.	Y	Y	Y	D3, D3b, D3d, D3e	Y	2	2
MIDDLE GRADES 5-8							
1. Predict and test whether objects will float or sink based on a qualitative and quantitative understanding of the concepts of density and buoyancy.	P-Part of a larger idea	P	N	D3, D3f	Y	5	2
2. Describe the evidence that all matter consists of particles called atoms that are made up of certain smaller particles.	Y	Y	particles are defined in	D3, D3a	Y	2	2
3. Use the Periodic Table to group elements based on their characteristics.	Y	P- the relationship is inverted in 2007, students need to describe how the periodic table reflects the characteristics of the elements	N	D3, D3b	Y	3	2
4. Describe how a substance can combine with different substances in different ways, depending on the conditions and the properties of each substance.	Y	Y	N	D3.D3f, D3b(9-D)	Some at 9-D	2	2
5. Describe how the motion of the particles of matter determines the state of that matter (e.g., solid, liquid, gas, plasma) and vice versa.	Y	Y	N	D3, D3d, D3e	Y	2	2

6. Explain how the relatively small number of naturally occurring elements can result in the large variety of substances found in the world.	P- grade three five starts this idea by illustrating that a large number of things can be made from a small number of ingredients.	P	N	D3b(3-5)			
7. Investigate the similarities and differences between elements, compounds, and mixtures.	P- no mention of mixtures	P-no mention of mixtures	N	D3,D3a	Y	Unclear	2
8. Demonstrate the law of conservation of matter.	Y	Y	N	D3,D3d	Y	unclear	3
SECONDARY GRADES							
1. Trace the development of models of the atom to the present and describe how each model reflects the scientific understanding of their time.	Y	Y	N	C4,C4b, A2, A2a	Y, N - A2a is 6-8		2 2,3
2. Analyze how matter is affected by changes in temperature, pressure, and volume.	P- the 2007 focuses on how the chemical reactivity of matter is affected	Y	N	D3, D3d	Y		2 2
3. Describe the characteristics and behavior of acids and bases.	Y	P- 2007 focuses on a molecules properities	N	D3, D3d	Y		2 2
4. Describe an application of the Law of Conservation of Matter.	Y	Y	N	D3, D3d	N (6-8)		2 2
5. Describe how atoms are joined by chemical bonding.	Y	Y	N	D3, D3a, D3b	Y		2 2
6. Compare the physical and chemical characteristics of elements.	P- 2007 focuses only on physical characteristics of elements	P	N	D3, D3d	N (6-8)		2 2
7. Describe nuclear reactions, including fusion, fission, and decay, their occurrences in nature, and how they can be used by humans.	Y	Y	N	D3, D3e, D3g,D3h	Y		2 2
F. THE EARTH							

Students will gain knowledge about the earth and the processes that change it. The earth's surface undergoes steady or sudden changes due to forces of wind, water, ice, volcanism, and shifting of tectonic plates.	Y	Y	N	D, D1, D2	N/A	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2							
1. Describe the way weather changes.	Y	Y	N	D2, D2a, D2b	Y	2	2
2. Analyze the relationships between observable weather patterns and the cycling of the seasons.	N						
3. Observe changes that are caused by water, snow, wind, and ice.	Y	Y	N	D2, D2b, D2c	N (3-5)	2	2
ELEMENTARY GRADES 3-4							
1. Describe the change in position of the continents over time.	Y	P	N	D2b(6-8), D2b(9-D)			
2. Demonstrate an understanding that many things about the earth (e.g., climate) occur in cycles that vary in length and frequency.	Y	Y - framed in the context of constancy and change	N	A3, A3a	Y	Unclear	1
3. Describe differences among minerals, rocks, and soils.	Y	P-no mention of minerals in 2007 and focused only on kinds of materials that form them	N	D2, D2d	Y	2	2
4. Illustrate how water and other substances go through a cyclic process of change in the environment.	Y	P-2007 mentions only water, not "other substances", and relates the changes to weather	N	D2, D2b	Y	unclear	2
MIDDLE GRADES 5-8							
1. Demonstrate how the earth's tilt on its axis results in the seasons.	Y	Y	N	D2, D2a	Y	Unclear	2
2. Describe how soils are formed and why soils differ from one place to another.	P- contained as a example of short/long term change	P- contained as a example of short/long term change	N	D2, D2b, D2f,	Y	2	1

3. Explain the evidence scientists use when they give the age of the earth.	Y	Y	N	D1c, E5a	Y		2	2
4. Describe factors that can cause short-term and long-term changes to the earth.	Y	Y	N	D2, D2c, D2fc	Y		2	2
5. Classify and identify rocks and minerals based on their physical and chemical properties, their composition, and the processes which formed them.	P- in the context of understanding rock formations	P	N	D2, D2b	Y		2	2
6. Describe the many products used by humans that are derived from materials in the earth's crust.	P- contained in the idea that personal choices about natural resources can have consequences.	P- contained in the idea that personal choices about natural resources can have consequences.	N	C3,C3b, D2, D2d	Y		2	1
7. Demonstrate factors effecting the flow of groundwater.	P- contained in the idea that personal choices about natural resources can have consequences.	P- contained in the idea that personal choices about natural resources can have consequences.	N	D2, D2b	Y		3	2
SECONDARY GRADES								
1. Describe how air pressure, temperature, and moisture interact to cause changes in the weather.	Y	Y	N	D2., D2a	Y		2	2
2. Analyze potential effects of changes in the earth's oceans and atmosphere.	Y	Y	N	D2, D2a, D2d	Y		5	2
3. Describe the impact of plate movement and erosion on the rock cycle.	P- only plate techtonice	P	N	D2, D2b	Y		2	2
4. Describe ways that scientists measure long periods of time and determine the age of very old objects.	P	P	N	E5a(6-8)	N (6-8)		2	2
5. Demonstrate how rocks and minerals are used to determine geologic history.	P	P	N	E5a(6-8)	N (6-8)		3	2

6. Analyze the changes in continental position and the evidence that supports the concept of tectonic plates.	Y	P- No mention speicifically in 2007 of the evidence for plate techtonics	N	D2, D2b, D2c	Y	5	2
G. THE UNIVERSE							
Students will gain knowledge about the universe and how humans have learned about it, and about the principles upon which it operates. This includes understanding the result of the relative positions and movement of the earth, moon, sun, stars, planets, and galaxies. It also entails an understanding of how scientists gather data and formulate explanations for phenomena in space.	Y	Y	N	D, D1	N/A	UNDEFINED BY STANDARDS	UNDEFINED BY STANDARDS
ELEMENTARY GRADES Pre-K-2							
1. Explain the cycles of day/night and of seasons.	P- No mention of season	P- focus on day and night limited to describing motion of sun and moon	N	D1, D1a, Dib(3-5)	N - some at 3-5	2	2
2. Demonstrate that shadows of objects change based on where light is coming from.	N						
3. Demonstrate an understanding that the sun is one of many stars in the universe and is the closest star to earth.	Y	P- focuses only on the sun being an average star	N	D1, D1c, D1c(3-5)	N- some at 3-5	3	2
ELEMENTARY GRADES 3-4							
1. Illustrate the relative positions of the sun, moon, and planets.	Y	Y	N	D1a	Y	unclear	2
2. Trace the sources of earth's heat and light energy to the sun.	Y	Y	N	D2a(PK-2)	N	2	2
3. Describe earth's rotation on its axis and its revolution around the sun.	Y	Y	N	D1, D1b	N (6-8)	1	2

4. Explore the relationship between the earth and its moon.	Y- In 2007the exploring takes the form of showing the location of the Sum, mon and Earth and their orbits.	Y	N	D1,D1a	Y	unclear		2
MIDDLE GRADES 5-8								
1. Compare past and present knowledge about characteristics of stars (e.g., composition, location, life-cycles) and explain how people have learned about them.	P	P	N	C4d(9-D), D1b(9-D)	N		3	1, 2
2. Describe the concept of galaxies, including size and number of stars.	Y	p - 2007 focuses on the understanding of the concept of a galaxy and the existence of multiple galaxies	N	D1, D1c	Y		2	2
3. Compare and contrast distances and the time required to travel those distances on earth, in the solar system, in the galaxy, and between galaxies.	P- different emphasis on the idea	P- different emphasis on the idea	N	D1c(9-D), D1a(9-D)	N		3	2
4. Describe scientists' exploration of space and the objects they have found (e.g., comets, asteroids, pulsars).	Y	P- 2007 places this ida in the larger context of scientific contributions that add to our understandings	N	C4,C4b	Y		2	2
5. Describe the motions of moons, planets, stars, solar systems, and galaxies.	Y	P-No mention of motion of stars, solar systems and galaxies	N	D1,D1a, D1c, D1b(6-8)	Some at 6-8		2	2

SECONDARY GRADES							
1. Describe how scientists gather data about the universe.	N						
2. Research current explanations for phenomena such as black holes and quasars.	N						
3. Explain how astronomers measure interstellar distances.	P	P	N	D1, D1a	Y	2	2
H. ENERGY							
Students will understand concepts of energy. Energy takes many forms which can exert forces and do work. The conversion of energy from one form to another offers useful applications and sometimes presents problems.	Y	Y	N	D3, D4	Y	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2							
1. Demonstrate an understanding that the sun gives off light and heat energy.	Y	Y	N	D1, D1a	Y	unclear	2
2. Explain why living things need energy.	Y	Y	N	E2, E2d	N (3-5	2	2
ELEMENTARY GRADES 3-4							
1. Identify different forms of energy (e.g., light, sound, heat).	Y	Y	N	D3, D3e	N (6-8)	1	2
2. Explain ways different forms of energy can be produced.	sun as a	P	N	D2,D2e			
MIDDLE GRADES 5-8							
1. Analyze the benefits and drawbacks of energy conversions (e.g., in electricity generation).	Y	P- 2007 focuses on conservation of energy in a variety of energy transformations	N	D3, D3f	N (9-d)	5	2
2. Demonstrate that energy cannot be created or destroyed but only changed from one form to another.	Y	Y	Y	D3, D3f	Y	unclear	2
3. Compare and contrast the ways energy travels (e.g., waves, conduction, convection, radiation).	Y	Y	Y	D3g	Y	3	2
4. Describe the characteristics of static and current electricity.	P- no mention of static electricity	P- no mention of static electricity	N	D4d	Y	2	2
5. Categorize energy sources as renewable or non-renewable and compare how these sources are used by humans.	N						
6. Describe how energy put into or taken out of a system can cause changes in the motion of particles in matter.	Y	Y	N	D4e	Y	2	2
SECONDARY GRADES							

1. Analyze the evidence that leads scientists to conclude that light behaves somewhat like a wave and somewhat like a particle.	Y	P- 2007 places this ida in the larger context of scientific contributions that add to our understandings	N	C4b	Y	5	2
2. Examine and describe how light is reflected and refracted (deflected) by mirrors and lenses.	Y	P- placed in the larger idea of comparing motion of different types of waves	N	D4a	Y	2	2
3. Explain or demonstrate how sound waves travel.	Y	P- placed in the larger idea of comparing motion of different types of waves	N	D4a	Y	2	2
4. Analyze the relationship between the kinetic and potential energy of a falling object.	Y	P- kinetic and potentila energy are not specifically mentioned	N	D4,D4c	Y	5	2
5. Use mathematics to describe the work and power in a system.	N						
6. Describe the relationship between matter and energy and how matter releases energy through the processes of nuclear fission and fusion.	Y	Y	N	D3, D3e	Y	2	2
7. Use mathematics to describe and predict electrical and magnetic activity (e.g., current, resistance, voltage).	P-no mathematical application required in 2007 MLR	P	N	D4, D4e			
8. Compare and contrast how conductors, semiconductors, and superconductors work and describe their present and potential uses.	Y	Y	N	D4, D4ee	Y	2	2

9. Demonstrate an understanding that energy can be found in chemical bonds and can be used when it is released from those bonds.	N						
I. MOTION							
Students will understand the motion of objects and how forces can change that motion. All objects are in motion, at least at an atomic/subatomic level. By understanding how forces (e.g., gravity, friction, and magnetism) act on objects, they can predict their effects on the motion of the object.	Y	Y	N	D, D4	Y	UNDEFINED BY STANDARD	UNDEFINED BY STANDARD
ELEMENTARY GRADES Pre-K-2							
1. Develop a variety of ways to describe the motion of an object.	Y	Y	N	D4,D4a	Y	Unclear	2
2. Demonstrate that the motion of an object can be changed.	Y	Y	N	D4, D4a	Y	Unclear	2
ELEMENTARY GRADES 3-4							
1. Describe the effects of different types of forces (e.g., mechanical, electrical, magnetic) on motion.	Y	Y	N	D4, D4c, D4a	Y	2	2
2. Draw conclusions about how the amount of force affects the motion of more massive and less massive objects.	Y	Y	N	D4, D4a	Y	5	3
3. Generate examples illustrating that when something is pushed or pulled, it exerts a reaction force.	Y	Y	N	D4,D4c	N (9-D)	1	1
MIDDLE GRADES 5-8							
1. Describe the motion of objects using knowledge of Newton's Laws.	Y	Y	N	D4,D4c	N (9-D)	2	2
2. Use mathematics to describe the motion of objects (e.g., speed, distance, time, acceleration).	Y	Y	N	A2, A2a	Y	3	3
3. Describe and quantify the ways machines can provide mechanical advantages in producing motion.	N						
SECONDARY GRADES							
1. Use mathematics to describe the law of conservation of momentum.							
2. Explain some current theories of gravitational force.	Y- 2007 focuses only on Newton concept of gravity	Y- 2007 focuses only on Newton concept of gravity	N	D4b	Y	2	2
3. Use Newton's Laws to qualitatively and quantitatively describe the motion of objects.	P-2007requires only that examples be provided not quantitative evidence.	P-2007requires only that examples be provided not quantitative evidence.	N	D4c	Y	3	2

4. Describe how forces affect fluids (e.g., air and water).	N						
5. Explain the relationship between temperature, heat, and molecular motion.	Y	Y	N	D3, D3i	Y	2	2
6. Describe how forces within and between atoms affect their behavior and the properties of matter.	P- 2007 MLR focuses on molecules	Y	N	D3, D3a, D3b	Y	2	2
J. INQUIRY AND PROBLEM SOLVING							
Students will apply inquiry and problem-solving approaches in science and technology. Scientific inquiry, problem solving, and the technological method provide insight into and comprehension of the world around us. A variety of tools, including emerging technologies assist, the inquiry processes. Models are used to understand the world.	Y	Y	N	B1, B2, A2	Y	undefined by standard	Undefined by standard
ELEMENTARY GRADES Pre-K-2							
1. Make accurate observations using appropriate tools and units of measure.	Y	Y	N	A4, A4a, B1, B1c	Y	2	3
2. Ask questions and propose strategies and materials to use in seeking answers to questions.	Y	Y	P	B1, B1a,B1b, B2, B2a,B2b,	Y	5	1,3,5
3. Use results in a purposeful way, which includes making predictions based on patterns they have observed.	Y	P- no mention of predictions in 2007	N	B1, B1d, B2, B2d	Y	3, 4	1, 6
4. Identify products which were invented to solve a problem.	Y	Y	N	C2,C2a	Y	1	1
ELEMENTARY GRADES 3-4							
1. Make accurate observations using appropriate tools and units of measure.	Y	Y	N	A4,A4a, B1,B1c	Y	unclear	3
2. Conduct scientific investigations: make observations, collect and analyze data, and do experiments.	Y	Y	N	B1,B1a, B1b, B1c, B1d, B1e	Y	5 and unclear	1, 3
3. Use results in a purposeful way: design fair tests, make predictions based on observed patterns, and interpret data to make further predictions.	Y	P- 2007 makes no mention of making predictions	N	A1, A1b, A1c	Y	3	3
4. Design and build an invention.	Y	Y	N	B2,B2b	Y	5	5
5. Explain how differences in time, place, or experimenter can lead to different data.	N						
6. Explain how different conclusions can be derived from the same data.	Y	Y	N	B1,B1f	Y	2	1
MIDDLE GRADES 5-8							
1. Make accurate observations using appropriate tools and units of measure.	Y	Y	N	B1,B1c	Y	Unclear	3

2. Design and conduct scientific investigations which include controlled experiments and systematic observations. Collect and analyze data, and draw conclusions fairly.	Y	Y	N	B1,B1b, B1c, B1d, B1e	Y	5, ??	5, 3
3. Verify and evaluate scientific investigations and use the results in a purposeful way.	Y	P- no mention of verifying and evaluating investigations	N	B1,B1d	Y	6,3	3
4. Compare and contrast the processes of scientific inquiry and the technological method.	Y	Y	Y	C2,C2a	Y	5	5
5. Explain how personal bias can affect observations.	Y	Y	N	C4, C4c	N (9-D)	2	1
6. Design, construct, and test a device (invention) that solves a special problem.	Y	Y	N	B2,B2b, B2d, B2d	Y	5	5,6
SECONDARY GRADES							
1. Make accurate observations using appropriate tools and units of measure.	Y	Y	N	See Pk-2, 3-5 and 6-8	N	unclear	3
2. Verify, evaluate, and use results in a purposeful way. This includes analyzing and interpreting data, making predictions based on observed patterns, testing solutions against the original problem conditions, and formulating additional questions.	P- no mention of predictions in 2007	P- no mention of predictions in 2007	N	B1, B1b, B1c, B1e	Y	3, 6	2, 5
3. Demonstrate the ability to use scientific inquiry and technological method with short term and long term investigations, recognizing that there is more than one way to solve a problem. Demonstrate knowledge of when to try different strategies.	Y	Y	N	B1 and B2 inclusive	Y	unclear	1,2,3, 4, 5, 6
4. Design and construct a device to perform a specific function, then redesign for improvement (e.g., performance, cost).	Y	Y	N	B2, B2a, B2b, B2f	Y	5	1,5,6
K. SCIENTIFIC REASONING							
Students will learn to formulate and justify ideas and to make informed decisions. This involves framing and supporting arguments, recognizing patterns and relationships, identifying bias and stereotypes, brainstorming alternative explanations and solutions, judging accuracy, analyzing situations, and revising studies to improve their validity.	Y	Y	N	B1, B2	Y	undefined by standard	undefined by standard
ELEMENTARY GRADES Pre-K-2							
1. Examine strengths and weaknesses of simple arguments.	a larger idea	P	N	B1, B1e	Y	2	2, 4, 5, 6
2. Distinguish between important and unimportant information in simple arguments.	Y	Y	N	B1d	Y	2	2
3. Make observations.	Y	Y	N	A4a, B1a	Y	unclear	4
4. Participate in brainstorming activities.	N						

5. Use various forms of simple logic.	P- included in a larger idea	P- included in a larger idea	N	B1, B1d	Y		3	3
6. Discover relationships and patterns.	Y	Y	N	A2a, A2b	N (3-5)	unclear		2
ELEMENTARY GRADES 3-4								
1. Give alternative explanations for observed phenomena.	Y	Y	N	B1f	N(6-8)		2	1
2. Describe how feelings can distort reasoning.	N							
3. Draw conclusions about observations.	Y	Y	N	B1d	Y		3	3
4. Use various types of evidence (e.g., logical, quantitative) to support a claim.	Y	Y	N	B1, B1d	Y		3	3
5. Demonstrate an understanding that ideas are more believable when supported by good reasons.	P- no mention of believability	P	N	C1, C1a	Y	unclear		2
6. Practice and apply simple logic, intuitive thinking, and brainstorming.	P- no mention of intuitive thinking and brainstorming	P- no mention of intuitive thinking and brainstorming	N	B1,B1e, B1c	N(6-8)and 9-D		3	3
MIDDLE GRADES 5-8								
1. Examine the ways people form generalizations.	P- student make generalizations but do not examine the way it is done	P- student make generalizations but do not examine the way it is done	N	B1, B1e, B1f	Y		4	3, 4
2. Identify exceptions to proposed generalizations.	Y	Y	B	B1, B1e, B1f	Y		4	3,4
3. Identify basic informal fallacies in arguments.	N							
4. Analyze means of slanting information.	P	P	N	B1, B1e, B1f	Y		4	3,4
5. Identify stereotypes.	N							
6. Support reasoning by using a variety of evidence.	Y	P- no mention of a variety of evidence	N	B1, B1e	Y		3	3, 4
7. Show that proving a hypothesis false is easier than proving it true, and explain why.	N							
8. Construct logical arguments.	Y	Y	N	B1, B1e	Y		3	3, 4
9. Apply analogous reasoning.	Y- included in larger idea	Y	N					
SECONDARY GRADES								
1. Judge the accuracy of alternative explanations by identifying the evidence necessary to support them.	Y	P- no mention of the accuracy	N	B1, B1e	Y		6	1,5

2. Explain why agreement among people does not make an argument valid.	P- 2007 focuses on the defense of ideas using evidence, explanations, logical evidence and verifyable results	P-	N	B1, B1b	Y	2	2
3. Develop generalizations based on observations.	Y	Y	N	B1, B1c	Y	5	5
4. Determine when there is a need to revise studies in order to improve their validity through better sampling, controls or data analysis techniques.	Y	P- no specific mention of needing to revise for the improvement of validity	N	B1c	Y	6	3
5. Produce inductive and deductive arguments to support conjecture.	Y-included in a larger idea	Y	N	B1, B1b	Y	5	5
6. Analyze situations where more than one logical conclusion can be drawn.	Y	Y	N	B1e	Y	5	2, 5
L. COMMUNICATION							
Students will communicate effectively in the applications of science and technology. Clear and accurate communication employs appropriate symbols and terminology, models, and a variety of media and presentation styles. Communication includes constructing knowledge through reflection, evaluation, refocusing, and critically analyzing information from a variety of sources. Individuals and collaborative groups must communicate effectively.							
ELEMENTARY GRADES Pre-K-2							
1. Describe and compare things in terms of number, shape, texture, size, weight, color, and behavior.	Y	Y	Y	A2, A2a, A2b, A3a,A4a, D1b, D4a, E1a, E1b, E1c, E3a, E3b,E5a,	Y	2	2
2. Read and write instructions to be followed or instructions which explain procedures.	P- the mode of communication in the 2007 MLR is not prescribed	P	Y	B1, B1b	Y	5	5, 3

3. Ask clarifying questions.	P- clarifying questions are not specified	P	Y	B1, B1a	Y		3	3
4. Explain problem-solving processes using verbal, pictorial, and written methods.	Y	Y	Y	B1, B1e, B2, B2e	Y		2	3
5. Make and read simple graphs.	P- graphs are not specified	P	Y	B1, B1e	Y		5	5
6. Use objects and pictures to represent scientific and technological ideas.	Y	Y	Y	B1, B1e, B2, B2e	Y		5	5
ELEMENTARY GRADES 3-4							
1. Record results of experiments or activities (e.g., interviews, discussions, field work) and summarize and communicate what they have learned.	Y	Y	N	B1, B1e, B2, B2g	Y		2	2
2. Ask clarifying and extending questions.	P- clarifying questions are not specified	P	N	B1, B1a	Y		3	3
3. Reflect on work in science and technology using such activities as discussions, journals, and self-assessment.	Y	Y	N	B1, B1d, B1e, B2, B2e, B2f, B2g	Y	2,5	2,3,4,5,6
4. Make and/or use sketches, tables, graphs, physical representations, and manipulatives to explain procedures and ideas.	Y	Y	N	B1, B1d, B1e, B2, B2g	Y	3, 5	2, 3
5. Gather and effectively present information, using a variety of media including computers (e.g., spreadsheets, word processing, programming, graphics, modeling).	Y	Y	N	B1, B1d, B1e, B2, B2g	Y	2, 3	2,3
6. Cite examples of bias in information sources and question the validity of information from varied sources.	N						
7. Function effectively in groups within various assigned roles (e.g., reader, recorder).	N						
MIDDLE GRADES 5-8							
1. Discuss scientific and technological ideas and make conjectures and convincing arguments.	Y	Y	N	B1, B1g, B2, B2g	Y	unclear	2,3
2. Defend problem-solving strategies and solutions.	Y	Y	N	B1, B1e, B2, B2c	y	unclear	2,3
3. Evaluate individual and group communication for clarity, and work to improve communication.	P- focus in 2007 MLR is to improve the ideas, part of a larger idea	P	N	B1, B1f, B2, B2e,b2f	Y		6	6,5

4. Make and use scale drawings, maps, and three-dimensional models to represent real objects, find locations, and describe relationships.	Y	Y	N	A2, A2a, A2b, A4, A41B1, B1d, B2, B2c, B2g	Y	3,5	2,3,4,5,
5. Access information at remote sites using telecommunications.	Y- part of a larger idea	Y	N	B2, B2c	Y	3	3
6. Identify and perform roles necessary to accomplish group tasks.	N						
SECONDARY GRADES							
1. Analyze research or other literature for accuracy in the design and findings of experiments.	Y	Y	N	B1, B1c, B1e	Y	4	1,4
2. Use journals and self-assessment to describe and analyze scientific and technological experiences and to reflect on problem-solving processes.	P- part of a larger idea about communicating ideas	P- part of a larger idea about communicating ideas	N	B1,B1f, B2, B2b, B2g	Y	2, 5	2, 5
3. Make and use appropriate symbols, pictures, diagrams, scale drawings, and models to represent and simplify real-life situations and to solve problems.	Y	Y	N	A2, B1, b1d, B1f, B2, B2d, B2g	Y	2, 4	2, 3, 6,
4. Employ graphs, tables, and maps in making arguments and drawing conclusions.	Y	Y	N	A2, B1, b1d, B1f, B2, B2d, B2g	Y	2, 4	2, 3, 6,
5. Critique models, stating how they do and do not effectively represent the real phenomenon.	Y	Y	N	A2,	Y	6	6
6. Evaluate the communication capabilities of new kinds of media (e.g., cameras with computer disks instead of film).	N						
7. Use computers to organize data, generate models, and do research for problem solving.	Y	Y	N	B1, B1d, B2, B2d	Y	3	3
8. Engage in a debate, on a scientific issue, where both points of view are based on the same set of information.	P-no specific mention of debate and no specific mention of same data set.	P-no specific mention of debate and no specific mention of same data set.	N	B1, B1f, B2, B2g, A2,	Y	3	3
M. IMPLICATIONS OF SCIENCE AND TECHNOLOGY							
Students will understand the historical, social, economic, environmental, and ethical implications of science and technology. Scientific and technological breakthroughs are influenced by prevailing beliefs and conditions which in turn are impacted by new ideas and inventions. By assessing the impacts of technological activity on the environment, students will develop their own sense of global stewardship.	Y	Y	N	C1, C2, C3, C4	N/A	undefined by standard	undefined by standard
ELEMENTARY GRADES Pre-K-2							

1. Describe how legends, stories, and scientific explanations are different ways in which people attempt to explain the world.	P	P	N	C1, C1a	Y	2	1
2. Describe at least two inventions, what they do, how they work, and how they have made life easier.	P	P	N	C2, C2a, C2b	Y	2	1
3. Identify commonly used resources, their sources, and where waste products go.	P- students should have learning experiences but no performance indicator	P- students should have learning experiences but no performance indicator	N	C3	Y	1	2
4. Demonstrate some practices for recycling and care of resources.	P- students should have learning experiences but no performance indicator	P- students should have learning experiences but no performance indicator	N	C3	Y	3	2
5. Explain how their lives would be different without specific inventions or scientific knowledge.	P -	P	N	C3, C2a	Y	2	1,2
ELEMENTARY GRADES 3-4							
1. Explore how cultures have found different technological solutions to deal with similar needs or problems (e.g., construction, clothing, agricultural tools and methods).	P - no specific mention of a cross-cultural comparison	P - no specific mention of a cross-cultural comparison	N	C3, C3a, C3b, C3c	Y	unclear	2
2. Investigate and describe the role of scientists and inventors.	Y	Y	N	C2, C2a	Y	2	2
3. Explore how technology (e.g., transportation, irrigation) has altered human settlement.	P- no specific mention of looking at effects on the context of human settlement	P- no specific mention of looking at effects on the context of human settlement	N	C3, C3a, C3b, C3c	Y	unclear	2
4. Explain practices for conservation in daily life, based on a recognition that renewable and non-renewable resources have limits.	P- not specific focus on the conservation practices	P- not specific focus on the conservation practices	N	C3, C3c	Y	2	1
MIDDLE GRADES 5-8							
1. Research and evaluate the social and environmental impacts of scientific and technological developments.	Y	Y	N	C3, C3a,C3b, C3c, C3d	Y	6	1,2

2. Describe the historical and cultural conditions at the time of an invention or discovery, and analyze the societal impacts of that invention.	Y	Y	N	C4, C4a, C4b, C4c	Y		2	2
3. Discuss the ethical issues surrounding a specific scientific or technological development.	Y	Y	N	C3, C3a, C3b, C3c(all at 9-D)	N- all at 9-D		2	2
4. Describe an individual's biological and other impacts on an environmental system.	Y	Y	N	C3, C3b,	Y		2	2
5. Identify factors that have caused some countries to become leaders in science and technology.	N							
6. Give examples of actions which may have expected or unexpected consequences that may be positive, negative, or both.	Y	Y	N	C3, C3a,C3b, C3c, C3d	Y		1	1, 2
7. Explain the connections between industry, natural resources, population, and economic development.	Y	Y	N	C3, C3a, C3c(all at 9-D)	N- all at 9-D		2	1,2
8. Recognize scientific and technological contributions of diverse people including women, different ethnic groups, races, and physically disabled.	Y	Y	N	C4, C4a,	Y		1	2
SECONDARY GRADES								
1. Examine the impact of political decisions on science and technology.	Y	Y	N	C3, C3b, C3c	Y	unclear		2
2. Demonstrate the importance of resource management, controlling environmental impacts, and maintaining natural ecosystems.	Y	Y	N	A1, A1a, A1b, A3, A4C3, C3a	Y	unclear	2,3	
3. Evaluate the ethical use or introduction of new scientific or technological developments.	Y	Y	N	C3, C3b, C3c	Y		6	2
4. Analyze the impacts of various scientific and technological developments.	Y	Y	N	C2, C2a, C2b	Y		4	2
5. Examine the historical relationships between prevailing cultural beliefs and breakthroughs in science and technology.	Y	Y	N	C4, C4c, C4b	Y	unclear		2
6. Research issues that illustrate the effects of technological imbalances and suggest some solutions.	Y	Y	N	C2, C2c	Y		5	1,2
Standards, PIs, Descriptors NOT found in 1997 document								
PK-2: B2d, C1ab, C2b, D2c, D2b, D4b,								
3-5: A1b, A3a, B2cde, C1b, C2a, D1bc, D2a, D3ac, D4b, E4a								
6-8: A1bc, B2a, C1ab, C2ab, D1a, D2ce, D3egk, D4bc, E1d, E3a, E4bc								
9-D: A2, A3, A4a, B2e, C1ab, C2b, C4a, D2d, D3c, D4ad, E4defg, E5c,								
% increase or decrease # of Standards								
13 to 5, 62% decrease								

% increase or decrease # of Performance Indicators							
PK-2: 51 to 17, 63% decrease							
3-5: 54 to 19, 65% decrease							
6-8: 75 to 19, 75% decrease							
9-D: 74 to 19, 76% decrease							