2016 Science Standards Review/Revision/Adoption Timeline		
Objective	**Details**	**Date of Completion**
Review of current national standards.	Participate in national review of Next Generation Science Standards and form teacher committees - Indiana participated in 2 cycles of review in 2012	2012
	Review process other states use for science standards adoption and modification of the Next Generation Science Standards - Currently 14 states have adopted NGSS and several other states have used NGSS with modifications, including Massachusetts, Arkansas, North Carolina	Ongoing
	Perform a correlational analysis of Indiana's 2010 standards and the NGSS	Jan-15
Define Review Groups	Grade band groups: K-2, 3-5, 6-8, Life Science, Chemistry, Physics, Earth and Space, Environmental, Adv. Science, Process Standards	Jan-15
	Stakeholder Groups: Public and Private School Teachers, K-12 Administrators, Higher Education (Both Scientists and Teacher Educators), Business and Industry, Parent and Community	Jan-15
	Management Structure: Work groups, Steering Committee, Team Leaders, College and Career Ready Committee, Overall Project Coordinator	Jan-15
Set-up Online Review Platform	Create Learning Connection Community and post the documents for review	January and February 2015
	Develop webinar explaining the process and how to use the Learning Connection Groups	Feb-15
	Develop application process for individuals who want to participate	
State Board of Education	Present standards review process to the State Board for their approval and feedback. Provide continuous updates on the process throughout as needed or requested.	Feb-15
HASTI Presentation: Standards Review Kick-off	Provide attendees with the correlation documents and solicit feedback	12-Feb-15
	Introduce the Standards Review Process and the groups needed	12-Feb-15
	Demonstrate the online groups	12-Feb-15
Applications	Review applications from participants and areas of expertise	Feb-15

For more information or questions, please contact:
Jeremy Eltz, jeltz@doe.in.gov, 317.232.9172

Develop Review Groups	Identify underrepresented areas (grade bands, content, areas of the state, stakeholder groups)	March 2015
	Webinar reviewing the process for each group and expected deliverables	March 2015
First round of revision	Expert groups will provide guidance on revisions, insertions, deletions. These groups will be guided by content and developmental experts with the latest research from the Framework for K12 Science Education, hold on-going webinars for each group to work through their revisions.	April-June 2015
Draft Development	Compile all reviewer feedback and drafts into one first round draft set of standards. Create site/survey for public comment.	July 2015
State Board of Education	Update on standards review process	August 5th
First round of public comment	Post standards to website for public comment	August 2015
	Compile usable comments and suggestions for each work group for next round of revision	August 2015
	Provide working groups with hard copies of public comment	August 2015
Second round of revision	Provide webinar explaining comments for revisions	September 2015
	Hold on-going webinars for each group to work through their revisions.	September 2015
	Continue work with content experts on revisions	September 2015
	Post standards to website for public comment	October 2015
Second round of public comment	Compile usable comments and suggestions for each work group for final revisions	October 2015
State Board of Education	Update on standards review process	November 2015
Final round of revision	Provide webinar explaining comments for revisions	November 2015
	Continue work with content experts on revisions	November 2015
College and Career Ready Committee Evaluation	Professionals from higher education, business, and industry will review the standards and determine if this prepares students for post-secondary success	December 2015
Resource determination and creation	Teams will begin creation and identification of resources	November - December 2015
	Alignment of resources with the standards	
State Board of Education	Standards will be presented to the State Board of Education for their approval	Between January and March 2016

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First Round Changes to the 2010 Indiana Science Standards

K-8: Most changes occurred in K-2; the biggest change will be the addition of computer science.

Kindergarten

Added

K.1.3 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

K.1.4 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.

K.3.3 Use observations to describe patterns of what plants and animals (including humans) need to survive.

Deleted

(2010) K.3.1 Observe and draw physical features of common plants and animals.
-Combined into K.3.2 and K.3.3

First

Added

1.1.2 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

1.1.3 Make observations using all senses as appropriate to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. Observe what material are used to make each piece.
-Modified from (2010) 1.1.2

1.1.5 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

1.1.6 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance

1.2.3 Use observations of the sun, moon and stars to describe patterns that can be predicted.

1.2.4 Make observations at different times of year to relate the amount of daylight to the time of year.

1.2.5 Use observations of the sun, moon, and stars to describe patterns that can be predicted.

1.4.2 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

1.4.3 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

1.4.4 Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light

1.4.5 Plan and conduct investigations to provide evidence that vibrating materials can make sounds and that sound can make materials vibrate.

Combined
(2010) 1.2.1 and 1.2.2 into 1.2.1 Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples. Choose, test and use tools to separate soil samples into component parts.

Removed
(2010) 1.2.4 Observe over time the effect of organisms like earthworms in the formation of soil from dead plants. Discuss the importance of earthworms in soil.
(2010) 1.4.1 Use all senses as appropriate to sort objects as being composed of materials that are naturally occurring, human made or a combination of the two.

Second

Added
2.1.1 Plan and conduct an investigation to describe and classify different kind of materials by their observable properties.

2.1.2 Test different materials to determine which materials have the properties that are best suited for an intended purpose.

2.1.3 Construct an argument with evidence that some changes caused by heating and cooling can be reversed and some cannot.

2.2.6 Develop a model to represent the shapes and kinds of land and bodies of water in an area.

2.2.7 Obtain information to identify where water is found on Earth and that it can be solid or liquid.

2.3.3 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

2.3.4 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Combined

(2010) 2.2.1 and 2.2.2 into 2.1.1 Plan and conduct an investigation to describe and classify different kind of materials by their observable properties.

Deleted

(2010) 2.1.4 Observe, sketch, demonstrate and compare how objects can move in different ways (e.g., straight, zig-zag, back-and-forth, rolling, fast and slow).

(2010) 2.1.5 Describe the position or motion of an object relative to a point of reference (e.g., background, another object).

(2010) 2.1.6 Observe, demonstrate, sketch and compare how applied force (i.e., push or pull) changes the motion of objects.

(2010) 2.1.7 Investigate the motion of objects when they are acted upon at a distance by forces like gravity and magnetism.

Third

Added

3.4. 3 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Deleted

(2010) 3.1.4 Investigate how light travels through the air and tends to maintain its direction until it interacts with some other object or material.

No other major changes, just rewording and more action/performance oriented standards.

Fourth

Added

4.2.6 Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

4.2.7 Use a calendar to record observations of the shape of the moon and the rising and setting times over the course of a month. Based on the observations, describe patterns in the moon cycle.

Combined (2010) 4.1.3 and (2010) 4.1.4 into 4.1.3 Construct a complete circuit through which an electrical current can pass as evidenced by the lighting of a bulb or ringing of a bell.

Deleted

(2010) 4.2.2 Describe how wind, water and glacial ice shape and reshape earth's land surface by eroding rock and soil in some areas and depositing them in other areas in a process that occurs over a long period of time.

No other major changes, just rewording and more action/performance oriented standards.

Fifth

Added

5.3.2 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Deleted
(2010) 5.2.2 Observe and use pictures to record how the sun appears to move across the sky in the same general way every day but rises and sets in different places as the seasons change.

(2010) 5.2.4 Use a calendar to record observations of the shape of the moon and the rising and setting times over the course of a month. Based on the observations, describe patterns in the moon cycle.

No other major changes, just rewording and more action/performance oriented standards.

Sixth

Deleted
(2010) 6.3.6 Recognize that food provides the energy for the work that cells do and is a source of the molecular building blocks that can be incorporated into a cell's structure or stored for later use.

No other major changes, just rewording and more action/performance oriented standards.

Seventh

Added
7.1.7: Apply Newton's Laws of Motion to demonstrate and describe the relationships between net force, speed and direction of motion.

Deleted
(2010) 7.1.6 Explain that forces have magnitude and direction and those forces can be added to determine the net force acting on an object.

No other major changes, just rewording and more action/performance oriented standards

Eighth

Added
8.1.3 Develop a model to explain why substances exist as gases, liquids or solids at a given temperature.

8.4.2: Investigate common synthetic materials (i.e.: plastics, composites, polyester, and alloys) to gain an understanding that synthetic materials do come from natural resources and have an impact on society.

Deleted
(2010) 8.4.2 Rank the strength of attractions among the particles of room-temperature materials.

No other major changes, just rewording and more action/performance oriented standards

High School: Most substantial changes occurred in Biology, Physics, and ICP. Biology pared down to essential knowledge and skills that would be needed for success in advanced sciences/ technical subjects or college. Physics and ICP were updated for the new research into Physics instruction. Chemistry and Earth &Space Science stayed very much the same. We are including Environmental Science this round of revisions which was not done in 2010.

Biology

Combined

Standards 1 and 2 into *Cellular Structure and Function*; Standards 5, 6, & 7 into *Inheritance and Variation in Traits*

Deleted- Seems like a lot, but several of these were combined into other standards and much of what was deleted is not essential knowledge for next level success as all of these standards are far too specific.

B.1.2 Understand that the shape of a molecule determines its role in the many different types of cellular processes (e.g., metabolism, homeostasis, growth and development, and heredity) and understand that the majority of these processes involve proteins that act as enzymes.

B. 1.3 Explain and give examples of how the function and differentiation of cells is influenced by their external environment (e.g., temperature, acidity and the concentration of certain molecules) and changes in these conditions may affect how a cell functions.

B.2.1 Describe features common to all cells that are essential for growth and survival. Explain their functions.

B.2.4 Explain that all cells contain ribosomes (the key sites for protein synthesis), where genetic material is decoded in order to form unique proteins.

B.2.5 Explain that cells use proteins to form structures (e.g., cilia, flagella), which allow them to carry out specific functions (e.g., movement, adhesion and absorption).

B.3.3 Recognize and describe that metabolism consists of all of the biochemical reactions that occur inside cells, which include the production, modification, transport, and exchange of materials that are required for the maintenance of life.

B.3.4 Describe how matter cycles through an ecosystem by way of food chains and food webs and how organisms convert that matter into a variety of organic molecules to be used in part in their own cellular structures.

B.4.4 Describe how climate, the pattern of matter and energy flow, the birth and death of new organisms, and the interaction between those organisms contribute to the long-term stability of an ecosystem.

B.6.2 Understand that most cells of a multicellular organism contain the same genes but develop from a single cell (e.g., a fertilized egg) in different ways due to differential gene expression.

B.6.3 Explain that in multicellular organisms the zygote produced during fertilization undergoes a series of cell divisions that lead to clusters of cells that go on to specialize and become the organism's tissues and organs.

B.6.5 Explain how in sexual reproduction that crossing over, independent assortment and random fertilization result in offspring that are genetically different from the parents.

B.7.1 Distinguish between dominant and recessive alleles and determine the phenotype that would result from the different possible combinations of alleles in an offspring.

B.7.2 Describe dominant, recessive, codominant, sex-linked, incompletely dominant, multiply allelic and polygenic traits and illustrate their inheritance patterns over multiple generations.
B.7.4 Explain the process by which a cell copies its DNA and identify factors that can damage DNA and cause changes in its nucleotide sequence.
B.7.5 Explain and demonstrate how inserting, substituting or deleting segments of a DNA molecule can alter a gene, how that gene is then passed to every cell that develops from it and how the results may be beneficial, harmful or have little or no effect on the organism.
B.8.1 Explain how anatomical and molecular similarities among organisms suggests that life on earth began as simple, one-celled organisms about 4 billion years ago and multicellular organisms evolved later.
B.8.2 Explain how organisms are classified and named based on their evolutionary relationships into taxonomic categories.
B.8.4 Understand that molecular evidence supports the anatomical evidence for these evolutionary relationships and provides additional information about the order in which different lines of descent branched.
B.8.6 Explain how genetic variation within a population (i.e., a species) can be attributed to mutations as well as random assortments of existing genes.

Chemistry

Added

C.1.8 Demonstrate an understanding of accuracy and precision and calculate a percent error given the appropriate information.

C.4.7 Apply lab data to determine the empirical and molecular formula of a compound.

Modified

C.4.1 Describe, classify and give examples of various kinds of reactions: synthesis (i.e., combination), decomposition, single displacement, double displacement, acid/base, and combustion.

-Added: C.4.2 Predict products of simple reactions as listed in C.4.1.

Deleted

C.4.6 Determine oxidation states and identify the substances gaining and losing electrons in redox reactions.

C.7.5 Explain how the rate of a reaction is qualitatively affected by changes in concentration, temperature, surface area and the use of a catalyst.

C.7.6 Write equilibrium expressions for reversible reactions.

C.8.5 From acid-base titration data, calculate the concentration of an unknown solution.

C.9.2 Illustrate the variety of molecular types formed by the covalent bonding of carbon atoms and describe the typical properties of these molecular types.

Earth and Space Science

Added

ES. 1.1: Construct an explanation detailing how observers can study space by observing all frequencies of the electromagnetic radiation with differentiated telescopes and observational tools.

ES.1.5 Construct a diagram illustrating the hierarchical relationship and scales of stars, planetary systems including multiple-star systems, star clusters, galaxies and galactic groups in the universe.

ES. 2.5: Construct an explanation that details how scientific theory changes over time with the introduction of new information and observational data. Use works from ancient Greeks such as Ptolemy, and other astronomers including Copernicus, Brahe, Kepler, and Galileo to demonstrate the effect of observational data and scientific discussion on our understanding of the mechanics and motion of our solar system.

ES 4.4: Create a model to demonstrate how the Coriolis Effect influences the global circulation of the atmosphere. Explain how changes in the circulation of the atmosphere and oceans can create events such as El Nino and La Nina.

E.S. 6.8: Create an action plan detailing what to do in an emergency if an earthquake occurred near the school or home. Detail what should be kept in an earthquake preparation kit, how we can prepare homes for earthquake safety, and what actions should we take during and after an earthquake to ensure personal safety.

Deleted

ES.3.4 Recognize that fundamental physical and chemical laws control past, present and future dynamic interactions between and within Earth systems.

Physics and ICP: This was almost a complete rewrite to address the new research into Physics First and Modeling instruction.

Environmental Science: Was not included in the 2010 standards, are included this year but will be using the 2000 set of standards as the basis for public comment.

BIOLOGY 1	
Indiana's 2010 Academic Standards	**Revised 2016**
2010 Standard 1: Cellular Chemistry	**Standard 1: Cellular Structure and Function**
B.1.1 Describe the structure of the major categories of organic compounds that make up living organisms in terms of their building blocks and the small number of chemical elements (i.e., carbon, hydrogen, nitrogen, oxygen, phosphorous and sulfur) from which they are composed.	**Construct an explanation based on evidence for how chemical elements (i.e. carbon, hydrogen, oxygen, nitrogen, phosphorus and sulfur) can combine to form essential biological macromolecules (carbohydrates, lipids, protens and nucleic acids) whose shapes determine their roles in different types of cellular processes (e.g., metabolism, homeostasis, growth and development, and heredity).**
B.1.2 Understand that the shape of a molecule determines its role in the many different types of cellular processes (e.g., metabolism, homeostasis, growth and development, and heredity) and understand that the majority of these processes involve proteins that act as enzymes.	
B. 1.3 Explain and give examples of how the function and differentiation of cells is influenced by their external environment (e.g., temperature, acidity and the concentration of certain molecules) and changes in these conditions may affect how a cell functions.	
Standard 2: Cellular Structure	**2010 Standards 1 & 2 merged into 2016 Standard 1**
B.2.1 Describe features common to all cells that are essential for growth and survival. Explain their functions.	
B.2.2 Describe the structure of a cell membrane and explain how it regulates the transport of materials into and out of the cell and prevents harmful materials from entering the cell.	**B.1.2 Develop and use models that illustrate how a cell membrane regulates the uptake of materials essential for growth and survival while removing or preventing harmful materials from accumulating through the processes of active and passive transport.**
B.2.3 Explain that most cells contain mitochondria (the key sites of cellular respiration), where stored chemical energy is converted into useable energy for the cell. Explain that some cells, including many plant cells, contain chloroplasts (the key sites of photosynthesis) where the energy of light is captured for use in chemical work.	**B.1.3 Develop and use models to illustrate how specialized structures within cells (nuclei, ribosomes, Golgi, endoplasmic reticulum) interact to produce, modify and transport proteins.**
B.2.4 Explain that all cells contain ribosomes (the key sites for protein synthesis), where genetic material is decoded in order to form unique proteins.	
B.2.5 Explain that cells use proteins to form structures (e.g., cilia, flagella), which allow them to carry out specific functions (e.g., movement, adhesion and absorption).	

B.2.6 Investigate a variety of different cell types and relate the proportion of different organelles within these cells to their functions.	**B.1.4 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.**
Standard 3: Matter Cycles and Energy Transfer	**Standard 2: Matter Cycles and Energy Transfer**
B.3.1 Describe how some organisms capture the sun's energy through the process of photosynthesis by converting carbon dioxide and water into high-energy compounds and releasing oxygen.	**B.2.1 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.**
B.3.2 Describe how most organisms can combine and recombine the elements contained in sugar molecules into a variety of biologically essential compounds by utilizing the energy from cellular respiration.	**B.2.2 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.**
B.3.3 Recognize and describe that metabolism consists of all of the biochemical reactions that occur inside cells, which include the production, modification, transport, and exchange of materials that are required for the maintenance of life.	
B.3.4 Describe how matter cycles through an ecosystem by way of food chains and food webs and how organisms convert that matter into a variety of organic molecules to be used in part in their own cellular structures.	
B.3.5 Describe how energy from the sun flows through an ecosystem by way of food chains and food webs and how only a small portion of that energy is used by individual organisms while the majority is lost as heat.	**B.2.4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.**
Standard 4: Interdependence	**Standard 3: Interdependence**
B.4.1 Explain that the amount of life environments can support is limited by the available energy, water, oxygen and minerals and by the ability of ecosystems to recycle the remains of dead organisms.	**B.3.1 Use mathematical and/or computational representation to explain why the carrying capacity ecosystems can support is limited by the available energy, water, oxygen and minerals and by the ability of ecosystems to recycle the remains of dead organisms.**
B.4.2 Describe how human activities and natural phenomena can change the flow and of matter and energy in an ecosystem and how those changes impact other species.	**B.3.2. Design, evaluate, and refine a model which shows how human activities and natural phenomena can change the flow of matter and energy in an ecosystem and how those changes impact the environment and biodiversity of populations in ecosystems of different scales, as well as how these human impacts can be reduced.**

B.4.3 Describe the consequences of introducing non-native species into an ecosystem and identify the impact it may have on that ecosystem.	**B.3.3 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, and identify the impact of changing conditions or introducing non-native species into that ecosystem.**
B.4.4 Describe how climate, the pattern of matter and energy flow, the birth and death of new organisms, and the interaction between those organisms contribute to the long-term stability of an ecosystem.	
Standard 5: Molecular Basis of Heredity	**Standard 4: Inheritance and Variation in Traits**
B.5.1 Describe the relationship between chromosomes and DNA along with their basic structure and function.	**B.4.1 Develop and revise a model that clarifies the relationship between DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.**
B.5.2 Describe how hereditary information passed from parents to offspring is encoded in the regions of DNA molecules called genes.	
B.5.3 Describe the process by which DNA directs the production of protein within a cell.	**B.4.2 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.**
B.5.4 Explain how the unique shape and activity of each protein is determined by the sequence of its amino acids.	**B.4.3 Construct a model to explain that the unique shape and function of each protein is determined by the sequence of its amino acids, and thus is determined by the sequence of the DNA that codes for this protein.**
B.5.5 Understand that proteins are responsible for the observable traits of an organism and for most of the functions within an organism.	
B.5.6 Recognize that traits can be structural, physiological or behavioral and can include readily observable characteristics at the organismal level or less recognizable features at the molecular and cellular level.	
Standard 6: Cellular Reproduction	**2010 Standards 5, 6, & 7 merged into 2015 Standard 4**
B.6.1 Describe the process of mitosis and explain that this process ordinarily results in daughter cells with a genetic make-up identical to the parent cells.	**B.4.4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.**
B.6.2 Understand that most cells of a multicellular organism contain the same genes but develop from a single cell (e.g., a fertilized egg) in different ways due to differential gene expression.	

B.6.3 Explain that in multicellular organisms the zygote produced during fertilization undergoes a series of cell divisions that lead to clusters of cells that go on to specialize and become the organism's tissues and organs.	
B.6.4 Describe and model the process of meiosis and explain the relationship between the genetic make-up of the parent cell and the daughter cells (i.e., gametes).	**B.4.5 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.**
B.6.5 Explain how in sexual reproduction that crossing over, independent assortment and random fertilization result in offspring that are genetically different from the parents.	
Standard 7: Genetics	
B.7.1 Distinguish between dominant and recessive alleles and determine the phenotype that would result from the different possible combinations of alleles in an offspring.	
B.7.2 Describe dominant, recessive, codominant, sex-linked, incompletely dominant, multiply allelic and polygenic traits and illustrate their inheritance patterns over multiple generations.	
B.7.3 Determine the likelihood of the appearance of a specific trait in an offspring given the genetic make-up of the parents.	**B.4.6 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population**
B.7.4 Explain the process by which a cell copies its DNA and identify factors that can damage DNA and cause changes in its nucleotide sequence.	
B.7.5 Explain and demonstrate how inserting, substituting or deleting segments of a DNA molecule can alter a gene, how that gene is then passed to every cell that develops from it and how the results may be beneficial, harmful or have little or no effect on the organism.	
Standard 8: Evolution	**Standard 5: Evolution**
B.8.1 Explain how anatomical and molecular similarities among organisms suggests that life on earth began as simple, one-celled organisms about 4 billion years ago and multicellular organisms evolved later.	
B.8.2 Explain how organisms are classified and named based on their evolutionary relationships into taxonomic categories.	

B.8.3 Use anatomical and molecular evidence to establish evolutionary relationships among organisms.	**B.5.1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence including both anatomical and molecular evidence.**
B.8.4 Understand that molecular evidence supports the anatomical evidence for these evolutionary relationships and provides additional information about the order in which different lines of descent branched.	
B.8.5 Describe how organisms with beneficial traits are more likely to survive, reproduce, and pass on their genetic information due to genetic variations, environmental forces and reproductive pressures.	**B.5.2 Apply concepts of statistics and probability to support a claim that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. Evaluate evidence to explain the role of natural selection as an evolutionary mechinism that leads to the adaptation of species, and to support claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and/or (3) the extinction of other species.**
B.8.6 Explain how genetic variation within a population (i.e., a species) can be attributed to mutations as well as random assortments of existing genes.	
B.8.7 Describe the modern scientific theory of the origins and history of life on earth and evaluate the evidence that supports it.	**B.5.3 Analyze and interpret data for patterns in the fossil record and molecular data that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.**

Process Standards (Same for 2010 and 2016)

Develop explanations based on reproducible data and observations gathered during laboratory investigations.

Recognize that their explanations must be based both on their data and other known information from investigations of others.

Clearly communicate their ideas and results of investigations verbally and in written form using tables, graphs, diagrams and photographs.

Regularly evaluate the work of their peers and in turn have their work evaluated by their peers.

Apply standard techniques in laboratory investigations to measure physical quantities in appropriate units and convert quantities to other units as necessary.

Use analogies and models (mathematical and physical) to simplify and represent systems that are difficult to understand or directly experience due to their size, time scale or complexity. Recognize the limitations of analogies and models.

Focus on the development of explanatory models based on their observations during laboratory investigations.

Explain that the body of scientific knowledge is organized into major theories, which are derived from and supported by the results of many experiments and allow us to make testable predictions.

Recognize that new scientific discoveries often lead to a re-evaluation of previously accepted scientific knowledge and of commonly held ideas.

Describe how scientific discoveries lead to the development of new technologies and conversely how technological advances can lead to scientific discoveries through new experimental methods and equipment.

Explain how scientific knowledge can be used to guide decisions on environmental and social issues.