Agriculture-Related Standards Database

This database was created in 2014 by Amy Jones, Plant Sciences Recruitment and Outreach Coordinator at Purdue University's College of Agriculture. Jeff Sanson, member of the College of Agriculture's PK-12 Council & Executive Director of the Indiana Council for Economic Education, provided the economics and personal finance standards. This document is intended to be utilized by faculty and staff in Purdue's College of Agriculture who engage with PK-12 audiences. This document makes navigating Indiana learning standards easier by allowing the use of a simple keyword search to efficiently find standards in order to align activities with them.

Table of Contents

Introduction to Indiana's Academic Standards for Science – 2010

Indiana's Academic Standards for Science were last revised in 2000. This new document, Indiana's Academic Standards for Science – 2010, reflects the ever-changing science content and the underlying premise that science education should be an inquiry-based, hands-on experience. These standards were adopted by the Indiana State Board of Education in April, 2010, and will be implemented in the 2011-12 school year.

Indiana's Academic Standards for Science – 2010 reflect a few significant changes that are worth noting. Primarily, there are fewer standards and each grade level focuses on the big ideas for each of these sub-disciplines: physical science; earth science; life science; and science, technology and engineering. The overarching organization of the standards has also changed; they are divided into two sections: Process Standards and Content Standards, which are described in greater detail below.

Process Standards

The Process Standards are the processes and skills that students are expected to learn and be able to do within the context of the science content. The separation of the Process Standards from the Content Standards is intentional; in doing so we want to make explicit the idea that what students are doing while they are learning science is extremely important. The Process Standards reflect the way in which students are learning and doing science and are designed to work in tandem with the science content, resulting in robust instructional practice.

The Process Standards are organized in the following grade bands: K-2, 3-5, 6-8. Within each grade band, the Process Standards address a particular topic or topics. Kindergarten introduces The Nature of Science, while grades 1 through 5, reflect two parts: The Nature of Science and The Design Process. In grades 6 through 8, Reading for Literacy in Science and Writing for Literacy in Science have been added to emphasize these processes in science. For high school, the Process Standards include Reading and Writing for Literacy in Science as well as The Nature of Science.

As noted in the previous paragraph, grades 6 through 8 and high school content courses will include Reading and Writing for Literacy in Science. It is important to note that these Process Standards emerged with the adoption of the Common Core State Standards in the area of Reading and Writing for Literacy in Science. The Literacy Standards establish that instruction in reading, writing, speaking, listening, and language is a shared responsibility. The Literacy Standards are predicated on teachers in the content areas using their unique disciplinary expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the literacy standards are meant to complement rather than supplant content standards in the disciplines.

Part of the motivation behind the disciplinary approach to literacy promulgated by the Literacy Standards is extensive research establishing the need for college- and career-ready students

to be proficient in reading complex informational text independently in a variety of content areas. Most of the required reading in college and workforce training programs is informational in structure and challenging in content. Postsecondary education programs typically provide students with both a higher volume of such reading than is generally required in K-12 schools and comparatively little scaffolding.

The Literacy Standards make clear that significant reading of informational texts should also take place outside ELA classrooms in order for students to be ready for college and careers. Future assessments will apply the sum of all the reading students do in a grade, not just their reading in the ELA context. The Literacy Standards demand that a great deal of reading should occur in all disciplines.

The Literacy Standards also cultivate the development of three mutually reinforcing writing capacities: writing to persuade, to explain, and to convey real or imagined experience.

College and career readiness requires that writing focus significantly on writing to argue and to inform or explain.

The Literacy Standards use grade level bands to present the standards. Teachers teaching at the beginning of the grade band may need to provide scaffolding for students to be successful, where teachers teaching at the end of the grade band should expect students to demonstrate the standards independently.

Content Standards

In grades 1 through 8, the Content Standards are organized in four distinct areas: 1) physical science; 2) earth science; 3) life science; and 4) science, technology and engineering.

Kindergarten has only the first three areas: physical, earth and life science. In each of these areas there is at least one core standard, which serves as the big idea at that grade level for that content area. For the high school science courses, the content standards are organized around the core ideas in each particular course, which are represented by the core standard. The core standard is not meant to stand alone or be used as an individual standard, but instead is meant to help teachers organize their instruction around the —big ideas in that content area and for grades K-8, at that particular grade level. Beneath each core standard are indicators which serve as the more detailed expectations within each of the content areas.

Finally, in the development of these revised science standards, careful attention was paid to how ideas are articulated across the grade levels so that content and skills that students will need to succeed in a particular sub-discipline are introduced in an appropriate manner in the early elementary grades and then progressed as students move towards high school.

The Nature of Science
Scientific knowledge is scientists' best explanations for the data from many investigations. Ideas about objects in the microscopic world that we cannot directly sense are often understood in terms of concepts developed to understand objects in the macroscopic world that we can see and touch. Student work should align with this process of science and should be guided by those principles. Students should also understand that scientific knowledge is gained from observation of natural phenomena and experimentation by designing and conducting investigations guided by theory and by evaluating and communicating the results of those investigations according to accepted procedures. These concepts should be woven throughout daily work.
1. Develop explanations based on reproducible data and observations gathered during laboratory investigations.
2. Recognize that their explanations must be based both on their data and other known information from investigations of others.
3. Clearly communicate their ideas and results of investigations verbally and in written form using tables, graphs, diagrams and photographs.
4. Regularly evaluate the work of their peers and in turn have their work evaluated by their peers.
5. Apply standard techniques in laboratory investigations to measure physical quantities in appropriate units and convert quantities to other units as necessary.
6. 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.
7. Focus on the development of explanatory models based on their observations during laboratory investigations.
8. 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.
9. Recognize that new scientific discoveries often lead to a re-evaluation of previously accepted scientific knowledge and of commonly held ideas.
10. 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.
11. Explain how scientific knowledge can be used to guide decisions on environmental and social issues.

K-8 Physical Science

Grade	Standard Code	Standard Description
K	K.1.1	Use all senses as appropriate to observe, sort and describe objects according to their composition and physical properties, such as size, color and shape. Explain these choices to others and generate questions about the objects.
K	K.1.2	Identify and explain possible uses for an object based on its properties and compare these uses with other students' ideas.
1	1.1.1	Use all senses as appropriate to identify the component parts of objects and the materials from which they are made.
1	1.1.2	Characterize materials as solid or liquid, investigate their properties, record observations and explain the choices to others based on evidence (i.e., physical properties).
1	1.1.3	Experiment with simple methods for separating solids and liquids based on their physical properties.
2	2.1.1	Observe, describe and measure ways in which the properties of a sample of water (including volume) change or stay the same as the water is heated and cooled and then transformed into different states.
2	2.1.2	Predict the result of combining solids and liquids in pairs. Mix; observe, gather, record and discuss evidence of whether the result may have different properties than the original materials.
2	2.1.3	Predict and experiment with methods (e.g. sieving, evaporation) to separate solids and liquids based on their physical properties.
2	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).
2	2.1.5	Describe the position or motion of an object relative to a point of reference (e.g., background, another object).
2	2.1.6	Observe, demonstrate, sketch and compare how applied force (i.e., push or pull) changes the motion of objects.
2	2.1.7	Investigate the motion of objects when they are acted upon at a distance by forces like gravity and magnetism.
3	3.1.1	Generate sounds using different materials, objects and techniques. Record the sounds and then discuss and share the results.
3	3.1.2	Investigate how the loudness and pitch of sound changes when the rate of vibrations changes.
3	3.1.3	Investigate and recognize that sound moves through solids, liquids and gases (e.g., air).
3	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.

3	3.1.5	Observe and describe how light is absorbed, changes its direction, is reflected back and passes through objects. Observe and describe that a shadow results when light cannot pass through an object.
3	3.1.6	Describe evidence to support the idea that light and sound are forms of energy.
4	4.1.1	Describe and investigate the different ways in which heat can be generated.
4	4.1.2	Investigate the variety of ways in which heat can be generated and moved from one place to another. Explain the direction the heat moved.
4	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.
4	4.1.4	Experiment with materials to identify conductors and insulators of heat and electricity.
4	4.1.5	Demonstrate that electrical energy can be transformed into heat, light, and sound.
5	5.1.1	Describe and measure the volume and weight of a sample of a given material.
5	5.1.2	Describe the difference between weight and mass. Understand that weight is dependent on gravity and mass is the amount of matter in a given substance or material.
5	5.1.3	Demonstrate that regardless of how parts of an object are assembled the weight of the whole object is identical to the sum of the weight of the parts; however, the volume can differ from the sum of the volumes.
5	5.1.4	Determine if matter has been added or lost by comparing weights when melting, freezing or dissolving a sample of a substance.
6	6.1.1	Understand that the properties and behavior of matter can be explained by a model that depicts particles representing atoms or molecules in motion.
6	6.1.2	Explain the properties of solids, liquids and gases using drawings and models that represent matter as particles in motion whose state can be represented by the relative positions and movement of the particles.
6	6.1.3	Using a model in which matter is composed of particles in motion, investigate that when substances undergo a change in state, mass is conserved.
6	6.1.4	Recognize that objects in motion have kinetic energy and objects at rest have potential energy.
6	6.1.5	Describe with examples that potential energy exists in several different forms (e.g., gravitational potential energy, elastic potential energy and chemical potential energy).
6	6.1.6	Compare and contrast potential and kinetic energy and how they can be transformed from one form to another.
6	6.1.7	Explain that energy may be manifested as heat, light, electricity, mechanical motion, and sound and is often associated with chemical reactions.
7	7.1.1	Explain that when energy is transferred from one system to another, the total quantity of energy does not change.

7	7.1.2	Describe and give examples of how energy can be transferred from place to place and transformed from one form to another through radiation, convection and conduction.
7	7.1.3	Recognize and explain how different ways of obtaining, transforming and distributing energy have different environmental consequences.
7	7.1.4	Recognize and provide evidence of how light, sound and other waves have energy and how they interact with different materials.
7	7.1.5	Describe and investigate how forces between objects—such as magnetic, electrical or gravitational forces—can act at a distance or by means of direct contact between objects.
7	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.
7	7.1.7	Demonstrate and describe how an object's speed or direction of motion changes when a force acts upon it. Demonstrate and describe that an object's speed and direction of motion remain unchanged if the net force acting upon it is zero.
8	8.1.1	Explain that all matter is composed of particular arrangements of atoms and that there are approximately one hundred types of atoms (i.e., elements).
8	8.1.2	Understand that elements are organized on the periodic table based on atomic number.
8	8.1.3	Explain how the arrangement of atoms and molecules determines chemical properties of substances.
8	8.1.4	Describe the structure of atoms and relate the arrangement of electrons to how atoms interact with other atoms.
8	8.1.5	Explain that atoms join together to form molecules and compounds and illustrate with diagrams the relationship between atoms and compounds and between atoms and molecules.
8	8.1.6	Explain that elements and compounds have characteristic properties such as density, boiling points and melting points that remain unchanged regardless of sample size.
8	8.1.7	Explain that chemical changes occur when substances react and form one or more different products, whose physical and chemical properties are different from those of the reactants.
8	8.1.8	Demonstrate that in a chemical change the total numbers of each kind of atom in the product are the same as in the reactants and that the total mass of the reacting system is conserved.

K-8 Earth Space Science

Grade	Standard Code	Standard Description
K	K.2.1	Observe and record during sunny days when the sun shines on different parts of the school building.
K	K.2.2	Describe and compare objects seen in the night and day sky.
K	K.2.3	Describe in words and pictures the changes in weather from month to month and season to season.
1	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.
1	1.2.2	Choose, test and use tools to separate soil samples into component parts.
1	1.2.3	Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.
1	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.
2	2.2.1	Construct and use tools to observe and measure weather phenomena like precipitation, changes in temperature, wind speed and direction.
2	2.2.2	Experience and describe wind as the motion of the air.
2	2.2.3	Chart or graph weather observations such as cloud cover, cloud type and type of precipitation on a daily basis over a period of weeks.
2	2.2.4	Ask questions about charted observations and graphed data. Identify the day-to-day patterns and cycles of weather. Understand seasonal time scales in terms of temperature and amounts of rainfall and snowfall.
2	2.2.5	Ask questions and design class investigations on the effect of the sun heating the surface of the earth.
2	2.2.6	Learn about, report on and practice severe weather safety procedures.
2	2.2.7	Investigate how the sun appears to move through the sky during the day by observing and drawing the length and direction of shadows.
2	2.2.8	Investigate how the moon appears to move through the sky during the day by observing and drawing its location at different times.
2	2.2.9	Investigate how the shape of the moon changes from day to day in a repeating cycle that lasts about a month.
3	3.2.1	Examine the physical properties of rock samples and sort them into categories based on size using simple tools such as sieves.
3	3.2.2	Observe the detailed characteristics of rocks and minerals. Identify rocks as being composed of different combinations of minerals.
3	3.2.3	Classify and identify minerals by their physical properties of hardness, color, luster and streak.

3	3.2.4	Identify fossils and describe how they provide evidence about the plants and animals that lived long ago and the nature of their environment at that time.
3	3.2.5	Describe natural materials and give examples of how they sustain the lives of plants and animals.
3	3.2.6	Describe how the properties of earth materials make them useful to humans in different ways. Describe ways that humans have altered these resources to meet their needs for survival.
4	4.2.1	Demonstrate and describe how smaller rocks come from the breakage and weathering of larger rocks in a process that occurs over a long period of time.
4	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.
4	4.2.3	Describe how earthquakes, volcanoes and landslides suddenly change the shape of the land.
4	4.2.4	Investigate earth materials that serve as natural resources and gather data to determine which ones are limited by supply.
4	4.2.5	Describe methods that humans currently use to extend the use of natural resources.
4	4.2.6	Describe ways in which humans have changed the natural environment. Explain if these changes have been detrimental or beneficial.
5	5.2.1	Recognize that our earth is part of the solar system in which the sun, an average star, is the central and largest body. Observe that our solar system includes the sun, moon, seven other planets and their moons, and many other smaller objects like asteroids and comets.
5	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.
5	5.2.3	In monthly intervals, observe and draw the length and direction of shadows cast by the sun at several chosen times during the day. Use the recorded data as evidence to explain how those shadows were affected by the relative position of the earth and sun.
5	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.
6	6.2.1	Describe and model how the position, size and relative motions of the earth, moon and sun cause day and night, solar and lunar eclipses, and phases of the moon.
6	6.2.2	Recognize that gravity is a force that keeps celestial bodies in regular and predictable motion, holds objects to earth's surface and is responsible for tides.
6	6.2.3	Understand that the sun, an average star where nuclear reactions occur, is the central and largest body in the solar system.

6	6.2.4	With regard to their size, composition, distance from sun, surface features and ability to support life, compare and contrast the planets of the solar system with one another and with asteroids and comets.
6	6.2.5	Demonstrate that the seasons in both hemispheres are the result of the inclination of the earth on its axis, which causes changes in sunlight intensity and length of day.
7	7.2.1	Describe how the earth is a layered structure composed of lithospheric plates, a mantle and a dense core.
7	7.2.2	Recognize that the earth possesses a magnetic field that is detectable at the surface with a compass.
7	7.2.3	Characterize the immensity of geologic time and recognize that it is measured in eras and epochs.
7	7.2.4	Explain how convection currents in the mantle cause lithospheric plates to move and cause fast changes like earthquakes and volcanic eruptions and slow changes like the creation of mountains and formation of new ocean floors.
7	7.2.5	Describe the origin and physical properties of igneous, metamorphic and sedimentary rocks and how they are related through the rock cycle.
7	7.2.6	Describe physical and chemical characteristics of soil layers and how they are influenced by the process of soil formation (including the action of bacteria, fungi, insects and other organisms).
7	7.2.7	Use geological features such as karst topography and glaciation to explain how large- scale physical processes have shaped the land.
7	7.2.8	Compare and contrast fossils with living organisms in a given location to explain how earth processes have changed environments over time.
8	8.2.1	Recognize and demonstrate how the sun's energy drives convection in the atmosphere and in bodies of water, which results in ocean currents and weather patterns.
8	8.2.2	Describe and model how water moves through the earth's crust, atmosphere and oceans in a cyclic way as a liquid vapor and solid.
8	8.2.3	Describe the characteristics of ocean currents and identify their effects on weather patterns.
8	8.2.4	Describe the physical and chemical composition of the atmosphere at different elevations.
8	8.2.5	Describe the conditions that cause Indiana weather and weather-related events such as tornadoes, lake effect snow, blizzards, thunderstorms and flooding.
8	8.2.6	Identify, explain and discuss some effects human activities (e.g., air, soil, light, noise and water pollution) have on the biosphere.
8	8.2.7	Recognize that some of Earth's resources are finite and describe how recycling, reducing consumption and the development of alternatives can reduce the rate of their depletion.
8	8.2.8	Explain that human activities, beginning with the earliest herding and agricultural activities, have drastically changed the environment and have affected the capacity of the environment to support native species. Explain

		current efforts to reduce and eliminate these impacts and encourage sustainability.

K-8 Life Science

Grade	Standard Code	Standard Description
K	K.3.1	Observe and draw physical features of common plants and animals.
K	K.3.2	Describe and compare living animals in terms of shape, texture of body covering, size, weight, color and the way they move.
K	K.3.3	Describe and compare living plants in terms of growth, parts, shape, size, color and texture.
1	1.3.1	Classify living organisms according to variations in specific physical features (e.g., body coverings, appendages) and describe how those features may provide an advantage for survival in different environments.
1	1.3.2	Observe organisms closely over a period of time in different habitats such as terrariums, aquariums, lawns and trees. Draw and write about observations.
1	1.3.3	Observe and explain that plants and animals have basic needs for growth and survival: plants need to take in water and need light, and animals need to take in water and food and have a way to dispose of waste.
1	1.3.4	Describe how animals' habitats, including plants, meet their needs for food, water, shelter and an environment in which they can live.
1	1.3.5	Observe and describe ways in which animals and plants depend on one another for survival.
2	2.3.1	Observe closely over a period of time and then record in pictures and words the changes in plants and animals throughout their life cycles-including details of their body plan, structure and timing of growth, reproduction and death.
2	2.3.2	Compare and contrast details of body plans and structures within the life cycles of plants and animals.
3	3.3.1	Identify the common structures of a plant including its roots, stems, leaves, flowers, fruits and seeds. Describe their functions.
3	3.3.2	Investigate plant growth over time, take measurements in SI units, record the data and display the data in graphs. Examine factors that might influence plant growth.
4	4.3.1	Observe and describe how offspring are very much, but not exactly, like their parents or one another. Describe how these differences in physical characteristics among individuals in a population may be advantageous for survival and reproduction.
4	4.3.2	Observe, compare and record the physical characteristics of living plants or animals from widely different environments. Describe how each plant or animal is adapted to its environment.
4	4.3.3	Design investigations to explore how organisms meet some of their needs by responding to stimuli from their environments.

4	4.3.4	Describe a way that a given plant or animal might adapt to a change arising from a human or non-human impact on its environment.
5	5.3.1	Observe and classify common Indiana organisms as producers, consumers, decomposers, predator and prey based on their relationships and interactions with other organisms in their ecosystem.
5	5.3.2	Investigate the action of different decomposers and compare their role in an ecosystem with that of producers and consumers.
6	6.3.1	Describe specific relationships (i.e., predator and prey, consumer and producer, and parasite and host) between organisms and determine whether these relationships are competitive or mutually beneficial.
6	6.3.2	Describe how changes caused by organisms in the habitat where they live can be beneficial or detrimental to themselves or to native plants and animals.
6	6.3.3	Describe how certain biotic and abiotic factors—such as predators, quantity of light and water, range of temperatures and soil composition—can limit the number of organisms an ecosystem can support.
6	6.3.4	Recognize that plants use energy from the sun to make sugar (i.e., glucose) by the process of photosynthesis.
6	6.3.5	Describe how all animals, including humans, meet their energy needs by consuming other organisms, breaking down their structures, and using the materials to grow and function.
6	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.
7	7.3.1	Explain that all living organisms are composed of one cell or multiple cells and that the many functions needed to sustain life are carried out within cells.
7	7.3.2	Understand that water is a major component within all cells and is required to carry out many cellular functions.
7	7.3.3	Explain that, although the way cells function is similar in all living organisms, multicellular organisms have specialized cells whose specialized functions are directly related to their structure.
7	7.3.4	Compare and contrast similarities and differences among specialized sub cellular components within plant and animal cells (including organelles and cell walls that perform essential functions and give cells shape and structure).
7	7.3.5	Explain that cells in multicellular organisms repeatedly divide to make more cells for growth and repair.
7	7.3.6	Explain that after fertilization a small cluster of cells divides to form the basic tissues of an embryo and further develops into all the specialized tissues and organs within a multicellular organism.
7	7.3.7	Describe how various organs and tissues serve the needs of cells for nutrient and oxygen delivery and waste removal.
8	8.3.1	Explain that reproduction is essential for the continuation of every species and is the mechanism by which all organisms transmit genetic information.

8	8.3.2	Compare and contrast the transmission of genetic information in sexual and asexual reproduction.
8	8.3.3	Explain that genetic information is transmitted from parents to offspring mostly by chromosomes.
8	8.3.4	Understand the relationship between deoxyribonucleic acid (DNA), genes and chromosomes.
8	8.3.5	Identify and describe the difference between inherited traits and the physical and behavioral traits that are acquired or learned.
8	8.3.6	Observe anatomical structures of a variety of organisms and describe their similarities and differences. Use the data collected to organize the organisms into groups and predict their relatedness.
8	8.3.7	Recognize and explain that small genetic differences between parents and offspring can accumulate in successive generations so that descendants may be different from their ancestors.
8	8.3.8	Examine traits of individuals within a population of organisms that may give them an advantage in survival and reproduction in given environments or when the environments change.
8	8.3.9	Describe the effect of environmental changes on populations of organisms when their adaptive characteristics put them at a disadvantage for survival. Describe how extinction of a species can ultimately result from a disadvantage.
8	8.3.10	Recognize and describe how new varieties of organisms have come about from selective breeding.

K-8 Science, Engineering, and Technology

Grade	Standard Code	Standard Description
1	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.
1	1.4.2	Choose two animals that build shelters within their habitats. Compare the shelters in terms of the materials and tools they use and the type and purpose of shelter they provide.
1	1.4.3	Construct a simple shelter for an animal with natural and human-made materials.
2	2.4.1	Identify parts of the human body that can be used as tools—like hands for grasping and teeth for cutting and chewing.
2	2.4.2	Identify technologies developed by humans to meet human needs. Investigate the limitations of technologies and how they have improved quality of life.
2	2.4.3	Identify a need and design a simple tool to meet that need.
3	3.4.1	Choose and use the appropriate tools to estimate and measure length, mass and temperature in SI units.
3	3.4.2	Define the uses and types of simple machines and utilize simple machines in the solution to a "real world" problem.
4	4.4.1	Investigate transportation systems and devices that operate on or in land, water, air and space and recognize the forces (lift, drag, friction, thrust and gravity) that affect their motion.
4	4.4.2	Make appropriate measurements to compare the speeds of objects in terms of the distance traveled in a given amount of time or the time required to travel a given distance.
4	4.4.3	Investigate how changes in speed or direction are caused by forces: the greater the force exerted on an object, the greater the change.
4	4.4.4	Define a problem in the context of motion and transportation. Propose a solution to this problem by evaluating, reevaluating and testing the design. Gather evidence about how well the design meets the needs of the problem. Document the design so that it can be easily replicated.
5	5.4.1	Investigate technologies that mimic human or animal musculoskeletal systems in order to meet a need.

5	5.4.2	Investigate the purpose of prototypes and models when designing a solution to a problem and how limitations in cost and design features might affect their construction.
5	5.4.3	Design solutions to problems in the context of musculoskeletal body systems. Using suitable tools, techniques and materials, draw or build a prototype or model of a proposed design.
6	6.4.1	Understand how to apply potential or kinetic energy to power a simple device.
6	6.4.2	Construct a simple device that uses potential or kinetic energy to perform work.
6	6.4.3	Describe the transfer of energy amongst energy interactions.
7	7.4.1	Understand that energy is the capacity to do work.
7	7.4.2	Explain that energy can be used to do work using many processes (e.g., generation of electricity by harnessing wind energy).
7	7.4.3	Explain that power is the rate that energy is converted from one form to another.
7	7.4.4	Explain that power systems are used to provide propulsion for engineered products and systems.
8	8.4.1	Understand how the strength of attractive forces among particles in a material helps to explain many physical properties of the material, such as why different materials exist as gases, liquids or solids at a given temperature.
8	8.4.2	Rank the strength of attractions among the particles of room-temperature materials.
8	8.4.3	Investigate the properties (i.e., mechanical, chemical, electrical, thermal, magnetic and optical) of natural and engineered materials.

Biology I

Standard Topic	Standard Code	Standard Description
Standard 1: Cellular Chemistry		
Describe the basic molecular structure and function of the four major categories of organic compounds (carbohydrates, lipids, proteins and nucleic acids) essential to cellular function. (B.1.1)		
Describe how work done in cells is performed by a variety of organic molecules—especially proteins, whose functions depend on the sequence of their monomers and the consequent shape of the molecule. (B.1.2, B.1.3)		
Cellular Chemstry	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.
Cellular Chemstry	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
Cellular Chemstry	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		
Describe features that are common to all cells and contrast those with distinctive features that allow cells to carry out specific functions		
Cellular Structure	B.2.1	Describe features common to all cells that are essential for growth and survival. Explain their functions
Cellular Structure	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
Cellular Structure	B.2.3	B.2.1 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
Cellular Structure	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

Cellular Structure	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)
Cellular Structure	B.2.6	Investigate a variety of different cell types and relate the proportion of different organelles within these cells to their functions
Standard 3: Matter Cycles and Energy Transfer		
Describe how the sun's energy is captured and used to construct sugar molecules that can be used as a form of energy or serve as building blocks of organic molecules. (B.3.1, B.3.2, B.3.3)		
Diagram how matter and energy cycle through an ecosystem. (B.3.4, B.3.5)		
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
Matter Cycles and Energy Transfer	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
Matter Cycles and Energy Transfer	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
Matter Cycles and Energy Transfer	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
Matter Cycles and Energy Transfer	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
Standard 4: Interdependence		
Describe the relationship between living and nonliving components of ecosystems and describe how that relationship is in flux due to natural changes and human actions.		
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
Interdependence	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
Interdependence	B.4.3	Describe the consequences of introducing non-native species into an ecosystem and identify the impact it may have on that ecosystem

Interdependence	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		
Describe the basic structure of DNA and how this structure enables DNA to function as the hereditary molecule that directs the production of RNA and proteins. (B.5.1, B.5.2, B.5.3)		
Understand that proteins largely determine the traits of an organism. (B.5.4, B.5.5, B.5.6)		
Molecular Basis of Heredity	B.5.1	Describe the relationship between chromosomes and DNA along with their basic structure and function
Molecular Basis of Heredity	B.5.2	Describe how hereditary information passed from parents to offspring is encoded in the regions of DNA molecules called genes
Molecular Basis of Heredity	B.5.3	Describe the process by which DNA directs the production of protein within a cell
Molecular Basis of Heredity	B.5.4	Explain how the unique shape and activity of each protein is determined by the sequence of its amino acids
Molecular Basis of Heredity	B.5.5	Understand that proteins are responsible for the observable traits of an organism and for most of the functions within an organism
Molecular Basis of Heredity	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		
Explain the processes (i.e., mitosis and meiosis) by which new cells are formed from existing cells and how in multicellular organisms groups of cells cooperate to perform essential functions within the organisms. (B.6.1, B.6.2, B.6.3)		
Explain the cellular processes that occur to generate natural genetic variations between parents and offspring. (B.6.4, B.6.5)		
Cellular Reproduction	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
Cellular Reproduction	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
Cellular Reproduction	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
Cellular Reproduction	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).

Cellular Reproduction	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		
Explain how the genetic information from parents determines the unique characteristics of their offspring.		
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
Genetics	B.7.2	Describe dominant, recessive, codominant, sex-linked, incompletely dominant, multiply allelic and polygenic traits and illustrate their inheritance patterns over multiple generations
Genetics	B.7.3	Determine the likelihood of the appearance of a specific trait in an offspring given the genetic make-up of the parents
Genetics	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
Genetics	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		
Describe how biochemical, fossil, anatomical, developmental, and genetic findings are used to determine relationships among organisms and how those relationships are then used to produce modern classification systems. (B.8.1, B.8.2, B.8.3, B.8.4)		
Describe how modern evolutionary theory provides an explanation of the history of life on earth and the similarities among organisms that exist today. (B.8.5, B.8.6, B.8.7)		
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
Evolution	B.8.2	Explain how organisms are classified and named based on their evolutionary relationships into taxonomic categories
Evolution	B.8.3	Use anatomical and molecular evidence to establish evolutionary relationships among organisms
Evolution	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
Evolution	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
Evolution	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
Evolution	B.8.7	Describe the modern scientific theory of the origins and history of life on earth and evaluate the evidence that supports it

Earth and Space Science

Standard Topic	Standard	Standard Description
Standard 1: The Universe		
Describe the age, origin and evolution of the universe. (ES.1.1)		
Describe the age, origin and evolution of the universe. (ES.1.1)		
The Universe	ES.1.1	Describe the Big Bang Theory and understand that evidence to support the formation of the universe and its age is found in Hubble's law and the cosmic background microwave radiation. Describe the role of gravitational attraction in formation of stars and galaxies.
The Universe	ES.1.2	Differentiate between the different types of stars, including our sun, found on the Hertzsprung - Russell diagram. Compare and contrast the evolution of stars of different masses.
The Universe	ES.1.3	Understand and discuss the basics of the fusion processes, which are the source of energy of stars and the formation of the elements.
The Universe	ES.1.4	Understand and explain the hierarchical relationship and scales of planetary systems, stars, multiple-star systems, star clusters, galaxies and galactic groups in the universe.
Standard 2: The Solar System		
Describe the age, origin and evolution of our solar system and describe the characteristics of objects in the solar system. (ES.2.1, ES.2.2, ES.2.3)		
Recognize the role of gravity and other forces in determining the motion of bodies in the solar system. (ES.2.4)		
The Solar System	ES.2.1	Understand and discuss the nebular theory concerning the formation of solar systems. Include in the discussion the roles of planetesimals and protoplanets.
The Solar System	ES.2.2	Describe the characteristics of the various kinds of objects in the solar system (e.g., planets, satellites, comets and asteroids). Recognize that planets have been identified orbiting stars other than the sun.
The Solar System	ES.2.3	Recognize that the sun is the main source of external energy for the Earth. Describe the cycles of solar energy and some of their impacts on the Earth.
The Solar System	ES.2.4	Describe the motions of the various kinds of objects in our solar system (e.g., planets, satellites, comets and asteroids). Explain that Kepler's laws determine the orbits of those objects and know that Kepler's laws are a direct consequence of Newton's Law of Universal Gravitation together with his laws of motion.

Standard 3: The Earth		
Recognize and describe that earth sciences address planet-wide interacting systems (e.g., the oceans, the air, solid ground, and life on Earth) and interactions with the solar system. (ES.3.1, ES.3.2, ES. 3.3)		
Examine the interrelationships between society and the planet-wide interacting systems and understand the basic physical and chemical laws that control these interactions. (ES.3.4)		
The Earth	ES.3.1	Understand that the Earth system contains fixed amounts of each stable chemical element and that each element moves among reservoirs in the solid earth, oceans, atmosphere and living organisms as part of biogeochemical cycles (i.e., nitrogen, water, carbon, oxygen and phosphorus cycles), which are driven by energy from within the earth and from the sun.
The Earth	ES.3.2	Demonstrate the possible effects of atmospheric changes brought about by natural and human-made processes.
The Earth	ES.3.3	Identify and differentiate between renewable and nonrenewable resources present within Earth's systems. Describe the possible long-term consequences that increased human consumption has placed on natural processes that renew some resources.
The Earth	ES.3.4	Recognize that fundamental physical and chemical laws control past, present and future dynamic interactions between and within Earth systems.
Standard 4: The Atmosphere and Hydrosphere		
Understand the structure and circulation of Earth's atmosphere and hydrosphere and explain how natural and human factors may interact with these processes. (ES.4.1, ES.4.2)		
Understand that both weather and climate involve the transfer of matter and energy throughout the atmosphere and hydrosphere, driven by solar energy and gravity. (ES.4.3, ES.4.4, ES.4.5, ES.4.6)		
The Atmosphere and Hydrosphere	ES.4.1	Examine the origins, structure, composition, and function of Earth's atmosphere. Include the role of living organisms in the production and cycling of atmospheric gases.
The Atmosphere and Hydrosphere	ES.4.2	Describe the relationships among evaporation, precipitation, ground water, surface water, and glacial systems in the water cycle. Discuss the effect of human interactions with the water cycle.
The Atmosphere and Hydrosphere	ES.4.3	Explain the importance of heat transfer between and within the atmosphere, land masses, and bodies of water.
The Atmosphere and Hydrosphere	ES.4.4	Understand and describe the origin, life cycle, and behavior of weather systems and methods of predicting them. Investigate the causes of severe weather and propose appropriate safety measures that can be taken in the event of severe weather.
The Atmosphere and Hydrosphere	ES.4.5	Explain the role of Milankovitch cycles (rotation, revolution, and procession of axis) on differential heating of Earth, leading to climate changes such as the cycles of glaciation.
The Atmosphere and Hydrosphere	ES.4.6	Understand the origin, effects and uses of tides.

Standard 5: The Solid Earth		
Understand the structural and compositional layers of the earth, its magnetic field, and how this knowledge is based on data from direct and indirect observation. (ES.5.1, ES.5.2, ES.5.3, ES.5.4. ES.5.5)		
Understand how the processes of rock formation, weathering, sedimentation, and reformation continually shape the surface of the Earth. (ES.5.6, ES.5.7)		
The Solid Earth	ES.5.1	Describe the large-scale, compositional layers of the Earth.
The Solid Earth	ES.5.2	Understand the origin and effects of Earth's magnetic field.
The Solid Earth	ES.5.3	Compare and contrast the properties of rocks and minerals. Explain the uses of rocks and minerals, particularly those found in Indiana, in daily life.
The Solid Earth	ES.5.4	Illustrate the various processes involved in the rock cycle and discuss the conservation of matter during formation, weathering, sedimentation and reformation.
The Solid Earth	ES.5.5	Understand the concepts of relative and absolute geologic time and their measurement by means of evidence from fossils and radioactive dating.
The Solid Earth	ES.5.6	Understand the role of changing sea level and climate in the formation of the sedimentary rocks of Indiana.
The Solid Earth	ES.5.7	Explain how sea level changes over time have exposed continental shelves, created and destroyed inland seas, and shaped the surface of the land.
Standard 6: Earth Processes		
Understand the cyclical nature of processes that modify the Earth and how humans interact with these cycles. (ES.6.1, ES.6.2, ES.6.3)		
Understand the role of plate tectonics in controlling the large scale structure of Earth's surface. Understand how the dynamic Earth impacts human society. (ES.6.4, ES.6.5)		
Earth Processes	ES.6.1	Investigate and discuss how humans affect and are affected by geological systems and processes.
Earth Processes	ES.6.2	Differentiate among the processes of weathering, erosion, transportation of materials, deposition and soil formation.
Earth Processes	ES.6.3	Explain the origin of geologic features and processes that result from plate tectonics (e.g., earthquakes, volcanoes, trenches and mountain ranges).
Earth Processes	ES.6.4	Understand and discuss the development of plate tectonic theory, which is derived from the combination of two theories: continental drift and seafloor spreading.
Earth Processes	ES.6.5	Explain that the source of Earth's energy, which drives the process of tectonics, is derived from the decay of radioactive isotopes and gravitational energy from Earth's original formation.

Integrated Chemistry & Physics

Standard Topic	Standard	Standard Description
Standard 1: Motion and Energy of Macroscopic Objects		
Describe and explain the motion of macroscopic objects in terms of Newton's laws and use the concepts of kinetic and potential energy to describe motion.		
Motion and Energy of Macroscopic Objects	ICP.1.1	Measure the motion of objects to understand the relationships among distance, velocity and acceleration. Develop deeper understanding through graphical analysis of the time dependence of acceleration, velocity and distance.
Motion and Energy of Macroscopic Objects	ICP.1.2	Describe and apply Newton's three laws of motion. By experimentation, determine the relationships among the variables in Newton's laws and how all three laws relate mass, acceleration and force as a triad of proportional variables, leading to the definitions of momentum and energy.
Motion and Energy of Macroscopic Objects	ICP.1.3	Describe how Newton's Law of Universal Gravitation and the laws of motion together explain the motions of objects on earth and of the moon, planets and stars.
Motion and Energy of Macroscopic Objects	ICP.1.4	Describe the kinetic and potential energies of macroscopic objects and use measurements to develop an understanding of these forms of energy.
Standard 2: Mechanical Energy and Propagation of Energy by Waves		
Explain that waves transmit energy, come in two forms (transverse and longitudinal) and occur throughout nature.		
Mechanical Energy and Propagation of Energy by Waves	ICP.2.1	Identify properties of objects that vibrate by using Newton's laws to understand the motion. Understand that vibrating objects can give rise to mechanical waves.
Mechanical Energy and Propagation of Energy by Waves	ICP.2.2	Identify properties of waves (e.g., frequency, wavelength, amplitude, energy and wave speed).
Mechanical Energy and Propagation of Energy by Waves	ICP.2.3	Describe how energy is propagated by waves without the transfer of mass using examples such as water waves, earthquakes and sound waves.
Mechanical Energy and Propagation of Energy by Waves	ICP.2.4	Apply the properties of waves to wave phenomena like reflection, refraction, transmission of energy and loss of energy.
Standard 3: Properties of Matter: Macroscopic as a Model for Microscopic		
Understand how the energies and motions of atoms and molecules at the microscopic level can be used to understand and predict the macroscopic properties of gases, liquids and solids.		

Macroscopic as a Model for Microscopic	ICP.3.1	Describe how we use macroscopic properties of matter to model microscopic processes.
Macroscopic as a Model for Microscopic	ICP.3.2	Study the characteristics of solids, liquids and gases and their changes of state. Interpret them in terms of a molecular model which describes their energies and motions.
Macroscopic as a Model for Microscopic	ICP.3.3	Understand how thermal energy (the microscopic motions of the atoms, molecules or both) is related to the macroscopic concept of temperature. Examine the differences in these concepts by measuring the temperature changes and determining specific heat capacity of water as it is heated or cooled.
Macroscopic as a Model for Microscopic	ICP.3.4	Understand how the microscopic kinetic molecular theory explains observations of macroscopic gas behavior in terms of temperature, volume, pressure and the number of particles (using the mole concept).
Standard 4: Energy Transport		
Describe how vibrations and waves transport energy.		
Energy Transport	ICP.4.1	Using conservation of energy, calculate the thermal energy released or absorbed by an object and distinguish between exothermic and endothermic changes.
Energy Transport	ICP.4.2	Differentiate among conduction, convection and radiation and identify them as types of energy transfer.
Energy Transport	ICP.4.3	Explain that electrons can absorb energy and can release energy and that electrons in atoms do this at specific energies.
Energy Transport	ICP.4.4	Describe the relationships among velocity, frequency, wavelength and energy in electromagnetic waves. Describe the regions of the electromagnetic spectrum.
Energy Transport	ICP.4.5	Understand that from diffraction it is known that visible light is an electromagnetic wave.
Standard 5: Chemical Energy, Reactions, and Bonding		
Describe how energy is produced and absorbed in chemical reactions.		
Chemical Energy, Reactions, and Bonding	ICP.5.1	Recognize and describe physical properties of matter and use them to differentiate between pure substances and mixtures.
Chemical Energy, Reactions, and Bonding	ICP.5.2	Use the periodic table to understand important patterns in properties of elements. Recognize that the pattern of properties of the elements correlates most closely with the configuration of the electrons in each element.

Chemical Energy, Reactions, and Bonding	ICP.5.3	Understand that the atomic number is unique to each element and is the number of protons in the nucleus of the element.
Chemical Energy, Reactions, and Bonding	ICP.5.4	Use the concept of the mole to relate number of moles and the mass of a sample of a pure substance of known chemical composition.
Chemical Energy, Reactions, and Bonding	ICP.5.5	Using conservation principles, write and balance chemical equations.
Chemical Energy, Reactions, and Bonding	ICP.5.6	Identify key indicators of a chemical change and classify simple types of chemical reactions. Differentiate among covalent, ionic, hydrogen and Van der Waals bonding. Write formulas for and name compounds of each type.
Chemical Energy, Reactions, and Bonding	ICP.5.7	Explain that in exothermic chemical reactions chemical energy is converted into other forms such as thermal, electrical, light and sound energy.
Standard 6:		
Describe how the movement and transfer of changed particles results in the transfer of electrical energy.		
Electrical Energy Propagation and Magnetism	ICP.6.1	Explain that objects that carry a net charge will exert an electric force (attractive or repulsive) on other objects.
Electrical Energy Propagation and Magnetism	ICP.6.2	Explain that, when charge is transferred from one object to another, the amount lost by one object equals the amount gained by the other, which is consistent with the principal of conservation of charge.
Electrical Energy Propagation and Magnetism	ICP.6.3	Using the example of electrolysis and its application in batteries, explain the relationship between chemical reactions and electrical energy.
Electrical Energy Propagation and Magnetism	ICP.6.4	Define and describe the relationships among voltage, current resistance and power in open and closed electrical circuits.
Electrical Energy Propagation and Magnetism	ICP.6.5	Describe the current-flow differences in parallel and series circuits.
Electrical Energy Propagation and Magnetism	ICP.6.6	Explain that some objects, called magnets, exert magnetic forces with no direct contact.
Electrical Energy Propagation and Magnetism	ICP.6.7	Using the examples of motors and generators, explain that electrical energy can be transformed into mechanical energy and vice versa.
Standard 7: Nuclear Energy (fission and fusion)		

Describe how the stability of nuclei in terms of the binding energies of their constituent protons and neutrons explains the energy production processes of fission and fusion.		
Nuclear Energy	ICP.7.1	Demonstrate how historical models and experiments supported the development of our current understanding of the atom and its nucleus.
Nuclear Energy	ICP.7.2	Differentiate among protons, neutrons and electrons and determine the number of these subatomic particles in each atom.
Nuclear Energy	ICP.7.3	Understand that the stability of nuclei depend on their numbers of neutrons and protons.
Nuclear Energy	ICP.7.4	Understand that fission results from large, less stable nuclei decomposing to form smaller, more stable nuclei.
Nuclear Energy	ICP.7.5	Understand that fusion results from two smaller nuclei combining to form one larger nucleus.
Nuclear Energy	ICP.7.6	Understand that the energy radiated from the sun derives from the fusion process.
Nuclear Energy	ICP.7.7	Describe the various forms of emission that are typical of radioactive decay.
Nuclear Energy	ICP.7.8	Relate the fission process to the human development and use of the fission process in war (uncontrolled) and in peace (controlled).
Standard 8: Society (Energy production, environment, economics)		
Understand the impact of energy production and use on society and the environment.		
Society	ICP.8.1	Describe how energy needs have changed throughout history and how energy needs are met in modern society.
Society	ICP.8.2	Describe the benefits and risks of the development of non-renewable forms of energy such as coal, oil, natural gas and uranium fission sources.
Society	ICP.8.3	Describe the benefits and risks of the development of renewable forms of energy such as solar energy, wind-energy, geothermal energy, fusion energy and biofuels.
Society	ICP.8.4	Describe how efficient use of renewable and non-renewable energy sources is essential to maintaining an acceptable environment.
Society	ICP.8.5	Describe how the availability of energy resources is essential to the development of an economically viable society.
Society	ICP.8.6	Contrast the dependence on and use of energy and other natural resources in the economies of industrial nations, of developing nations and of undeveloped nations.
Society	ICP.8.7	Describe the energy needs of a modern urban city. Compare and contrast these needs with those of a modern rural community.

Agriculture

Available by Topic:		
http://www.doe.in.gov/standards/cte-agriculture		
Title	**Updated**	**Download**
Advanced Life Science - Animals	8/4/2014	PDF
Advanced Life Science - Foods	8/20/2014	PDF
Advanced Life Science - Plants and Soils	8/4/2014	PDF
Agribusiness Management	8/4/2014	PDF
Agriculture Power, Structure and Technology	8/4/2014	PDF
Animal Science	8/4/2014	PDF
Food Science	8/4/2014	PDF
Horticulture Science	8/4/2014	PDF
Intro to Agriculture, Food, and Natural Resources	8/4/2014	PDF
Landscape Management	8/4/2014	PDF
Landscape Management II	8/4/2014	PDF
Natural Resources	8/4/2014	PDF
Plant and Soils Science	8/4/2014	PDF
Supervised Agricultural Experience (SAE)	2/15/2012	PDF
Sustainable Energy Alternatives	8/4/2014	PDF

Writing Standards

Writing Standards for Literacy in Science Text Types and Purposes	
Text Types and Purposes	
9-10.WS.1	Write arguments focused on discipline-specific content.
	Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
	Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
	Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
	Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
	Provide a concluding statement or section that follows from or supports the argument presented.
9-10.WS.2	Write informative/explanatory texts, including scientific procedures/ experiments.
	Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
	Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
	Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.
	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
	Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

	Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
9-10.WS.3	Note: Students' narrative skills continue to grow in these grades.
	The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/ explanatory texts. In science, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations that others can replicate them and (possibly) reach the same results.
Production and Distribution of Writing	
9-10.WS.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
9-10.WS.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
9-10.WS.6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
Research to Build and Present Knowledge	
9-10.WS.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
9-10.WS.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectivity to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
9-10.WS.9	Draw evidence from informational texts to support analysis, reflection, and research.
Range of Writing	

9-10.WS.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
Writing Standards for Literacy in Science Text Types and Purposes	
11-12.WS.1	Write arguments focused on discipline-specific content.
	Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
	Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.
	Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
	Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
	Provide a concluding statement or section that follows from or supports the argument presented.
11-12.WS.2	Write informative/explanatory texts, including scientific procedures/ experiments.
	Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
	Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
	Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

	Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
	Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
11-12.WS.3	Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In science, students must be able to write precise enough descriptions of the step-by- step procedures they use in their investigations that others can replicate them and (possibly) reach the same results.
Production and Distribution of Writing	
11-12.WS.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
11-12.WS.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
11-12.WS.6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
Research to Build and Present Knowledge	
11-12.WS.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
11-12.WS.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectivity to maintain the flow of ideas, avoiding plagiarism and overreliance on any once source and following a standard format for citation.
11-12.WS.9	Draw evidence from informational texts to support analysis, reflection, and research.

Range of Writing	
11-12.WS.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Reading Standards

Reading Standards for Literacy in Science Key Ideas and Details	
Key Ideas and Details (Gr 9-10)	
9-10.RS.1	Cite specific textual evidence to support analysis of science texts, attending to the precise details of explanations or descriptions.
9-10.RS.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
9-10.RS.3	Follow precisely a complex multistep procedure when carrying out experiments or taking measurements, attending to special cases or exceptions defined in the text.
Craft and Structure	
9-10.RS.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific context relevant to grades 9-10 texts and topics.
9-10.RS.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
9-10.RS.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
Integration of Knowledge and Ideas	
9-10.RS.7	Translate quantitative information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
9-10.RS.8	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific problem.
9-10.RS.9	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
Range of Reading and Level of Text Complexity	

9-10.RS.10	By the end of grade 10, read and comprehend science texts in the grades 9-10 text complexity band independently and proficiently.
Key Ideas and Details (Gr 11-12)	
11-12.RS.1	Cite specific textual evidence to support analysis of science, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
11-12.RS.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
11-12.RS.3	Follow precisely a complex multistep procedure when carrying out experiments or taking measurements; analyze the specific results based on explanations in the text.
Craft and Structure	
11-12.RS.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific context relevant to grades 11-12 texts and topics.
11-12.RS.5	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
11-12.RS.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.
Integration of Knowledge and Ideas	
11-12.RS.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
11-12.RS.8	Evaluate the hypotheses, data, analysis, and conclusions in a science text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
11-12.RS.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Range of Reading and Level of Text Complexity	
11-12.RS.10	By the end of grade 12 read and comprehend science texts in the grades 11-CCR text complexity band independently and proficiently.

K-8 Economics (Soc. Studies)

Grade	Standard Code	Standard Description
Kindergarten		*Students explain that people do different jobs and work to meet basic economic wants and needs.*
K	K.4.1	Explain that people work to earn money to buy the things they want and need.
K	K.4.2	Identify and describe different kinds of jobs that people do and the tools or equipment used in these jobs.
K	K.4.3	Explain why people in a community choose different jobs.
K	K.4.4	Give examples of work activities that people do at home.
Grade 1		*Students explain how people in the school and community use goods and services and make choices as both producers and consumers.*
1	1.4.1	Identify goods (tangible objects, such as food or toys, that can satisfy people's wants and needs) that people use.
1	1.4.2	Identify services (actions that someone does for someone else) that people do for each other.
1	1.4.3	Compare and contrast different jobs people do to earn income.
1	1.4.4	Describe how people in the school and community are both producers (people who use resources to provide goods or services) and consumers (people who use goods or services).
1	1.4.5	Explain that people have to make choices about goods and services because resources are limited in relation to people's wants and needs (scarcity).
1	1.4.6	Explain that people exchange goods and services to get the things they want and need.
Grade 2		*Students describe how people in a community use productive resources, create a variety of businesses and industries, specialize in different types of jobs, and depend on each other to supply goods and services.*
2	2.4.1	Define the three types of productive resources (human resources, natural resources and capital resources
2	2.4.2	Identify productive resources used to produce goods and services in the community.
2	2.4.3	Identify community workers who provide goods and services for the rest of the community and explain how their jobs benefit people in the community.
2	2.4.4	Explain that a price is what people pay when they buy goods or services and what people receive when they sell goods or services.
2	2.4.5	Research goods and services produced in the local community and describe how people can be both producers and consumers.

2	2.4.6	Define opportunity cost and explain that because resources are limited in relation to people's wants (scarcity), people must make choices as to how to use resources.
2	2.4.7	Define specialization and identify specialized jobs in the school and community.
2	2.4.8	Explain why people trade for goods and services and explain how money makes trade easier.
2	2.4.9	Explain the concept of savings and why this is important for individuals and for our economy.
Grade 3		*Students explain how people in the local community make choices about using goods, services and productive resources; how they engage in trade to satisfy their economic wants and needs; how they use a variety of sources to gather and apply information about economic changes in the community; and how they compare costs and benefits in economic decision making.*
3	3.4.1	Give examples from the local community that illustrate the scarcity of productive resources. Explain how this scarcity requires people to make choices and incur opportunity costs.
3	3.4.2	Give examples of goods and services provided by local business and industry.
3	3.4.3	Give examples of trade in the local community and explain how trade benefits both parties.
3	3.4.4	Define interdependence and give examples of how people in the local community depend on each other for goods and services.
3	3.4.5	List the characteristics of money and explain how money makes trade and the purchase of goods easier.
3	3.4.6	Explain that buyers and sellers interact to determine the prices of goods and services in markets.
3	3.4.7	Illustrate how people compare benefits and costs when making choices and decisions as consumers and producers.
3	3.4.8	Gather data from a variety of resources about changes that have had an economic impact on your community.
3	3.4.9	Identify different ways people save their income and explain advantages and disadvantages of each.
Grade 4		*Students study and compare the characteristics of Indiana's changing economy in the past and present.*
4	4.4.1	Give examples of the kinds of goods and services produced in Indiana in different historical periods.
4	4.4.2	Define productivity and provide examples of how productivity has changed in Indiana during the past 100 years.
4	4.4.3	Explain how both parties can benefit from trade and give examples of how people in Indiana engaged in trade in different time periods.
4	4.4.4	Explain that prices change as a result of changes in supply and demand for specific products.

4	4.4.5	Describe Indiana's emerging global connections.
4	4.4.6	List the functions of money and compare and contrast things that have been used as money in the past in Indiana, the United States and the world.
4	4.4.7	Identify entrepreneurs who have influenced Indiana and the local community.
4	4.4.8	Define profit and describe how profit is an incentive for entrepreneurs.
4	4.4.9	Identify important goods and services provided by state and local governments by giving examples of how state and local tax revenues are used.
4	4.4.10	Explain how people save, develop a savings plan, and create a budget in order to make a future purchase.
Grade 5		*Students describe the productive resources and market relationships that influence the way people produce goods and services and earn a living in the United States in different historical periods. Students consider the importance of economic decision making and how people make economic choices that influence their future.*
5	5.4.1	Describe the economic activities within and among Native American Indian cultures prior to contact with Europeans. Examine the economic incentives that helped motivate European exploration and colonization.
5	5.4.2	Summarize a market economy and give examples of how the colonial and early American economy exhibited these characteristics.
5	5.4.3	Define types of trade barriers.
5	5.4.4	Describe the impact of technological developments and major inventions on business productivity during the early development of the United States.
5	5.4.5	Explain how education and training, specialization and investment in capital resources increase productivity.
5	5.4.6	Use economic reasoning to explain why certain careers are more common in one region than in another and how specialization results in more interdependence.
5	5.4.7	Predict the effect of changes in supply and demand on price.
5	5.4.8	Analyze how the causes and effects of changes in price of certain goods and services had significant influence on events in United States history.
5	5.4.9	Explain the purpose and components of a personal budget and compare factors that influence household saving and spending decisions in early United States history and today.
Grade 6		*Students examine the influence of physical and cultural factors upon the economic systems of countries in Europe and the Americas.*
6	6.4.1	Give examples of how trade related to key developments in the history of Europe and the Americas.
6	6.4.2	Analyze how countries of Europe and the Americas have been influenced by trade in different historical periods.

6	6.4.3	Explain why international trade requires a system for exchanging currency between various countries.
6	6.4. 4	Describe how different economic systems (traditional, command, market and mixed) in Europe and the Americas answer the basic economic questions on what to produce, how to produce and for whom to produce.
6	6.4.5	Compare the standard of living of various countries of Europe and the Americas today using Gross Domestic Product (GDP) per capita as an indicator.
6	6.4.6	Analyze current economic issues in the countries of Europe or the Americas using a variety of information resources.
6	6.4.7	Identify economic connections between the local community and the countries of Europe or the Americas and identify job skills needed to be successful in the workplace.
6	6.4.8	Identify ways that societies deal with helpful and harmful externalities (spillovers) in Europe or the Americas.
6	6.4.9	Explain how saving and investing help increase productivity and economic growth and compare and contrast individual saving and investing options.
Grade 7		*Students examine the influence of physical and cultural factors upon the economic systems found in countries of Africa, Asia and the Southwest Pacific.*
7	7.4.1	Explain how voluntary trade benefits countries and results in higher standards of living in Africa, Asia, and the Southwest Pacific
7	7.4.2	Illustrate how international trade requires a system for exchanging currency between and among nations.
7	7.4.3	Trace the development and change over time of the economic systems (traditional, command, market and mixed) of various cultures, societies or nations in Africa, Asia and the Southwest Pacific. and analyze why these changes occurred over time
7	7.4.4	Compare and contrast the standard of living of various countries in Africa, Asia, and the Southwest Pacific using Gross Domestic Product (GDP) per capita as an indicator; hypothesize how factors, including urbanization, industrialization, and globalization could affect the differences in the standard of living statistics.
7	7.4.5	Analyze different methods that countries in Africa, Asia and the Southwest Pacific have used to increase their citizens' individual human capital.
7	7.4.6	Identify ways that societies deal with helpful and harmful externalities (spillovers) in Africa, Asia or the Southwest Pacific.
Grade 8		*Students identify, describe and evaluate the influence of economic factors on national development from the founding of the nation to the end of Reconstruction.*
8	8.4.1	Identify economic factors contributing to European exploration and colonization in North America, the American Revolution and the drafting of the Constitution of the United States.

8	8.4.2	Identify and explain the four types of economic systems (traditional, command, market, and mixed); evaluate how the characteristics of a market economy have affected the economic and labor development of the United States.
8	8.4.3	Explain how federal, state, and local governments are involved in the economy of the United States.
8	8.4.4	Analyze contributions of entrepreneurs and inventors in the development of the United States economy to 1877.
8	8.4.5	Relate how new technology and inventions brought about changes in labor productivity in the United States in the eighteenth and nineteenth centuries.
8	8.4.6	Trace the development of different kinds of money used in the United States.
8	8.4.7	Trace the development of the banking system in the United States.
8	8.4.8	Explain and evaluate examples of domestic and international interdependence throughout United States history.
8	8.4.9	Examine the importance of borrowing and lending (the use of credit) in the United States economy and list the advantages and disadvantages of using credit.
8	8.4.10	Compare and contrast job skills needed in different time periods in United States history.

Economics

Standard	Standard Description
Standard 1: Scarcity and Economic Reasoning	***Students understand that productive resources are limited; therefore, people, institutions, and governments cannot have all the goods and services they want. As a result, people, institutions, and governments must choose some things and give up others.***
E.1.1	Define and identify each of the productive resources (natural, human, capital) and explain why each is necessary for the production of goods and services.
E.1.2	Explain that entrepreneurs combine productive resources to produce goods and services with the goal of making a profit.
E.1.3	Identify incentives and explain how they influence decisions.
E.1.4	Explain that voluntary exchange occurs when households, businesses, and governments expect to gain.
E.1.5	Define scarcity and explain how choices incur opportunity costs and tradeoffs.
E.1.6	Use a production possibilities curve to explain the concepts of choice, scarcity, opportunity cost, tradeoffs, unemployment, productivity, and growth.
E.1.7	Describe and compare the various economic systems (traditional, market, command, mixed); explain their strengths and weaknesses.
E.1.8	Describe how clearly defined and enforced property rights are essential to a market economy.
E.1.9	Diagram and explain the circular flow model of a market economy.
Standard 2: Supply and Demand	***Students understand the role that supply and demand, prices, and profits play in determining production and distribution in a market economy.***
E.2.1	Define supply and demand and explain the causes of the Law of Supply and the Law of Demand.
E.2.2	Recognize that consumers ultimately determine what is produced in a market economy.
E.2.3	Illustrate how supply and demand determine equilibrium price and quantity.
E.2.4	Identify factors that cause changes in market supply and demand and how these changes affect price and quantity in a competitive market.
E.2.5	Describe how elasticity (price) sends signals to buyers and sellers.
E.2.6	Demonstrate how government wage and price controls, such as rent controls and minimum wage laws, create shortages and surpluses.
E.2.7	Describe how the earnings of workers are determined by the market value of the product produced and workers' productivity, as well as other factors.
E.2.8	Illustrate how physical and human capital investment raise productivity and future standards of living.

Standard 3: Market Structures	***Students understand the role of business firms and analyze the various types of market structures in the United States economy.***
E.3.1	Identify the ways that firms raise financial capital and explain the advantages and disadvantages of each.
E.3.2	Demonstrate how firms determine optimum levels of output by comparing marginal cost and marginal revenue.
E.3.3	Compare and contrast the basic characteristics of the four market structures: monopoly, oligopoly, monopolistic competition, and pure competition; explain how various amounts of competition affect price and quantity.
E.3.4	Recognize the benefits of natural monopolies (economies of scale) and explain the purposes of government regulation of these monopolies.
Standard 4 : The Role of Government	***Students understand that typical microeconomic roles of government in a market or mixed economy are the provision of public goods and services, redistribution of income, protection of property rights, and resolution of market failures.***
E.4.1	Explain the roles of government in a market economy.
E.4.2	Explain how markets underproduce public goods and explain why the government has an interest in producing these public goods.
E.4.3	Describe how the government taxes negative externalities (spillovers) and subsidizes positive externalities (spillovers) to resolve the inefficiencies they cause.
E.4.4	Describe major revenue and expenditure categories and their respective proportions of state and federal budgets
E.4.5	Define progressive, proportional, and regressive taxation and determine whether different types of taxes (including income, sales, and Social Security) are progressive, proportional, or regressive.
E.4.6	Explain how costs of government policies may exceed benefits because social or political goals (rather than economic efficiency) are being pursued.
E.4.7	Define the national debt, explain the effects of the debt on the economy, and explain how to achieve a balanced budget.
Standard 5: National Economic Performance	***Students understand the means by which economic performance is measured and the causes and effects of business cycles in a market economy.***
E.5.1	Explain measures of a country's economic performance such as gross domestic product (GDP), unemployment, and inflation.
E.5.2	Recognize that a country's overall level of income, employment, and prices is determined by rational spending and production decisions of households, firms, and government.
E.5.3	Explain the limitations of using GDP to measure economic welfare.

E.5.4	Identify the different causes of inflation (including cost-push and demand-pull) and explain the impact of inflation on economic decisions.
E.5.5	Explain and illustrate the impact of changes in aggregate supply and aggregate demand.
E.5.6	Explain the causes and effects of business cycles in a market economy.
E.5.7	Explain the different types of unemployment.
E.5.8	Describe the impact of unemployment and unexpected inflation on an economy and how individuals and organizations try to protect themselves.
Standard 6: Money and the Role of Financial Institutions	***Students understand the role of money and financial institutions in a market economy.***
E.6.1	Explain the basic functions of money.
E.6.2	Identify the composition of the money supply of the United States.
E.6.3	Explain the roles of financial institutions.
E.6.4	Demonstrate how banks create money through the principle of fractional reserve banking.
E.6.5	Describe the structure and functions of the Federal Reserve System.
E.6.6	Explain how interest rates act as an incentive for savers and borrowers.
E.6.7	Compare and contrast different types of financial investments.
E.6.8	Demonstrate how supply and demand determine equilibrium price and quantity in the financial markets.
Standard 7: Economic Stabilization	***Students understand the macroeconomic role of the government in developing and implementing economic stabilization policies and how these policies impact the macroeconomy.***
E.7.1	Define and explain fiscal and monetary policy.
E.7.2	Explain the tools of fiscal and monetary policy.
E.7.3	Analyze how the government uses fiscal policy to promote price stability, full employment, and economic growth.
E.7.4	Explain how the use of fiscal policy affects budget deficits or surpluses and the national debt.
E.7.5	Analyze how the Federal Reserve uses monetary policy to promote price stability, full employment, and economic growth.
E.7.6	Compare and contrast the major macroeconomic theories.
Standard 8: Trade	***Students understand why households, businesses, and governments trade goods and services and how trade affects the economies of the world.***
E.8.1	Explain that most trade occurs because producers have a comparative advantage (rather than an absolute advantage) in the production of a good or service.
E.8.2	Explain the benefits of trade among households and countries.
E.8.3	Explain the difference between balance of trade and balance of payments.

E.8.4	Define and explain the impact of trade barriers, such as quotas and tariffs, and analyze why countries erect them.
E.8.5	Evaluate the arguments for and against free trade.
E.8.6	Explain how changes in exchange rates affects the value of imports and exports.

Middle School Personal Finance

Topic	Standard	Standard Description
Standard 1: Financial Responsibility and Decision Making		***Demonstrate management of individual and family finances by applying reliable information and systematic decision making.***
8-1.1 Demonstrate taking responsibility for personal financial decisions.	8-1.1.1	Describe the benefits of financial responsibility and the costs of financial irresponsibility.
8-1.2 Analyze financial information from a variety of reliable sources.	8-1.2.1	Analyze online and printed sources of financial information by describing strengths and weaknesses of each.
8-1.3 Utilize consumer protection laws and resources.	8-1.3.1	Identify the primary consumer protection agency in Indiana.
8-1.3 Utilize consumer protection laws and resources.	8-1.3.2	Describe unfair or deceptive business practices that are forbidden by consumer protection laws.
8-1.3 Utilize consumer protection laws and resources.	8-1.3.3	Explain steps for resolving a consumer complaint.
8-1.4 Make financial decisions by systematically considering alternatives and consequences.	8-1.4.1	Set measurable short-term and medium-term financial goals.
8-1.4 Make financial decisions by systematically considering alternatives and consequences.	8-1.4.2	Evaluate the results of financial decisions.
8-1.4 Make financial decisions by systematically considering alternatives and consequences.	8-1.4.3	Apply systematic decision making to short-term and medium-term goals.
8-1.5 Demonstrate communication strategies for discussing financial issues.	8-1.5.1	Explain benefits of discussing important financial matters with household members and/or financial personnel.
8-1.5 Demonstrate communication strategies for discussing financial issues.	8-1.5.2	Identify factors that explain differing values and attitudes about money.
8-1.6 Demonstrate strategies to control personal information.	8-1.6.1	Describe the possible consequences of disclosing particular types of personal information to others.

Standard 2: Relating Income and Careers		***Analyze how education, income, career, and life choices relate to achieving financial goals.***
8-2.1 Describe how career choice, education, skills, entrepreneurship, and economic conditions affect income.	8-2.1.1	Explain how an individual's interests, knowledge, abilities, and career and job choices affect income.
8-2.1 Describe how career choice, education, skills, entrepreneurship, and economic conditions affect income.	8-2.1.2	Summarize the financial risks and benefits of entrepreneurship as a career choice.
8-2.2 Identify sources of personal income.	8-2.2.1	Identify jobs children and youth can do to earn money.
8-2.2 Identify sources of personal income.	8-2.2.2	Give examples of sources of income other than wages or salary.
8-2.3 Explain how taxes and employee benefits relate to disposable income.	8-2.3.1	Describe taxable income and employee benefits.
8-2.3 Explain how taxes and employee benefits relate to disposable income.	8-2.3.2	Describe the items commonly included in payroll deductions.
Standard 3: Planning and Managing Money		***Manage money effectively by developing financial goals and budgets.***
8-3.1 Demonstrate ability to use money management skills and strategies.	8-3.1.1	Explain basic budget categories, including income, taxes, planned savings, and fixed and variable expenses.
8-3.1 Demonstrate ability to use money management skills and strategies.	8-3.1.2	Explain the relationship between spending practices and achieving financial goals.
8-3.2 Develop a system for keeping and using financial records.	8-3.2.1	Create a system to record income and spending for purchases, services, and taxes.
8-3.2 Develop a system for keeping and using financial records.	8-3.2.2	Create a system for organizing product information and warranties and financial documents such as receipts and account statements.
8-3.3 Analyze services of financial institutions.	8-3.3.1	Compare the advantages and disadvantages of different payment methods, including cash, checks, stored-value cards, debit cards, credit cards, and electronic or online payment systems.
8-3.3 Analyze services of financial institutions.	8-3.3.2	Demonstrate steps in establishing and maintaining financial accounts including checking and savings accounts, on-line banking, investments, and other financial services.
8-3.4 Apply consumer skills to purchase decisions.	8-3.4.1	Analyze how external factors, such as marketing and advertising techniques, influence spending decisions for different individuals.

8-3.4 Apply consumer skills to purchase decisions.	8-3.4.2	Use reliable consumer resources and practices to make buying decisions.
8-3.4 Apply consumer skills to purchase decisions.	8-3.4.3	Apply systematic decision making to choose among courses of action that include a range of spending, delayed spending, and non-spending alternatives.
8-3.5 Connect the role of charitable giving, volunteer service, and philanthropy to community development and quality of life.	8-3.5.1	Determine how charitable giving can fit into a personal budget and appropriate percentages for giving.
8-3.6 Develop a personal financial plan.	8-3.6.1	Explain the relationship between spending practices and achieving financial goals.
8-3.6 Develop a personal financial plan.	8-3.6.2	Illustrate allocation of a weekly allowance among the financial goals of spending, saving/investing, and sharing/giving.
8-3.6 Develop a personal financial plan.	8-3.6.3	Create a plan to secure funding for a financial goal.
8-3.7 Examine the purpose and value of estate planning.	8-3.7.1	Define the components of a simple will.
Standard 4: Managing Credit and Debt		***Manage credit and debt to remain both creditworthy and financially secure.***
8-4.1 Analyze the costs and benefits of using various types of credit.	8-4.1.1	Compare advantages and disadvantages of various types of credit.
8-4.1 Analyze the costs and benefits of using various types of credit.	8-4.1.2	Explain factors to consider when using credit or obtaining a loan.
8-4.1 Analyze the costs and benefits of using various types of credit.	8-4.1.3	Determine the total cost of repaying credit and loans under various rates of interest and over different periods.
8-4.2 Analyze factors that influence establishing and maintaining a good credit rating.	8-4.2.1	Describe the information in a credit report and how long it is retained.
8-4.2 Analyze factors that influence establishing and maintaining a good credit rating.	8-4.2.2	Explain the value of a positive credit history and credit reports to consumers, borrowers and lenders.
8-4.3 Analyze methods and benefits of avoiding or correcting credit and debt problems.	8-4.3.1	Identify possible credit and debt problems and ways to avoid them.
8-4.3 Analyze methods and benefits of avoiding or correcting credit and debt problems.	8-4.3.2	Describe actions that a consumer can take to reduce or better manage excessive debt.
8-4.4 Analyze major consumer credit laws.	8-4.4.1	Explain the rights, responsibilities, and protections of buyers and sellers under consumer credit laws.

Standard 5: Risk Management and Insurance		***Analyze the features of insurance, its role in balancing risk and benefits in financial planning.***
8-5.1 Analyze the nature of personal financial risk and the importance of protecting against financial loss.	8-5.1.1	Explain the relationship between risk and insurance.
8-5.1 Analyze the nature of personal financial risk and the importance of protecting against financial loss.	8-5.1.2	Explain how insurance deductibles work.
8-5.2 Analyze the need for and value of various types of insurance across stages of the life cycle.	8-5.2.1	Describe the need for and value of health, property, life, disability, and liability insurance.
8-5.2 Analyze the need for and value of various types of insurance across stages of the life cycle.	8-5.2.2	Identify factors to consider when determining the amount of protection needed.
8-5.2 Analyze the need for and value of various types of insurance across stages of the life cycle.	8-5.2.3	Identify factors that can influence insurance costs.
8-5.3 Apply concepts related to financial risk, protection from loss, and financial planning.	8-5.3.1	Apply opportunity-cost analysis to potential situations that can threaten personal and family income and assets.
8-5.3 Apply concepts related to financial risk, protection from loss, and financial planning.	8-5.3.2	Analyze importance of developing plans for protecting current and future personal and family assets against financial loss.
Standard 6: Saving and Investing		***Analyze saving and investing to build long-term financial security and wealth.***
8-6.1 Explain how saving contributes to financial wellbeing.	8-6.1.1	Describe the advantages and disadvantages of saving for short-term and medium-term financial goals.
8-6.1 Explain how saving contributes to financial wellbeing.	8-6.1.2	Explain simple interest, compound interest, and the benefits of a compound rate of return.
8-6.2 Apply strategies for creating wealth and building assets.	8-6.2.1	Compare reasons and risk/return trade-offs for saving and for investing.
8-6.2 Apply strategies for creating wealth and building assets.	8-6.2.2	Define the time value of money and explain how small amounts of money invested regularly over time grow exponentially.
8-6.2 Apply strategies for creating wealth and building assets.	8-6.2.3	Devise a periodic investment plan for accumulating the money for a major life goal.
8-6.3 Compare investment alternatives.	8-6.3.1	Compare the investment potential of investment options such as stocks, bonds, certificates of deposit, and savings accounts.
8-6.3 Compare investment alternatives.	8-6.3.2	Explain how inflation affects investment returns.

8-6.4 Describe how to buy and sell investments.	8-6.4.1	Describe various sources of investment information, including prospectuses, online resources, and financial publications.
8-6.4 Describe how to buy and sell investments.	8-6.4.2	Research and track publicly traded stock and record daily market values and gains or losses between two specified dates.
8-6.5 Analyze factors that affect the rate of return on investments.	8-6.5.1	Explain how the time value of money and economic conditions affect the rate of return on investments.
8-6.5 Analyze factors that affect the rate of return on investments.	8-6.5.2	Identify taxes on investments and income tax–free earnings limit for an investor under the age of 18.
8-6.6 Analyze how agencies that regulate financial markets protect investors.	8-6.6.1	Describe benefits and limits of deposit insurance.
8-6.6 Analyze how agencies that regulate financial markets protect investors.	8-6.6.2	Utilize the Indiana Securities Commission to investigate legitimacy of one or more investment opportunities.

High School Personal Financial Responsibility

	Topic	Standard	Standard Description
	Standard 1 - Financial Responsibility and Decision Making		*1.0 Demonstrate management of individual and family finances by applying reliable information and systematic decision making.*
PFR-1.1	Demonstrate taking responsibility for personal financial decisions.	PFR-1.1.1	**Explain how individuals demonstrate responsibility for financial well-being over a lifetime.**
PFR-1.1	Demonstrate taking responsibility for personal financial decisions.	PFR-1.1.2	Analyze ways financial responsibility is different for individuals with and without dependents.
PFR-1.2	Analyze financial information from a variety of reliable and questionable sources.	PFR-1.2.1	**Analyze financial information for objectivity, accuracy, relevancy to given needs, and currency.**
PFR-1.2	Analyze financial information from a variety of reliable and questionable sources.	PFR-1.2.2	**Investigate current types of consumer fraud, including online scams.**
PFR-1.3	Utilize consumer protection laws and resources.	PFR-1.3.1	Describe services of Indiana's consumer protection agency and its benefits to consumers.
PFR-1.3	Utilize consumer protection laws and resources.	PFR-1.3.2	**Analyze consumer protection laws for the issues they address and the safeguards they provide.**
PFR-1.3	Utilize consumer protection laws and resources.	PFR-1.3.3	Demonstrate steps for resolving a consumer complaint.
PFR-1.4	Make financial decisions by systematically considering alternatives and consequences.	PFR-1.4.1	**Set measurable short-term, medium-term, and long-term financial goals.**
PFR-1.4	Make financial decisions by systematically considering alternatives and consequences.	PFR-1.4.2	**Evaluate the results of financial decisions.**
PFR-1.4	Make financial decisions by systematically considering alternatives and consequences.	PFR-1.4.3	**Apply systematic decision making to long-term goals.**
PFR-1.5	Demonstrate communication strategies for discussing financial issues.	PFR-1.5.1	Compare and contrast the benefits of sharing financial goals and personal finance information with a potential partner before forming a partnership.

PFR-1.5	Demonstrate communication strategies for discussing financial issues.	PFR-1.5.2	Describe essential elements of a contract between individuals and between individuals and businesses.
PFR-1.6	Demonstrate strategies to control personal information.	PFR-1.6.1	**Describe the actions a victim of identity theft can take to restore personal security.**
	Standard 2 - Relating Income and Careers		*2.0 Analyze how education, income, career, and life choices relate to achieving financial goals.*
PFR-2.1	Describe how personal factors, career choices, and economic conditions affect income.	PFR-2.1.1	**Analyze ways economic, social, cultural, education and political conditions can affect income and career potential.**
PFR-2.1	Describe how personal factors, career choices, and economic conditions affect income.	PFR-2.1.2	Analyze the financial risks and benefits of entrepreneurship as a career choice.
PFR-2.2	Identify sources of personal income.	PFR-2.2.1	**Compare and contrast wage, gift, rent, interest, dividend, capital gain, tip, commission, and business profit as sources of personal income.**
PFR-2.2	Identify sources of personal income.	PFR-2.2.2	Analyze the advantages and disadvantages of participation in government assistance programs.
PFR-2.3	Explain how taxes and employee benefits relate to disposable income.	PFR-2.3.1	**Analyze typical employee benefits and explain why they are a form of compensation.**
PFR-2.3	Explain how taxes and employee benefits relate to disposable income.	PFR-2.3.2	Describe benefits of employer sponsored savings plans and other personal options for shifting current income to the future.
	Standard 3 - Planning and Managing Money		*3.0 Manage money effectively by developing financial goals and budgets.*
PFR-3.1	Develop a personal financial plan to demonstrate the ability to use money management skills and strategies.	PFR-3.1.1	**Create a basic budget with categories for income, taxes, planned savings, and fixed and variable expenses.**
PFR-3.1	Develop a personal financial plan to demonstrate the ability to use money management skills and strategies.	PFR-3.1.2	**Analyze and adjust budget categories to manage spending and achieve financial goals.**
PFR-3.1	Develop a personal financial plan to demonstrate the ability to use money management skills and strategies.	PFR-3.1.3	**Develop a personal financial plan that shows allocation of income, spending, saving, investing and sharing/giving over a year-long time span.**
PFR-3.1	Develop a personal financial plan to demonstrate the ability to use	PFR-3.1.4	**Analyze a plan to secure funding for a financial goal (such as college, major consumer purchases, etc.)**

	money management skills and strategies.		
PFR-3.2	Develop a system for keeping and using financial records.	PFR-3.2.1	**Utilize a system to record income and spending for categories such as purchases, services, and taxes.**
PFR-3.2	Develop a system for keeping and using financial records.	PFR-3.2.2	**Demonstrate recordkeeping that utilizes digital financial management systems.**
PFR-3.3	Analyze services of financial institutions.	PFR-3.3.1	**Evaluate different payment methods, including cash, checks, stored-value cards, debit cards, credit cards, and electronic or online payment systems.**
PFR-3.3	Analyze services of financial institutions.	PFR-3.3.2	**Demonstrate skill in basic financial tasks (such as bill payments, check writing, reconciling checking and debit account statements, and monitoring printed and online account statements for accuracy).**
PFR-3.3	Analyze services of financial institutions.	PFR-3.3.3	**Investigate and demonstrate ability to apply for financial assistance (such as FAFSA, 21st Century Scholars, scholarships, grants, and aid from colleges and universities).for post-secondary education.**
PFR-3.4	Apply consumer skills to purchase decisions.	PFR-3.4.1	**Evaluate impact of external factors (such as marketing, advertising and the economy) on spending decisions.**
PFR-3.4	Apply consumer skills to purchase decisions.	PFR-3.4.2	**Justify consumer buying decisions by evaluating external factors.**
PFR-3.4	Apply consumer skills to purchase decisions.	PFR-3.4.3	Evaluate opportunity costs (such as owning versus renting a house, purchasing or leasing an auto).
PFR-3.4	Apply consumer skills to purchase decisions.	PFR-3.4.4	**Recognize potential threats (such as identity fraud, scams, theft, phishing, spam, unethical internet practices) to sound financial decisions.**
PFR-3.5	Connect the role of charitable giving, volunteer service, and philanthropy to community development and quality of life.	PFR-3.5.1	**Demonstrate budgeting financial and other resources to make contributions to a charitable organization.**
PFR-3.6	Examine the purpose and value of estate planning.	PFR-3.6.1	Contrast wills, "living wills," trusts and other ways estates can be transferred.
PFR-3.6	Examine the purpose and value of estate planning.	PFR-3.6.2	Evaluate estate planning tools (such as pensions, retirements, social security, trusts, and annuities).
	Standard 4 - Managing Credit and Debt		*4.0 Manage credit and debt to remain both creditworthy and financially secure.*

PFR-4.1	Analyze the costs and benefits of using various types of credit such as student loans, home and automotive loans, and credit cards.	PFR-4.1.1	**Evaluate the cost of borrowing a set amount of money using various types of credit.**
PFR-4.1	Analyze the costs and benefits of using various types of credit such as student loans, home and automotive loans, and credit cards.	PFR-4.1.2	**Explain how grace periods, methods of calculating interest, and fees affect borrowing costs.**
PFR-4.1	Analyze the costs and benefits of using various types of credit such as student loans, home and automotive loans, and credit cards.	PFR-4.1.3	**Apply systematic decision making to identify the most cost-effective option for making a purchase.**
PFR-4.2	Analyze factors that influence establishing and maintaining a good credit rating.	PFR-4.2.1	Analyze the effect of positive and negative credit report s on credit worthiness.
PFR-4.2	Analyze factors that influence establishing and maintaining a good credit rating.	PFR-4.2.2	**Illustrate steps to overcome a negative credit report and improve a personal financial future.**
PFR-4.3	Analyze methods and benefits of avoiding or correcting credit and debt problems.	PFR-4.3.1	**Evaluate the effect of living beyond one's financial resources.**
PFR-4.3	Analyze methods and benefits of avoiding or correcting credit and debt problems.	PFR-4.3.2	**Analyze actions that a consumer can take to reduce or better manage excessive debt.**
PFR-4.4	Analyze major consumer credit laws and the changing nature of these laws.	PFR-4.4.1	Analyze online and printed resources for up-to-date information about consumer credit rights.
PFR-4.4	Analyze major consumer credit laws and the changing nature of these laws.	PFR-4.4.2	Describe debtors' and creditors' rights related to debt that is not paid.
	Standard 5 - Risk Management and Insurance		*5.0 Analyze the features of insurance, its role in balancing risk and benefits in financial planning.*
PFR-5.1	Examine various types of financial risk and risk management strategies.	PFR-5.1.1	Describe ways people can manage risk through avoidance, reduction, retention, assumption, and transfer of risk.
PFR-5.2	Examine the purposes, types, and costs associated with insurance.	PFR-5.2.1	**Analyze the types and amounts of coverage, and features needed, for various stages of life for health, property, life, disability, and liability insurance.**
PFR-5.2	Examine the purposes, types, and costs associated with insurance.	PFR-5.2.2	Analyze factors that can reduce or increase the amount and type of insurance coverage needed.
PFR-5.2	Examine the purposes, types, and costs associated with insurance.	PFR-5.2.3	Analyze factors that affect cost of insurance for various types of insurance.

	Standard 6 - Saving and Investing		*6.0 Analyze saving and investing to build long-term financial security and wealth.*
PFR-6.1	Evaluate how saving contributes to financial wellbeing.	PFR-6.1.1	**Analyze effect of saving strategies, including "pay yourself first," payroll deduction, automatic savings options, and reflective spending practices on financial well being.**
PFR-6.1	Evaluate how saving contributes to financial wellbeing.	PFR-6.1.2	**Compare the interest generated by simple and compound interest at various rates.**
PFR-6.2	Apply strategies for creating wealth and building assets.	PFR-6.2.1	Compare various investing strategies for their potential to build wealth.
PFR-6.2	Apply strategies for creating wealth and building assets.	PFR-6.2.2	Analyze investment possibilities utilizing the principles of time value of money and opportunity costs.
PFR-6.2	Apply strategies for creating wealth and building assets.	PFR-6.2.3	**Calculate the end value of lump sum and periodic investments.**
PFR-6.3	Compare saving and investment alternatives.	PFR-6.3.1	**Analyze the characteristics (such as earnings, risks, liquidity) and benefits of various saving and investment options in the current economy.**
PFR-6.3	Compare saving and investment alternatives.	PFR-6.3.2	Analyze investment alternatives utilizing principles of inflation and other economic factors.
PFR-6.4	Describe how to buy and sell investments.	PFR-6.4.1	Compare advantages and disadvantages of buying and selling investments through various channels, including financial advisors, investment clubs, and online brokers.
PFR-6.4	Describe how to buy and sell investments.	PFR-6.4.2	**Compare the investment objectives and historical rates of return of various Investment options.**
PFR-6.5	Analyze factors that affect the rate of return on investments.	PFR-6.5.1	**Analyze the rate of return on investments using time value of money and economic conditions as factors.**
PFR-6.5	Analyze factors that affect the rate of return on investments.	PFR-6.5.2	Calculate the amount of taxes on investments and income tax-free earnings.
PFR-6.6	Analyze how agencies that regulate financial markets protect investors.	PFR-6.6.1	Explain how federal and state financial regulatory agencies decrease savings and investing risks.
PFR-6.6	Analyze how agencies that regulate financial markets protect investors.	PFR-6.6.2	Identify additional services and benefits of the Indiana Securities Division and other federal and state regulators.