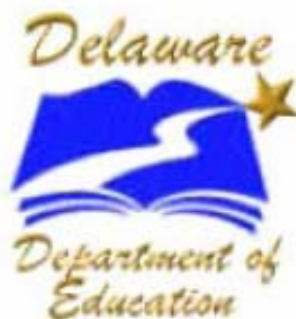


TEACHERS' DESK REFERENCE

**Delaware Content Standards, Performance Indicators,
and Extended Performance Indicators**

GRADES K - 12



**FOR ACCESS TO THE
GENERAL CURRICULUM
AND IEP DEVELOPMENT**

TEACHER'S DESK REFERENCE

Introduction

This *Teachers' Desk Reference to Delaware Content Standards, Performance Indicators, and Extended Performance Indicators for Access to the General Curriculum and IEP Development* is part of the Delaware Department of Education's ongoing efforts to provide assistance and support to local school districts in their development of curricula for students with the most significant cognitive disabilities.

About this Practical Reference Tool:

Inside this binder you will find useful information that:

- details the essential skills and knowledge that general education students must attain at each grade level in English Language Arts, Mathematics, Science, and Social Studies;
- offers IEP teams material to assist in the development and revision of IEP objectives and benchmarks;
- serves as a reference for teachers in planning lessons and developing units;
- provides an overview of all the Performance Indicators (PI) at each grade level; and
- provides an overview of Extended Performance Indicators (ExPI) which provide alternative “access points” to the Standards.

Performance Indicators and Extended Performance Indicators:

The Performance Indicators – statements for what students should know and be able to do at the completion of each grade level – have not been changed from the *Delaware Content Standards and Performance Indicators* document. Rather, they have been reformatted and condensed into one document in order to assist IEP teams. There is one additional page added to each Content Standard, which includes the Extended Performance Indicators (ExPIs).

ExPIs were developed because existing performance indicators within the *Delaware Content Standards* do not adequately address the educational needs of all students who participate in the alternate assessment. These ExPIs are embedded functional skills within the Academic Content Standards.

Unlike the DSTP, the DAPA-II may use off-grade PIs or ExPIs. The No Child Left Behind Act allows students in the alternate assessment to have different “access points” to the Academic Content Standards.

IEP Development:

According to the IDEA Re-authorization of 1997, the IEP must address two areas: (1) access to and progress in the general education curriculum; and (2) other areas of needs that are related to the student's disability. These *Academic Content Standards* address the first area only.

The IEP does not have to link to all standards.

The Individualized Education Plan (IEP) team will select which standards and corresponding performance indicators (PIs and ExPIs) will be used in the student's IEP.

Before selecting an Extended Performance Indicator the IEP team should ...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., *4.216 round money as an estimation strategy* could be modified as *round money to the next highest dollar*).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., *K4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns* could be modified as *take turns* or *share*).

How the Performance Indicators are Presented for Use:

English Language Arts – The Content Standards are presented as broad, end-point goals. For each content standard the characteristics of proficient student performance are described for each of the state-defined grade clusters: K-3, 4-5, 6-8, and 9-10. Many of the performance indicators remain consistent across the grade levels; it is the nature of the text,

which the students are creating or to which they are responding, that become more complex.

Mathematics – The Content Standards are written for grades K-10 since the study of mathematics is more specialized after this time. The document's *Content Standards* define what every Delaware student should know and be able to do. The standards are not meant to define a chapter in a text or a unit of instruction. Rather, learning events and problem solving integrate topics and ideas across standards and curricular areas. The content is described as a set of essential mathematical processes and knowledge with an emphasis on the use of technology, cooperative learning, a variety of instructional techniques, and the student's active involvement in the learning process.

Science – The Science Standards are presented as a K-12, (13 year) curriculum framework. The primary intent is to encourage study and participation by all students and the building of capacity for life-long learning. Current requirements in science are completed by the end of the sophomore year. Extension beyond 10th grade is reserved, in many cases, for students who are moving into science related majors in college.

Social Studies – For each grade cluster, the Content Standards specify what students should know and be able to do by the time they have completed the highest grade in the cluster. This content area is divided into four core discipline areas. Each core area is followed by the four standards for that discipline, with an explanation and cluster-by-cluster progression of specific expectations. For example, History Standard One revolves around the concept of chronology (e.g., measuring time). Beneath the standard are the expectations of students at each grade cluster. All history standards are grouped together so that the reader can gain an overall perspective of the skills and content and an understanding of the progression through which they will be taught.

Science

SCIENCE STANDARD ONE

Nature and Application of Science and Technology

Topic: Nature and Application of Science and Technology

End of Cluster Expectations

By the end of Grade 3 students will know that:

Science as Inquiry

- Scientists' curiosity about the natural world leads them to ask questions about how things work. In order to answer these questions, scientists observe and explore things carefully.
- Scientists sometimes observe the same object or event and describe it differently. It is important for scientists to describe things as accurately as possible in order to compare their observations.
- Scientists use a variety of instruments, some of them quite simple, in order to obtain additional information for answering questions about the natural world.
- Graphs and charts are used to better visualize the results of observation and measurement, and are an important part of describing what counts as suitable evidence in answering questions.

Science, Technology, and Society

- People have always invented new ways to solve problems and get work done. These new inventions affect all aspects of life.

History and Context of Science

- People from all parts of the world have practiced science and have made many important scientific contributions.
- Many men and women have chosen science as a career and a life-time activity because of their intense interest in better understanding nature and the great joy this pursuit brings them.

By the end of grade 5 students will know that:

Science as Inquiry

- Curiosity about nature and the world around us leads scientists to ask questions in a way that requires scientific investigation in order to develop an explanation. The breadth and style of this investigation depend on the questions asked.
- In science, answering certain questions requires observation and simple testing to generate additional information and enable a more complete investigation.
- The ability to observe and gather data is enhanced by using a variety of instruments.
- Collaboration, communication, and comparison are important parts of science. Graphs, charts, maps, equations, and oral and written reports can be used to share the results of a scientific investigation and facilitate discussion about it.

Science, Technology, and Society

- Science consists of many disciplines such as chemistry, biology, geology, and physics, and in the broadest sense, can be viewed as the collective efforts by people in these disciplines to organize, describe, and understand the natural world.
- Technology applies knowledge to solve problems and to change the world to suit us better. Technological innovation plays an important role in improving the quality of life. Such innovation involves scientific disciplines as well as other disciplines such as engineering, mathematics, medicine, and economics in order to create practical, cost-effective solutions to problems and opportunities.
- Technological development improves the quality of our life immensely and continues to do so in many areas such as medicine, communications, transportation, and agriculture. However, not all development is perfect, uniformly beneficial, or equally available to everyone.

History and Context of Science

- Men and women of all ages and from diverse cultures are involved in a multitude of scientific endeavors in the search to better understand nature. These people practice science in many ways and at various depths and levels of complexity. This search continues to add new knowledge to society's understanding of the world.

Science Standard One

Topic: Nature and Application of Science and Technology

End of Cluster Expectations

By the end of grade 8 students will be able to:

Science as Inquiry

- The design of an investigation, in many cases, is determined by the type of questions asked. Therefore, the thoughtful and informed structuring of such questions is an important part of scientific inquiry. For example, a questions such as, “what are the similarities and differences among the plants that grow in this region?” requires a taxonomic investigation in which plants are collected, identified, and classified. On the other hand, answering “What was the reaction of Marie Curie’s contemporaries to her work and accomplishment?” may involve consulting, reviewing, and discussing both contemporary and historical publications as part of an investigative design. However, an experimental investigation in which systematic observations are made and in which data are used and analyzed to construct an explanation could result from a question such as, “How do the physical properties of local soil samples lead to differences in drainage or percolation?”
- The ultimate goal of any scientific investigation is to obtain evidence precise and thorough enough to answer a question. Various experimental designs and strategies can be developed to answer the same question. The comprehensiveness and sophistication of the investigation depend on the tools and technologies used.
- Explanations in science result from careful and logical analysis of evidence gained from an investigation. Explanations relate causes to effects and develop relationships based on evidence. Critical analysis skills learned in the classroom can be applied to judge the validity of claims made in everyday life.

Science, Technology, and Society

- Social, cultural, environmental, scientific and technological strengths, and economic facts influence which scientific and technological areas are pursued and invested in. At the same time, the scientific discoveries made and technologies developed directly influence society and its habits, organization, and cultural values.
- The issues surrounding science, technology, and society are complex and involve many risk/benefit considerations. Even though new technology may provide a solution to an important problem, its impact on human health, the environment, and social dynamics needs to be analyzed.

History and Context of Science

- Over the course of human history, science has been practiced by different people in different cultures. Unfortunately, women and minorities have often been discouraged or denied the opportunity of participating in science because of education and employment prejudices or restrictions.
- People engaged in doing science are found in many occupations and institutions such as hospitals, universities, classrooms, industry, and farms. The nature of scientific investigation often requires that teams of individuals with different abilities work together to solve a problem or to understand the natural world.

By the end of grade 12 students will be able to:

Science as Inquiry

- 1.11 The identification and formulation of appropriate questions guide the design and breadth of a scientific investigation. Based on the type of questions(s) proposed, investigations explore new phenomena, solve science and technology related problems, compare different theories, resolve conflicts concerning societal issues, determine reasons for discrepancies in previous experimental results, or test the practicality of a consumer product.
- 1.12 Scientific investigations in many cases follow no fixed set of steps. However, there are certain features of a valid scientific investigation that are essential and result in evidence that can be used to construct explanations.
- 1.13 Tools and technologies extend human capabilities to perform investigations in more detail and with greater accuracy and improved precision.
- 1.13 The close examination of evidence is necessary to construct logical scientific explanations and present arguments which defend proposed explanations. Such critical analyses of supporting evidence are not only important to scientific investigations but help in judging the validity of claims made in advertisements or concluded from investigative reports.
- 1.15 Publication and presentation of scientific work with supporting evidence is part of the critique, review, and validation process conducted by the scientific community. The presentation of such work in accessible journals and reviews adds to the body of scientific knowledge and serves as background for subsequent investigations in similar areas.

Science, Technology, and Society

- 1.21 The practice of science and technology is not a linear process. In many cases, the desire of scientists to find what is real in nature creates opportunities for technology development. At the same time, technology provides scientists with tools and techniques that allow expansion of their capabilities and effectiveness.
- 1.22 The social, economic, and political forces of a society have a significant influence on what science and technology programs are pursued, invested in, and used.

History and Context of Science

- 1.31 Science is an international activity in which significant inventions and innovations have come from around the world. Even though scientists live and work in different cultures and come from different backgrounds, many of their activities are part of international collaborative efforts, and the knowledge created is shared in order to maximize the benefits to society.
- 1.32 Science is divided into many disciplines such as astrophysics, biochemistry, and geophysics. Each discipline is a field of endeavor in itself and requires specialized training. Many of the tools, techniques, methods, and much of the knowledge created in one discipline are shared across disciplines in order to maximize the impact of the work.

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.301 observe and describe the properties of a variety of living and non-living things using the 5 senses. K.303 use the physical properties of living and non-living things (e.g. prickliness, slickness, stretchiness, and squishiness) to describe their similarities and differences. K.304 sort, group, and regroup a variety of familiar living and non-living things based on their physical properties (e.g., shape, color, texture, taste, size, etc.). K.305 identify the hand lens (magnifier) as an appropriate instrument for observing and discussing living and non-living things in greater detail.</p>	<p>Topic: Comparing and Testing the Physical Properties of Solid and Liquid Forms of Materials <i>Students will be able to:</i> 1.315 conduct simple investigations to identify the physical properties of solids and liquids, and record the results on charts, diagrams, graphs, drawings, etc. (e.g., ability to sink or float, dissolve in water, roll or stack). 1.316 sort and group solids based on physical properties such as color, shape, ability to roll or stack, hardness, magnetic attraction, or whether they sink or float in water. 1.317 compare and describe similarities and differences in physical properties of an assortment of solid objects. 1.318 sort and group liquids based on physical properties such as color; odor; tendency to flow; and whether they sink, float, or dissolve in water.</p>	<p>Topic: Accounting for Why Objects Move and Balance <i>Students will be able to:</i> 2.320 use an equal arm balance to weigh and compare a variety of objects and recognize that weighing is the process of balancing an object against a certain number of standard units. 2.321 predict the serial order for the weights of a variety of objects and test these predictions by weighing the objects. 2.322 investigate and identify factors that affect balance such as the amount of weight, position of the weight, and position of the fulcrum. 2.323 present data about the weight of objects on record sheets, bar graphs, line plots, data tables, or Venn diagrams. 2.324 communicate ideas, observations, and experiences about balancing and weighing through writing, drawing, and discussion.</p>	<p>Topic: Earth, Moon, and Sun: Patterns of Movement in the Sky <i>Students will be able to:</i> 3.301 construct and use simple solar system models to demonstrate and explain that the Sun, Moon, and planets are separated by a vast space and enormous distance. 3.302 describe the Earth's 24-hour day/night rotation using simple models. 3.303 observe the day and night sky for at least a one-month period of time and identify those objects such as the Sun, Moon, and stars whose patterns of movement are cyclic. 3.304 identify and explain how the inventions and contributions of Delaware scientists and businesses have contributed to the success of the Nation's space program.</p>	<p>Topic: Examining the Rate at Which Forces Change Earth <i>Students will be able to:</i> 4.307 analyze materials that make up land and describe these materials on the basis of their properties. 4.308 sort and classify samples of Earth materials according to physical properties such as color, luster, weight relative to size, particle size, and hardness. 4.310 use stream tables (e.g., inclined tray) to model natural processes and to compare the changes in land created by water flowing over and through soil.</p>	<p>Topic: Explaining How Forces Produce Changes in Motion and Speed of Objects <i>Students will be able to:</i> 5.302 use rulers, meter sticks, tapes, and watches to measure the distance objects travel in a given period of time; organize the measurements in tables; and construct graphs based on the measurements. 5.305 predict, measure, and compare how the speed and motion of an object are influenced by the objects mass, structural design, and material composition. 5.306 explain how varying the conditions upon which an object moves (flat surface → inclined plane → smooth surface → rough surface) changes the speed of the object. 5.309 develop appropriate vocabulary to describe the relationship among, distance, time and speed.</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.306 use a hand lens (magnifier) to inspect a variety of living and non-living things and demonstrate through discussion or drawings how the lens extends the sense of sight. K.307 demonstrate, through a variety of ways (e.g., matching the picture to the word, applying thematic vocabulary), development of appropriate vocabulary used to describe living and non-living things K.308 construct simple class graphs (e.g., pictographs, physical graphs) to organize information (e.g., odors, tastes, textures) collected through the use of senses. K.309 observe and describe the simple graphs constructed by the class in order to explain the information contained in the graph.</p>	<p>Topic: Comparing and Testing the Physical Properties of Solid and Liquid Forms of Materials <i>Students will be able to:</i> 1.319 compare and describe similarities and differences in physical properties of an assortment of liquids. 1.320 construct individual and class Venn diagrams to compare the similarities and differences between the properties of solids and liquids. 1.321 observe and describe changes in the physical properties of solids and liquids after exposure to a variety of treatments (temperature, sunlight, and sanding). 1.322 use writing, drawing, and discussion to communicate observations, descriptions, investigations, and experiences concerning solids and liquids.</p>	<p>Topic: Healthy Growth and Development of Humans <i>Students will be able to:</i> 2.301 use simple devices such as watches, thermometers, stethoscopes, scales, and measuring tapes to collect, record, and graph personal health data and to discuss individual, group, or class trends or patterns. 2.303 identify technologies (e.g., refrigerator, cooler, vacuum packaging, plastic wrap) which are used to keep foods fresh and explain why spoiled foods are dangerous to the health and well being of humans.</p>	<p>Topic: Earth: A Rock Planet <i>Students will be able to:</i> 3.305 observe a variety of Earth's materials such as rocks, sand, and soil and sort the materials into groups based on similar physical properties. 3.306 examine an assortment of rocks and use appropriate measuring tools (balances, meter tapes, syringes) to gather data about the rocks' physical properties (length, circumference, weight). 3.309 sort and group an assortment of minerals based on similarities and differences in their physical properties.</p>	<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.311 use stream tables (e.g., inclined tray) to model natural processes and to determine the effects of slope, flow, and land formation caused by erosion and deposition. 4.312 select and use a variety of appropriate instruments for collecting, recording, and analyzing data obtained from stream table investigations. 4.313 communicate the results of stream table investigations through record sheets, oral and written observations, and drawings.</p>	<p>Topic: Mixtures and Solutions: Combining and Separating Substances <i>Students will be able to:</i> 5.322 measure volumes of solids and liquids to make solutions that differ either in the amount of solid material or in the amount of water. 5.323 measure accurately the amount of solids and liquids needed to prepare a variety of mixtures and solutions and compare the weight of the mixtures and solutions to the weight of their parts. 5.324 prepare aqueous solutions with different concentrations and observe and record changes in properties of these mixtures (e.g., color, transparency, feel) as the relative amount of the component substance changes.</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.310 use non-standard units of measure (e.g., string around trees, paper clips to measure length of leaves) to compare the size and weight of living and non-living things. K.311 observe and describe changes in the physical properties of objects (wood – saw dust, candy bar left in the sun) that take place when they are exposed to a variety of treatments temperature, sunlight, water).</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.308 conduct short-term and long-term investigations on selected outdoor plots or natural systems such as aquariums or terrariums and identify the living and non-living components of the plot or system. 1.309 identify the number of different kinds of living things in an outdoor plot or natural system and compare the similarities and differences in these living things. 1.310 observe a variety of living organisms (plants and animals) and identify basic needs common to the organisms such as food, water, air, shelter, etc. 1.313 select the hand lens as an appropriate instrument for observing greater detail of organisms.</p>	<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.308 conduct simple tests to identify the three basic components of soil and to compare and contrast the unique properties of each of the components. 2.309 select and use appropriate instruments (e.g., hand lens/magnifier, droppers, funnels, filter paper, sieves) to analyze soil samples. 2.310 interpret test results and draw conclusions about soil composition. 2.311 record and organize the results of soil tests and explain these results through writing, drawing, and discussion. 2.312 reflect on the test results and predict how plants will grow in different soils.</p>	<p>Topic: Human Body: How Form Relates to Function <i>Students will be able to:</i> 3.316 conduct simple investigations to determine and explain how different body parts respond to different kinds of visual, auditory, and tactile stimuli.</p>	<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.314 conduct simple investigations to determine how different types of soil (sand, clay, humus) affect plant growth and develop and use the results of the investigation to support an individual's choice to fertilize, irrigate a parcel of land, etc. 4.315 select a current or past issue that has been discussed in the media such as the building of Delaware Route 1, damming of various rivers, replenishing coastal beaches, expanding urban development to determine how human activity affects the interaction between land and water.</p>	<p>Topic: The Human Body and Healthy Living <i>Students will be able to:</i> 5.333 analyze and describe how science and technology have contributed to healthy living. 5.334 identify local community agencies that advocate for healthy individuals, families, and communities.</p> <p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.310 recognize that models that simulate an ecosystem can be used to learn about the complex relationships that exist within ecosystems throughout the world. 5.312 use appropriate equipment such as hand lens, pH paper, and measuring devices to conduct, record, and analyze long-term daily observations of a natural or simulated ecosystem.</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.314 sort and group plants and animals based on their physical properties or behavioral characteristics.</p> <p>Topic: Weather Patterns and Their Influence on Living Things <i>Students will be able to:</i> 1.301 keep daily records of temperature and weather conditions and use these records to identify patterns over short and long periods of time. 1.302 organize weather data on graphs and on long-term data collection charts. 1.303 interpret and summarize long-term weather data.</p>	<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.313 explain how composting is an effective method to recycle plants and other discarded organic matter.</p> <p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.314 observe the life cycle of a selected organism (e.g., plant, butterfly, frog, etc.) and recognize that the phases of the life cycle are predictable and describable. 2.315 maintain a record of an organism's growth and change over time and identify both the basic and specific survival needs of this organism. 2.316 identify and describe specific features of an organism that help it survive in its environment.</p>	<p>Topic: Acquiring Evidence of How Materials Respond to Change <i>Students will be able to:</i> 3.318 observe and describe the physical properties of a variety of materials in order to construct classification systems which sort and group these materials. 3.321 observe and describe changes in the properties of a material the material changes from one state to another. 3.323 conduct simple to determine how a variety of common materials can be identified by their interaction with substances such as water, vinegar, iodine, red cabbage, etc.</p>	<p>Topic: Using Models to Explain the Solar System <i>Students will be able to:</i> 4.301 design and construct simple models to demonstrate how the Earth's movement and position alter the visibility of constellations. 4.302 observe and record the apparent path of the Sun and chart the times and directions of sunrise and sunset over an extended period of time. 4.304 analyze NASA photographs and satellite images of the Earth, Moon, and other planets and identify similar and dissimilar features.</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.318 conduct simple investigations to determine the effects different conditions, factors, or pollutants e.g., pH of water, road salt, fertilizer run off) could possibly have on an ecosystem. 5.320 use evidence obtained from experiments to inform those ecosystem decisions that may be expressed in writings, drawings, discussions, or presentations.</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
	<p>Topic: Weather Patterns and Their Influence on Living Things <i>Students will be able to:</i> 1.305 select and use appropriate instruments such as wind scales (e.g., flags, pinwheels), thermometers, and rain gauges to measure different features of weather. 1.306 describe different weather conditions (e.g., sunny, foggy, rains, and seasonal patterns) and identify the impact these conditions have on plant, animal, and human activity. 1.307 recognize that meteorologists are scientists who study, observe, and record information about the weather and use this information to forecast the weather.</p>	<p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.317 observe parents and offspring from a selected species of organism and identify characteristics that offspring have in common with their parents and characteristics which are different from their parents. 2.318 identify evidence of changes in growth and development of an organism such as shedding of skin, increase in body size, increase in excrement, decrease in the amount of food eaten. 2.319 observe growth and change in the life cycle of an organism and relate this to change and growth in their (students) own bodies.</p>	<p>Topic: Acquiring Evidence of How Materials Respond to Change <i>Students will be able to:</i> 3.324 predict the results of simple tests conducted to identify materials and compare these predictions to the actual results. 3.325 analyze and draw conclusions from material test results and support these conclusions with reasons based on evidence. 3.326 develop lab procedures that ensure safety as well as the proper acquisition of evidence.</p>	<p>Topic: Using Models to Explain the Solar System <i>Students will be able to:</i> 4.305 use simple models to explain how light from the Sun travels in straight lines and interacts with objects in the solar system. 4.306 use simple models to explain how the Earth's position relative to the Sun determines the length of daylight.</p>	

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Using Electricity in Everyday Life <i>Students will be able to:</i> 4.324 test objects for their conductivity and classify the objects based on whether they conduct electricity (conductors) or do not conduct electricity (insulators). 4.325 demonstrate a variety of ways to construct a complete circuit using the same set of materials. 4.326 apply trouble shooting strategies to complete an incomplete circuit. 4.329 describe how, when, and where electricity is generated for the local community and the sources of raw materials used to produce the community's electricity.</p>	

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.317 observe and describe structures in living organisms (plants and animals) that enable them to reproduce, grow, and survive in their environment. 4.318 develop simple classification systems (properties of germination, territorial behavior) based on similarities and differences in the structures or behavior of living organisms. 4.319 observe, compare, and record variations within a species (e.g., crayfish, grass hoppers, bean plants, tree seedlings) and predict how the variations may affect the ability of the organism to survive. 4.321 select a living organism and develop descriptions of how the organism responds to a variety of stimuli based on multiple observations and data collection.</p>	

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.322 maintain journals to record systematically the growth and development of a selected organism and compare and discuss journal entries with classmates. 4.323 develop reasonable, testable scientific questions about the life cycle of organisms (e.g., the effect of variations within species, how the structure of an organism relates to the function it performs, etc.) and plan and conduct a simple investigation to answer the questions.</p>	

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Grade Six	Grade Seven	Grade Eight
<p>Topic: Science as Inquiry: Understanding the Context and Processes of Science <i>Students will be able to:</i></p> <p>6.301 identify reasonable, relevant, and testable questions that can be answered through scientific investigations.</p> <p>6.302 design and conduct simple scientific investigations.</p> <p>6.303 compare and contrast observations of the same object or phenomena and discuss why differences in observations exist.</p> <p>6.304 select and use appropriate tools, technology, and mathematical techniques to gather, analyze and interpret data.</p> <p>6.305 develop descriptions, explanations, predictions, and models based on evidence.</p> <p>6.306 form logical explanations about the cause and effect relationship in an investigation.</p> <p>6.307 present and defend experimental results by describing observations and methods, summarizing data, and generating reasonable explanations.</p> <p>6.308 evaluate and provide appropriate feedback regarding experimental results and explanations proposed by other students.</p> <p>6.309 explain what makes science different from other disciplines (e.g., science is the study of nature; science has established rules for acquiring evidence; science verifies claims, assertions, and theories). Describe what science tells us that other disciplines do not.</p> <p>6.310 cite examples of important contributions made in science and technology by diverse cultures over time.</p> <p>6.311 identify barriers women and minorities have experienced in their attempts to become scientists.</p> <p>6.312 research contributions and discoveries made by Delaware scientists and describe their impact.</p>	<p>Topic: Science as Inquiry: Understanding the Context and Processes of Science <i>Students will be able to:</i></p> <p>7.349 identify reasonable, relevant, and testable questions that can be answered through scientific investigations.</p> <p>7.350 design and conduct simple scientific investigations.</p> <p>7.351 compare and contrast observations of the same object or phenomena and discuss why differences in observations exist.</p> <p>7.352 select and use appropriate tools, technology, and mathematical techniques to gather, analyze and interpret data.</p> <p>7.353 develop descriptions, explanations, predictions, and models based on evidence.</p> <p>7.354 form logical explanations about the cause and effect relationship in an investigation.</p> <p>7.355 present and defend experimental results by describing observations and methods, summarizing data, and generating reasonable explanations.</p> <p>7.356 evaluate and provide appropriate feedback regarding experimental results and explanations proposed by other students.</p> <p>7.357 explain what makes science different from other disciplines (e.g., science is the study of nature; science has established rules for acquiring evidence; science verifies claims, assertions, and theories). Describe what science tells us that other disciplines do not.</p> <p>7.358 cite examples of important contributions made in science and technology by diverse cultures over time.</p> <p>7.359 identify barriers women and minorities have experienced in their attempts to become scientists.</p> <p>7.360 research contributions and discoveries made by Delaware scientists and describe their impact.</p>	<p>Topic: Science as Inquiry: Understanding the Context and Processes of Science <i>Students will be able to:</i></p> <p>8.350 identify reasonable, relevant, and testable questions that can be answered through scientific investigations.</p> <p>8.351 design and conduct simple scientific investigations.</p> <p>8.352 compare and contrast observations of the same object or phenomena and discuss why differences in observations exist.</p> <p>8.353 select and use appropriate tools, technology, and mathematical techniques to gather, analyze and interpret data.</p> <p>8.354 develop descriptions, explanations, predictions, and models based on evidence.</p> <p>8.355 form logical explanations about the cause and effect relationship in an investigation.</p> <p>8.356 present and defend experimental results by describing observations and methods, summarizing data, and generating reasonable explanations.</p> <p>8.357 evaluate and provide appropriate feedback regarding experimental results and explanations proposed by other students.</p> <p>8.358 explain what makes science different from other disciplines (e.g., science is the study of nature; science has established rules for acquiring evidence; science verifies claims, assertions, and theories). Describe what science tells us that other disciplines do not.</p> <p>8.359 cite examples of important contributions made in science and technology by diverse cultures over time.</p> <p>8.360 identify barriers women and minorities have experienced in their attempts to become scientists.</p> <p>8.361 research contributions and discoveries made by Delaware scientists and describe their impact.</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Grade Six	Grade Seven	Grade Eight
<p>Topic: Investigating the Rock Cycle as Evidence of a Changing Earth <i>Students will be able to:</i></p> <p>6.313 identify and classify rocks and minerals according to their physical and chemical properties.</p> <p>6.315 create models of rock formation to investigate how igneous, sedimentary, and metamorphic rocks are formed.</p> <p>6.316 classify unknown rock samples (e.g., igneous, sedimentary, or metamorphic) based on identifiable characteristics. Explain how this method of classifying is related to the rocks' formation.</p> <p>6.317 investigate factors that cause weathering of rocks (e.g., exposure to wind, precipitation, temperature changes, plant growth, acid rain, etc.).</p> <p>6.318 survey the local area (e.g., walk around the school building, visit a cemetery) to observe, describe, and explain visual and structural effects of weathering on both natural and manmade rock structures.</p> <p>6.319 examine soil samples to identify and discuss factors that determine soil composition and structure (type of underlying rocks, climate, sorts of vegetation present).</p> <p>6.320 investigate how rocks are cycled through the processes of weathering, erosion, transport, and deposition.</p> <p>6.321 conduct simulations to demonstrate how erosion (e.g., beach erosion) and soils (e.g., beach formation) lead to the development of land forms.</p> <p>6.322 recognize that successive layers of sedimentary rock and the fossilized remains found in those layers confirm Earth's long history.</p> <p>6.323 compare and contrast fossils and anatomical models to draw reasonable conclusions regarding evolutionary change over time (e.g., trilobites → horseshoe crabs, belemnites → squid).</p>	<p>Topic: Using Physical and Chemical Properties to Distinguish and Separate Mixtures and Solutions <i>Students will be able to:</i></p> <p>7.302 observe, measure, and compare characteristic properties of a variety of substances.</p> <p>7.304 identify common materials found in the classroom or at home which are mixtures or solutions and conduct investigations to determine the components of those mixtures or solutions (e.g., chromatography, reading labels).</p> <p>7.305 conduct investigations to identify factors that affect the rate of solubility.</p> <p>7.306 use ratios and percentages to prepare solutions of different concentrations.</p> <p>7.308 investigate and discuss why the measurements of specific components of a physical mixture are reported to people (e.g., particles in the air, cholesterol in blood, unsaturated fats in foods, turbidity in lakes) and how the measurements are used to monitor health problems and or environmental pollutants.</p> <p>7.309 develop investigations or use models to explore how solutions spread or move from an area of higher concentration to one of lower concentrations.</p> <p>7.310 investigate what types of barriers (e.g., cell membrane, soil type) would prohibit or prevent the movement of a solution from one area to another.</p>	<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes <i>Students will be able to:</i></p> <p>8.304 conduct simple investigations with a variety of materials (sand, water, cloth, objects) to describe and measure the effects (including both physical and chemical changes) of light energy on these materials.</p> <p>8.306 conduct simple investigations to demonstrate that heat flows from one object to another in predictable ways, from warmer objects to cooler ones, until both reach the same temperature.</p> <p>8.308 use models to explain how variations in the amount of Sun's energy hitting the Earth's surface results in seasons.</p> <p>8.309 use a variety of models, charts, diagrams, or simple investigations to explain how the Sun's energy causes water to cycle through the Earth's crust, oceans, and atmosphere.</p> <p>8.311 conduct investigations to determine how the physical (e.g., size, shape, color, texture, hardness) and characteristic properties (e.g., boiling points, melting points, solubility) of materials can account for the degree of change observed in the materials when they interact with the same amount of energy (for example: dark cloth absorbs more heat than light cloth, clear water transmits more light than murky water, water retains heat longer than sand, shiny material reflects more light than dull material).</p> <p>8.313 conduct simple investigations to determine how constructive and destructive forces alter the surface of the earth (e.g., build glaciers, rock formation of river beds, stream tables that model weathering and erosion, model wind erosion, etc.).</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Grade Six	Grade Seven	Grade Eight
<p>Topic: Building an Understanding of Forces that Cause Motion <i>Students will be able to:</i></p> <p>6.324 conduct investigations to demonstrate that a force causes a resting object to move, brings a moving object to rest, or changes the direction of a moving object.</p> <p>6.326 observe and compare the speed of objects when forces such as friction are varied.</p> <p>6.328 use simple machine principles to design a device which performs a task (e.g., lift a weight, move a heavy object). Explain the forces and motions involved.</p> <p>6.329 conduct investigations to determine how invisible forces such as magnetism and static electricity can cause objects to move.</p> <p>6.332 design simple investigations to determine the effect different variables (number of turns of wire around the core, the materials that the core is made of, diameter of the core) have on electromagnetic strength.</p> <p>Topic: Developing the Criteria for Classifying Living and Nonliving Things <i>Students will be able to:</i></p> <p>6.338 examine an assortment of plants and animals and use simple classification keys, based on observable features, to sort and group the organisms.</p> <p>6.339 investigate appropriate methods that could be used to obtain samples of plants and animals from a specific area. Design and conduct a survey of the area to explain the diversity of local plants and animals.</p> <p>6.340 discuss how the different species of plants and animals, from the area surveyed, might be classified. Develop classification flow charts (dichotomous keys) to group and classify the observed species.</p>	<p>Topic: Investigating the Cellular Dimensions of Living Systems <i>Students will be able to:</i></p> <p>7.312 observe both unicellular and multi-cellular organisms to identify common life processes. Recognize that the more complex the organism, the greater the extent of cellular specialization.</p> <p>7.315 use microscopes and other appropriate tools and technology to observe and compare a variety of unicellular organisms. Explain how specific cellular structures perform such specialized functions as water regulation, digestion, locomotion, and circulation.</p> <p>7.316 use microscopes and other appropriate tools and technology to observe multi-cellular organisms (plant and animal cells) and explain how the structures of the major organelles are related to the functions they perform.</p> <p>7.320 conduct investigations (how the body reacts to exercise, changes in temperature, etc.) to determine how the systems in the human organism respond to various external stimuli to maintain stable internal conditions.</p> <p>7.322 research the sequence of events that lead to formulation of the cell theory and explain how the events correlate with technological advancements.</p>	<p>Topic: Explaining How the Sun's Energy Drives Earth's Weather and Climate <i>Students will be able to:</i></p> <p>8.317 record and interrupt daily weather measurements over an extended period of time using a variety of instruments (e.g., barometer, anemometer, sling psychrometer, etc.).</p> <p>8.319 use weather maps to describe the movement of air masses, fronts, and storms and to predict their influence on local weather.</p> <p>8.325 examine satellite imagery pictures and describe the use of these images in photographing weather systems and producing forecasts.</p> <p>Topic: Constructing Models that Explain the Visual and Physical Relationships Among the Earth, Sun, Moon, and the Solar System <i>Students will be able to:</i></p> <p>8.328 use models, charts, illustrations, and other suitable representations to predict regular patterns of motion for most objects in the solar system.</p> <p>8.331 construct scale models of the solar system in order to describe the relative sizes of planets (as viewed from Earth) and their distances from the Sun. Understand how a telescope magnifies the appearance of certain objects in the sky, including the Moon and the planets.</p> <p>8.334 observe and demonstrate that patterns of stars only appear to move across the sky and that different stars can be seen at different times of the year.</p> <p>8.335 investigate how some people have used the movement of objects in the sky in order to tell time and location.</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Grade Six	Grade Seven	Grade Eight
<p>Topic: Developing the Criteria for Classifying Living and Nonliving Things (cont.) <i>Students will be able to:</i></p> <p>6.343 conduct investigations to determine the difference between melting and dissolving (characteristic properties). Recognize that melting requires only one substance while dissolving requires two substances.</p> <p>6.344 conduct investigations to determine that different pure substances melt or boil at different temperatures and that these differences can be used to classify or sort objects, materials, or substances.</p>	<p>Topic: Genetics: The Key to Inheritance and Diversity <i>Students will be able to:</i></p> <p>7.325 use models or diagrams to explain why sexually produced offspring are never identical to their parents.</p> <p>7.326 use models or diagrams to identify the structures of a flowering plant that produce eggs and sperm and explain that plants also reproduce sexually.</p> <p>7.328 use models to demonstrate that chromosomes and genes come in pairs and that chromosomes are composed of many genes. Use these same models to discuss how genetic material is transmitted from cell to cell or from parent to offspring.</p> <p>7.330 use a variety of resources to develop a report on selective breeding. Select an organism (e.g., super sweet corn, oven stuffed roaster) and trace its history of development and the traits of the plant or animal that were enhanced by selective breeding.</p> <p>7.333 observe a variety of organisms and explain how a specific trait could increase an organism's chances of survival.</p> <p>7.334 conduct a natural selection simulation to demonstrate that a specific trait has selective advantages for an organism.</p>	<p>Topic: Tracking Growth, Change, and Adaptations in Ecosystems Over Time <i>Students will be able to:</i></p> <p>8.342 construct data tables or line graphs to show population changes of a selected species over time.</p> <p>8.343 observe graphs or data tables showing both the population growth of a species and the consequences of resource depletion on the population. Analyze the data and explain how exponential growth can have a dramatic effect on resources.</p> <p>8.345 investigate and discuss how short-term physiological adaptations of an organism (e.g., skin tanning, muscle development, formation of calluses) differ from long-term evolutionary adaptations (e.g., white coloration or polar bears, seed formation in plants) that occur in a group of organisms over generations.</p> <p>8.346 investigate local areas, disturbed and undisturbed, that are undergoing natural cycles of succession such as, abandoned gardens; uncut areas beneath power lines; areas how plant communities that grow in the area may change over time and how their presence determines what kinds of animals may move into and out of the areas.</p> <p>8.347 research and analyze data on human population changes that have occurred in a specific Delaware area or county. Discuss reasons for changes in human population and explain how these changes have affected biodiversity and availability of natural resources (e.g., habitat loss, water quality, preservation/concentration efforts).</p> <p>8.348 investigate some of the economic and environmental tradeoffs given Delaware's short-term and long-term resource management plans.</p> <p>8.349 contact the Department of Natural Resources or a wildlife agency to acquire information on animals or plants that have been introduced to Delaware. Investigate issues that relate to the introduction or reintroduction of a species into a local habitat (e.g., Norway Maple, Delmarva Fox, Squirrel, Gypsy Moth, Phragmites).</p>

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Grade Six	Grade Seven	Grade Eight
	<p>Topic: Understanding the Importance of Protecting Delaware Watersheds <i>Students will be able to:</i></p> <p>7.337 use models or diagrams to explain how water stored underground and water stored above ground form a continuum each supply water to the other.</p> <p>7.341 conduct tests (e.g., pH, dissolved oxygen) or surveys (e.g., macroinvertebrate) to determine the ecological health and potability of local water samples.</p> <p>7.342 conduct investigations to determine the extent to which the permeability and porosity of a soil sample affect water percolation.</p> <p>7.346 research the processes used by municipalities to ensure water taken from local reservoirs is safe to drink.</p> <p>7.347 investigate the extent to which legislation such as the Clean Water Act has impacted the quality of Delaware water.</p>	

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Grade Nine

Grade Ten

Grade Eleven

To view the **Performance Indicators** for **High School Science Level One** (Grade Nine), **Level Two** (Grade Ten), and **Level Three** (Grade Eleven) please refer to the **Teachers' Desk Reference Grades 9 – 12** the DOE website <http://www.doe.state.de.us>.

SCIENCE STANDARD ONE
Performance Indicators
Nature and Application of Science and Technology

Before selecting an Extended Performance Indicator* the IEP team should...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

X.301 Select clothing based on weather conditions.

X.302 Comment on aspects of the environment.

X.303 Describe different weather conditions (e.g., sun, fog, rain).

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.

SCIENCE STANDARD TWO

Materials and Their Properties

Topic: Materials and Their Properties

End of Cluster Expectations

By the end of grade 3 students will know that:

Properties and Structure of Materials

- Objects can be classified according to physical properties such as size, shape, weight, texture, color, and material composition such as wood, metal, plastic, or cloth. These properties can be observed and measured using tools such as rulers, balances, magnifiers, and thermometers.
- Materials exist in one of three states - solid, liquid, or gas - and can be changed from one state of matter to another. Each state has distinct physical properties. Physical properties and changes from one state of matter to another state are strongly influenced by heating and cooling.
- Objects and materials may be composed of structures too small to be seen without the use of a tool such as a magnifier.

Changes in Materials

- Physical properties of materials can be changed by exposure to heat, light, pressure, and chemicals or by cutting, mixing, and grinding. Not all materials respond the same way to these treatments.

Mixtures

- Physical mixtures such as trail mix, tossed salad, and iron filings/sand, are composed of different kinds of materials, each having distinct physical properties. Physical property differences can often be used to separate, sort, and group the materials of a mixture.

Material Technology

- The properties of a material or an object influence how the material or object is used. Some materials are more suitable than others for making a particular product or device.
- Technology has created and introduced new materials to help people solve problems. In some cases a new material may solve one problem, but create another one.

By the end of grade 5 students will know that:

Properties and Structure of Materials

- Observable and measurable properties of materials such as solubility, transparency, magnetic characteristics, strength, and the ability to conduct heat and electricity can be used to identify, group, and classify materials.
- The ability to define structure in detail is limited when objects or materials are studied with the naked eye. The observation and determination of more detailed structure require magnification.

Changes in Materials

- The weight of an object remains unchanged when broken into parts, and the parts together weigh the same as the original object.
- The properties of materials and objects can be changed by interaction with air, moisture, light, heat, and other substances or materials. The structure of materials and objects strongly influences behavior during such interactions.

Mixtures

- Most things we deal with everyday are mixtures of component substances. The properties of these mixtures largely depend on the relative amounts and properties of the components. Mixtures can consist of different solid materials or be solutions such as salt or sugar in water.

Material Technology

- Through science and technology, new materials are created whose function and performance have advantages over natural materials and lead to benefits for society.
- The creation of new synthetic materials has challenged individuals and industry to consider both the benefits and the risks in the use of these materials. One current example is the effort to find better ways to discard and recycle different materials.

Science Standard Two

Topic: Materials and Their Properties

End of Cluster Expectations

By the end of grade 8 students will be able to:

Properties and Structure of Matter

- Elements are substances that cannot be decomposed into simple materials by chemical reaction. However, elements can react with other elements or materials to form compounds. There are more than 100 known elements which combine in a multitude of ways to produce compounds, which account for all living and nonliving substances.
- The three states or phases of matter (solid, liquid, gas) are determined by the arrangement, motion, and interaction of molecules. In the solid state, molecules are packed tightly together and their movement is restricted to vibrations. In the liquid state, molecules are more loosely packed and can slide past each other. In the gaseous state, molecules are less restricted and move freely. Changes in state require the addition or removal of heat but result in no change in the chemical structure of the material. Changes in the temperature, pressure, or volume of a gas result in predictable changes in the other properties.
- Some physical properties such as mass and volume depend upon the amount of material; others such as density and melting point, known as characteristic properties, are independent of the quantity and are unique to the material.

Mixtures and Solutions

- Mixtures have component parts. Most natural materials, such as milk, blood, mineral ores, sea water, soil, and air; and man-made materials, such as processed foods, cosmetics, and paints, are physical mixtures consisting of a variety of components in a wide range of concentrations. The individual components can be analyzed and separated by making use of their unique chemical and physical properties.
- Solutions are homogenous mixtures of two or more components. The properties of a solution depend on the nature and concentration of the solute(s) (the material being dissolved) and the nature of solvent(s) (the medium in which the solutes are dissolved).

Transformation and Conservation of Matter

- Substances react chemically in characteristic ways with other substances to form new substances. In all chemical reactions the total mass is conserved. Substances can be categorized and grouped based on similarity in reactivity (for example metals). (National Science Education Standards, November 1994.)

Material Technology

- Societies use the understanding of physical and chemical change to create new and useful products. The production of these materials has social, environmental, and other implications that require analyses of the risks and benefits.

By the end of grade 12 students will be able to:

Properties and Structure of Matter

- 2.11 All matter is composed of minute particles called atoms. Atoms are electrically neutral and consist of a nucleus of neutrons and positively charged protons surrounded by negatively charged electrons. Most of the mass of an atom is concentrated in the nucleus, whereas, most of the space is occupied by the electron cloud. The electron structure of the atom strongly influences its chemical behavior.
- 2.12 Elements are pure substances that are composed of identical atoms. Chemists and physicists have identified the elements, isolated them from their natural sources, synthesized them from other elements, and determined their properties. The periodic table arranges the elements in order of their atomic numbers (the number of protons in the nucleus). The elements are grouped according to similar chemical and physical properties (metals, non-metals, noble gases). The periodic table is used to predict the behavior of the elements and relates variations in their properties to the electron configuration of their atoms.
- 2.13 Substances are formed by atoms interacting with one another and transferring or sharing electrons. These interactions generally involve the electrons farthest from the nucleus, and result in the formation of chemical bonds and molecules, the building blocks of compounds.
- 2.14 The properties of compounds depend on the properties and interactions of their molecules. These molecular properties and interactions depend on the kinds of atoms in the molecule, molecular shape and motion, and the electrical forces that exist between molecules. An enormous variety of biological, chemical, and physical phenomena can be explained by these properties and interactions. Bonding diagrams and three-dimensional models can be used to represent and visualize atoms, molecules, and their interactions.
- 2.15 Elements and compounds exist as solids, liquids, and gases. In solids, the atomic and molecular structure are orderly and nearly rigid and the vibration of atoms and molecules is constrained to a fixed site. In liquids, atoms and molecules move more freely and randomly, and this movement is insufficient to overcome the attractive forces that exist between the atoms and molecules. In gases, molecular motion is rapid and random and overcomes the attractive forces that exist between molecules.
- 2.16 Isotopes of a given element differ in the number of neutrons in the nucleus, although their chemical properties remain essentially the same. Radioactive isotopes spontaneously decay, releasing energy, and/or emitting particles. The products and energy resulting from radioactive decay have uses in research, industry, and medicine. If not properly controlled, radioactive isotopes have negative effects on humans and the environment.

Transformation and Conservation of Matter

- 2.21 Chemical reactions which take place between the atoms and molecules of elements and compounds occur all around us, for example, combustion, rusting of iron, growing of plants, and cooking of foods. Complex chemical reactions take place constantly in every cell of the human body. A chemical equation

Science Standard Two

Topic: Materials and Their Properties

End of Cluster Expectations

Transformation and Conservation of Matter (continued)

- 2.22 Virtually all chemical reactions release or absorb energy. During chemical reaction, energy in the form of heat, light, or electricity is absorbed in the breaking of bonds or released when new bonds are formed. The rate of a chemical reaction depends on the properties and concentration of the reactants, temperature, and the presence or absence of a catalyst. A catalyst changes the rate of a chemical reaction by interacting with the reacting species but is not consumed in the overall reaction.
- 2.23 A large number of reactions, usually in solution, that are important in non-living and living systems, involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base reactions).
- 2.24 Regardless of how atoms and molecules in a closed system interact with one another, or how they combine or break apart, the total weight of the system remains the same. (Benchmark for Scientific Literacy, 1993).
- 2.25 Certain small molecules (monomers) react with one another in repetitive fashion (polymerization) to form long chain macromolecules (polymers). The properties of the macromolecules depend on the properties of the molecules used in their formation and on the lengths and structure of the polymer chain. Polymers can be natural such as DNA, hair, skin, spider webs, and silk or synthetic such as polyethylene and nylon. Natural polymers are essential to cellular structure and cellular processes; synthetic polymers are the basis of an industry which provides a variety of fibers, plastics, films, and coatings.

Mixtures and Solutions

- 2.31 Mixtures have variable compositions and are either homogeneous or heterogeneous. A homogeneous mixture (solution) has the same properties throughout whereas a heterogeneous mixture consists of two or more phases that differ in properties. The formation of a mixture is a physical change; therefore, mixtures can be separated into their component parts without conducting a chemical reaction.
- 2.32 A variety of methods are used to prepare mixtures and to separate mixtures into their component parts. These methods such as blending, grinding, use of surfactants, distillation, floatation, and filtration are used throughout the scientific and industrial world.
- 2.33 The properties of solutions depend upon the concentration, properties, and interactions of the solute and solvents.

Material Technology

- 2.41 The properties of materials determine how they are used by society. New material discoveries are being used to improve the quality of life; however, their development often raises social, economic, and environmental issues.

SCIENCE STANDARD TWO
Performance Indicators
Materials and Their Properties

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.301 observe and describe the properties of a variety of living and non-living things using the 5 senses. K.303 use the physical properties of living and non-living things (e.g., prickliness, slickness, stretchiness, and squishiness) to describe their similarities and differences. K.304 sort, group, and regroup a variety of familiar living and non-living things based on their physical properties (e.g., shape, color, texture, taste, size, etc.). K.305 identify the hand lens (magnifier) as an appropriate instrument for observing and discussing living and non-living things in greater detail.</p>	<p>Topic: Comparing and Testing the Physical Properties of Solid and Liquid Forms of Materials <i>Students will be able to:</i> 1.315 conduct simple investigations to identify the physical properties of solids and liquids, and record the results on charts, diagrams, graphs, drawings, etc. (e.g., ability to sink or float, dissolve in water, roll or stack). 1.316 sort and group solids based on physical properties such as color, shape, ability to roll or stack, hardness, magnetic attraction, or whether they sink or float in water. 1.317 compare and describe similarities and differences in physical properties of an assortment of solid objects. 1.318 sort and group liquids based on physical properties such as color; odor; tendency to flow; and whether they sink, float, or dissolve in water.</p>	<p>Topic: Accounting for Why Objects Move and Balance <i>Students will be able to:</i> 2.320 use an equal arm balance to weigh and compare a variety of objects and recognize that weighing is the process of balancing an object against a certain number of standard units. 2.321 predict the serial order for the weights of a variety of objects and test these predictions by weighing the objects.</p> <p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.308 conduct simple tests to identify the three basic components of soil and to compare and contrast the unique properties of each of the components.</p>	<p>Topic: Earth: A Rock Planet <i>Students will be able to:</i> 3.305 observe a variety of Earth's materials such as rocks, sand, and soil and sort the materials into groups based on similar physical properties. 3.306 examine an assortment of rocks and use appropriate measuring tools (balances, meter tapes, syringes) to gather data about the rocks' physical properties (length, circumference, weight). 3.307 examine rocks in order to identify their composition and to recognize that they are made up of more than one component. 3.310 order or serrate a group of minerals based on such physical properties as hardness, color, and luster.</p>	<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.307 analyze materials that make up land and describe these materials on the basis of their properties. 4.308 sort and classify samples of Earth materials according to physical properties such as color, luster, weight relative to size, particle size, and hardness.</p>	<p>Topic: Explaining How Forces Produce Changes in Motion and Speed of Objects <i>Students will be able to:</i> 5.306 explain how varying the conditions upon which an object moves (flat surface @inclined plane, smooth surface @rough surface), changes the speed of the object.</p> <p>Topic: Mixtures and Solutions: Combining and Separating Substances <i>Students will be able to:</i> 5.321 recognize that most things we deal with everyday are mixtures of component substances and that mixtures can consist of different solid materials or be solutions such as salt or sugar in water.</p>

SCIENCE STANDARD TWO
Performance Indicators
Materials and Their Properties

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.306 use a hand lens (magnifier) to inspect a variety of living and non-living things and demonstrate through discussion or drawings how the lens extends the sense of sight. K.307 demonstrate, through a variety of ways (e.g., matching the picture to the word, applying thematic vocabulary), development of appropriate vocabulary used to describe living and nonliving things. K.308 construct simple class graphs (e.g., pictographs, physical graphs) to organize information (e.g., odors, tastes, textures) collected through the use of senses. K.309 observe and describe the simple graphs constructed by the class in order to explain the information contained in the graph.</p>	<p>Topic: Comparing and Testing the Physical Properties of Solid and Liquid Forms of Materials <i>Students will be able to:</i> 1.319 compare and describe similarities and differences in physical properties of an assortment of liquids. 1.320 construct individual and class Venn diagrams to compare the similarities and differences between the properties of solids and liquids. 1.321 observe and describe changes in the physical properties of solids and liquids after exposure to a variety of treatments (temperature, sunlight, and sanding). 1.322 use writing, drawing, and discussion to communicate observations, descriptions, investigations, and experiences concerning solids and liquids.</p>	<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.309 select and use appropriate instruments (e.g., hand lens/magnifier, droppers, funnels, filter paper, sieves) to analyze soil samples.</p>	<p>Topic: Acquiring Evidence of How Materials Respond to Change <i>Students will be able to:</i> 3.318 observe and describe a variety of materials in order to construct classification systems which sort and group these materials. 3.319 identify changes that materials undergo (form, color, texture) when exposed to various treatments such as heating, grinding, and mixing with other materials, or when the materials are separated into their component parts. 3.320 explain why the total amount of a material remains the same even when exposed to a variety of physical treatments (e.g., flattening or balling up clay, breaking apart a candy bar, pouring liquid into a tall, slender glass vs. a short, fat glass). 3.321 observe and describe changes in the properties of a material as the material changes from one state to another.</p>	<p>Topic: Using Models to Explain the Solar System <i>Students will be able to:</i> 4.304 analyze NASA photographs and satellite images of the Earth, Moon, and other planets and identify similar and dissimilar features.</p> <p>Topic: Using Electricity in Everyday Life <i>Students will be able to:</i> 4.324 test objects for their conductivity and classify the objects based on whether they conduct electricity (conductors) or do not conduct electricity (insulators).</p>	<p>Topic: Mixtures and Solutions: Combining and Separating Substances <i>Students will be able to:</i> 5.322 measure volumes of solids and liquids to make solutions that differ either in the amount of solid material or in the amount of water. 5.323 measure accurately the amount of solids and liquids needed to prepare a variety of mixtures and solutions and compare the weight of the mixtures and solutions to the weight of their parts. 5.324 prepare aqueous solutions with different component concentrations and observe and record changes in properties of these mixtures (e.g., color, transparency, feel) as the relative amount of the component substance changes. 5.326 determine the quantities of two different materials (e.g., salt and sugar) required to saturate equal volumes of water and compare the results.</p>

SCIENCE STANDARD TWO
Performance Indicators
Materials and Their Properties

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.310 use non-standard units of measure (e.g., string around trees, paper clips to measure length of leaves) to compare the size and weight of living and non-living things. K.311 observe and describe changes in the physical properties of objects (wood – saw dust, candy bar left in the sun) that take place when they are exposed to a variety of treatments temperature, sunlight, water).</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.308 conduct short-term and long-term investigations on selected outdoor plots or natural systems such as aquariums or terrariums and identify the living and non-living components of the plot or systems. 1.309 identify the number of different kinds of living things in an outdoor plot or natural system and compare the similarities and differences in these living things. 1.313 select the hand lens as an appropriate instrument for observing greater detail of organisms. 1.314 sort and group plants and animals based on their physical properties or behavioral characteristics.</p>		<p>Topic: Acquiring Evidence of How Materials Respond to Change <i>Students will be able to:</i> 3.322 recognize that mixtures are composed of different kinds of materials each having distinct properties and determine appropriate procedures to separate the mixtures into their component parts. 3.323 conduct simple tests to determine how a variety of common materials can be identified by their interaction with substances such as water, vinegar, iodine, red cabbage, etc. 3.324 predict the results of simple tests conducted to identify materials and compare these predictions to the actual results. 3.325 analyze and draw conclusions from material test results and support these conclusions with reasons based on evidence. 3.326 develop lab procedures that ensure safety as well as the proper acquisition of evidence.</p>		<p>Topic: Mixtures and Solutions: Combining and Separating Substances <i>Students will be able</i> 5.327 compare the physical properties of precipitates to determine their identities.</p>

SCIENCE STANDARD TWO

Performance Indicators

Materials and Their Properties

Grade Six	Grade Seven	Grade Eight
<p>Topic: Investigating the Rock Cycle as Evidence of a Changing Earth <i>Students will be able to:</i></p> <p>6.313 identify and classify rocks and minerals according to their physical and chemical properties.</p> <p>6.316 classify unknown rock samples (e.g., igneous, sedimentary, or metamorphic) based on identifiable characteristics. Explain how this method of classifying is related to the rocks' formation.</p> <p>Topic: Developing the Criteria for Classifying Living and Nonliving Things <i>Students will be able to:</i></p> <p>6.341 explain how physical properties (e.g., size, shape, color, texture, hardness) and characteristic properties (e.g., boiling points, melting points, solubility, density, conductivity, pH) can be used to classify and sort objects or nonliving things.</p> <p>6.342 distinguish between the physical properties and characteristic properties of an object or material.</p> <p>6.343 conduct investigations to determine the difference between melting and dissolving (characteristic properties). Recognize that melting requires only one substance while dissolving requires two substances.</p> <p>6.344 conduct investigations to determine that different pure substances melt or boil at different temperatures and that these differences can be used to classify or sort objects, materials, or substances.</p> <p>6.345 classify a variety of materials or substances according to whether or not they dissolve in specific solvents.</p> <p>6.346 use the characteristic property of conductivity to classify a variety of objects, materials, or substances as either conductors or insulators.</p> <p>6.347 explain how the physical and characteristic properties of materials and substances determine how the material or substance is used.</p>	<p>Topic: Using Physical and Chemical Properties to Distinguish and Separate Mixtures and Solutions <i>Students will be able to:</i></p> <p>7.301 distinguish between the physical properties (e.g., size, shape, color, texture, hardness) and characteristic properties (e.g., boiling points, melting points, solubility, density, conductivity, pH) of a substance or material.</p> <p>7.302 observe, measure, and compare characteristic properties of a variety of substances.</p> <p>7.304 identify common materials found in the classroom or at home which are mixtures or solutions and conduct investigations to determine the components of those mixtures or solutions (e.g., chromatography, reading labels).</p> <p>7.305 conduct investigations to identify factors that affect the rate of solubility.</p> <p>7.306 use ratios and percentages to prepare solutions of different concentrations.</p> <p>7.307 demonstrate that when a solute dissolves in a solvent the dissolved substance does not disappear but is added to the mass of the solvent.</p> <p>7.308 investigate and discuss why the measurements of specific components of a physical mixture are reported to people (e.g., particles in the air, cholesterol in blood, unsaturated fats in foods, turbidity in lakes) and how the measurements are used to monitor health problems and or environmental pollutants.</p> <p>7.309 develop investigations or use models to explore how solutions spread or move from an area of higher concentration to one of lower concentrations.</p> <p>7.310 investigate what types of barriers (e.g., cell membrane, soil type) would prohibit or prevent the movement of a solution from one area to another.</p>	<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes <i>Students will be able to:</i></p> <p>8.304 conduct simple investigations with a variety of materials (sand, water, cloth, objects) to describe and measure the effects (including both physical and chemical changes) of light energy on these materials.</p> <p>8.310 describe and demonstrate how light energy interacts with a variety of materials by transmission (including refraction), absorption, and scattering (including reflection). Explain how interactions with materials account for a range of phenomena observed (colors of objects, changes of state, light from the Moon).</p> <p>8.311 conduct investigations to determine how the physical (e.g., size, shape, color, texture, hardness) and characteristic properties (e.g., boiling points, melting points, solubility) of materials can account for the degree of change observed in the materials when they interact with the same amount of energy (for example: dark cloth absorbs more heat than light cloth, clear water transmits more light than murky water, water retains heat longer than sand, shiny material reflects more light than dull material).</p>

SCIENCE STANDARD TWO
Performance Indicators
Materials and Their Properties

Grade Six	Grade Seven	Grade Eight
	<p>Topic: Understanding the Importance of Protecting Delaware Watersheds <i>Students will be able to:</i></p> <p>7.339 recognize that water is a solvent and as it passes through the water cycle it dissolves minerals, gases, and pollutants and carries them to surface water and ground water supplies.</p> <p>7.341 conduct tests (e.g., pH, dissolved oxygen) or surveys (e.g., macroinvertebrate) to determine the ecological health and potability of local water samples.</p>	

**SCIENCE STANDARD TWO
Performance Indicators
Materials and Their Properties**

Grade Nine

Grade Ten

Grade Eleven

To view the **Performance Indicators** for **High School Science Level One** (Grade Nine), **Level Two** (Grade Ten), and **Level Three** (Grade Eleven) please refer to the **Teachers' Desk Reference Grades 9 – 12** the DOE website <http://www.doe.state.de.us>.

**SCIENCE STANDARD TWO
Performance Indicators
Materials and Their Properties**

Before selecting an Extended Performance Indicator* the IEP team should...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

X.304 Participate and prepare meals/snacks.

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.

SCIENCE STANDARD THREE

Energy and Its Effects

Topic: Energy and Its Effects End of Cluster Expectations

By the end of grade 3 students will know that:

Forms/Sources of Energy

- The Sun is the source of heat and light that warms the earth.
- Sound is produced when objects vibrate. Various characteristics of sound such as loudness/softness and high pitch/low pitch can be changed by altering the material producing the sound.
- Force is any push or pull exerted by one body on another. Pushes and/or pulls change the position, motion, and direction.
- Moving objects can exhibit different kinds of motion such as fast, slow, straight, back and forth, circular, and zigzag. The application of pushes or pulls is required to produce any change in the type of motion, including stopping and starting an object in motion.
- Some forces (e.g., magnetism, static electricity) can make things move without touching them.

Transformation/Conservation of Energy

There are no content standards at this grade cluster.

Production/Consumption/Application of Energy

- People burn fuels such as wood, oil, coal, or natural gas or use electricity to cook their food and warm their homes.
- The production of heat, light, and electricity uses natural resources, therefore, careful attention should be paid to turning off machines and lights when not in use.
- Heat, light, electricity, or any form of energy can be harmful or even dangerous if misused. Household electricity can stun or kill a person; sunlight can cause painful sunburn; loud sounds can cause hearing loss or even deafness; microwaves interacting with metal objects can cause sparking.

By the end of grade 5 students will know that:

Forms/Sources of Energy

- Light is a form of energy which is visible to the eye, spreads from a source, and travels in straight lines. Light is transmitted, reflected, refracted, or absorbed by different materials. Materials which do not transmit light cast shadows.
- Like the Sun, many other objects which give off light also produce heat. Heat can also be produced by electrical and mechanical machines and by one object rubbing against another.
- Electricity in circuits can produce light, heat, sound, and magnetic effects. Electrical circuits require a complete loop through which the electrical current can pass.
- When an object is set in motion by a force, its position is defined with reference to the distance it travels and the period of time it takes to travel that distance. Speed is the measure of the distance traveled by a moving object in a given period of time (distance divided by time).
- Force must be applied to change the speed or direction of a moving object. The greater the force, the greater the change in motion.

Transformation/Conservation of Energy

- Most of the energy reaching the Earth's surface comes from the Sun as light. It is then stored, transferred, or transformed in a variety of ways. Some of the Sun's light is transformed into heat when it hits objects.
- When warmer things are put with cooler ones, the warm ones lose heat and the cool ones gain it until they are all at the same temperature.
- An important property of materials is their ability to conduct and transfer heat. Some materials such as certain metals are excellent conductors of heat while other materials such as glass are good insulators. Insulators are used to conserve heat and reduce the cost of heating and cooling homes.

Production/Consumption/Application of Energy

- Society uses energy to perform work and improve the quality of life. The attractiveness and extent of use of the various sources of energy depend on factors such as availability, cost, and the ability to control side effects such as pollution and radiation.

Science Standard Three

Topic: Energy and Its Effects

End of Cluster Expectations

By the end of grade 8 students will be able to:	By the end of grade 12 students will be able to:
<p>Forms/Sources of Energy</p> <ul style="list-style-type: none"> The electromagnetic spectrum is composed of different wavelength domains. The radiation in this spectrum comes from various sources and spans energy levels from radio waves (longest wavelengths, lowest energy) through microwaves, infrared, visible, ultraviolet, x-rays, to gamma rays (shortest wavelengths, highest energy). White light from the Sun consists of a mixture of wavelengths and energies in the visible part of the electromagnetic spectrum (red to violet). Electrical energy results from the movement of electric charges (electrons) driven by a voltage through a complete circuit. Electrical energy can be readily generated, transmitted over great distances, and transformed into heat, light, sound, and motion. Electrical systems can be designed to perform a variety of tasks, using series, parallel, or combination circuits. Static electricity represents potential energy stored in a collection of separated negative and positive charges. Similar charges repel each other,; opposite charges attract each other and can lead to a sudden flow of electrons (e.g., a spark, a lightning bolt). Chemical energy is stored in elements and compounds. In most chemical reactions, energy is released or added to the system in the form of heat, light, electrical, or mechanical energy. (National Science Education Standards, 1994) <p>Forces and Motion</p> <ul style="list-style-type: none"> Forces must be used to change speed or direction (or both) of a moving object. In the absence of such a force, the object will continue to move with the same speed and in the same direction. Forces have directions and magnitudes that can be measured. Any change in motion depends upon the amount of force causing the change and the mass of the object. <p>Interactions of Energy With Materials</p> <ul style="list-style-type: none"> Energy can travel as waves which are characterized by wavelength, frequency, amplitude, and speed. Waves have common properties of absorption, reflection, and refraction when they interact with matter. They are either mechanical (e.g., sound, earthquake, tidal) or electromagnetic (e.g., sunlight, radio waves); only electromagnetic waves will travel through a vacuum. Mechanical energy comes from the motion and/or the position of physical objects. The work done on an object depends on the applied force and on the distance that the object moves. The motion of an object can be described as its change in position, direction, and speed relative to another object. Simple machines (e.g., levers, inclines, pulleys, gears) are used to change the force on an object and its speed or direction in order to make work easier. <p>Transformation and Conservation of Energy</p> <ul style="list-style-type: none"> Almost all events in the Universe involve the transformation of one form of energy into another form with the release of heat. Regardless of the transformation, the total amount of energy remains constant. 	<p>Forms/Sources of Energy</p> <p>3.11 Electromagnetic radiation is a form of energy which can exhibit both wave and particle characteristics and does not require a material medium for its transmission. The energy of the radiation depends on both the intensity (brightness) and frequency.</p> <p>3.12 Electricity results from the movement of electric charges through a complete circuit under the influence of an applied voltage. The electric current flowing in any circuit or part of a circuit depends on the voltage and resistance and can be calculated using Ohm's Law.</p> <p>3.13 Electric forces between charged objects are attractive or repulsive. The electric forces between electrons and protons are attractive, determine the structure of atoms, and are involved in all chemical reactions. The electromagnetic forces acting between atoms or molecules are much stronger than the gravitational forces between the same atoms or molecules and are responsible for the physical and mechanical properties of materials (e.g., frictional forces, force of a compressed spring, surface tension, or boiling point of a liquid).</p> <p>3.14 Magnetic forces and electric forces are thought of as different aspects of a single electromagnetic force. Moving electric charges produce magnetic fields which exert magnetic force on other objects and produce electric forces. The interaction of electric and magnetic forces is the basis for electric motors, electric generators, and many other modern technologies.</p> <p>3.15 Chemical energy is derived from the gain or loss of electrons between atoms during the making and breaking of chemical bonds. The energy released or absorbed in a chemical reaction can be predicted and measured. The rate of many chemical reactions can be increased by raising the temperature or by adding catalysts in order to reduce the activation energy.</p> <p>3.16 Nuclear energy is released as heat, light, or radiation when a portion of the mass of the nucleus is converted to energy. The nuclear forces which hold the nucleus of an atom together are much stronger than the repulsive electric forces between protons which would make the nucleus fly apart; therefore, most atoms have stable nuclei. When nuclear decay does occur, very large amounts of energy are released - See also <u>Materials and Their Properties</u>.</p> <p>Forces and Motion</p> <p>3.21 A force acting on an object and moving it through a distance does work on that object and changes it's kinetic energy (energy of motion), potential energy (energy of position), or both. The ratio of output work to input energy is the efficiency of the machine or process and is always less than 100%. Power is the rate at which the work is done.</p> <p>3.22 Displacement, velocity, acceleration, and time are used to describe the motion or changes in the motion of an object.</p> <p>3.23 Objects can have linear motion, rotational motion, or both. Newton's Laws can be used to predict changes in linear motion and/or rotational motion. Momentum allows objects to remain in motion after the applied force is removed. The Law of Conservation of Momentum can be used to predict the outcomes of a collision between moving objects.</p>

Science Standard Three

Topic: Energy and Its Effects

End of Cluster Expectations

<p>Transformation and Conservation of Energy (continued)</p> <ul style="list-style-type: none"> Heat energy is transported through materials by conduction, by convection in fluids (e.g., air or water), or across space by radiation. The addition or removal of heat from a material changes its temperature or its physical state (e.g., ice melting). the resistance to flow of an electric current through a material depends on the mobility of electrons in the material. In conductors (e.g. metals) the electrons flow easily, while in insulators (e.g., wood, glasses) they flow hardly at all. The resistance to flow converts electric energy to heat energy. <p>Production/Consumption/Application of Energy</p> <ul style="list-style-type: none"> Technological advances throughout history (e.g. electric light, steam engine, internal combustion engine, radio, TV) have led to new applications which use different forms of energy. Such advances have led to increased demand for Energy, and in some cases, unanticipated effects on society. Energy is obtained from a variety of sources, some of which are finite and some of which are renewable. The major source of energy for society is chemical energy stored in fossil fuels created many years ago through the process of photosynthesis. Another source is nuclear energy. Renewable sources (e.g., wind, geothermal, waves, biomass) vary in their availability and ease of use. Most energy used by industrial societies is derived from fossil fuel sources. Such sources are inherently limited on the earth and are unevenly distributed geographically. Responsible use of energy requires consideration of energy availability, efficiency, environmental issues, and alternative sources. 	<p>Transformation/Conservation of Energy (continued)</p> <p>3.31 Energy can be transformed from one form into another, but the total energy is constant in a closed system. The amount of energy involved in any process, and the rate at which it is generated or consumed can be discussed qualitatively and measured. Some heat is released or absorbed in most energy transformations.</p> <p>3.32 Energy can be transferred from one place to another by gross movement of material (e.g., wind, waterfalls, thrown ball), by mechanical waves moving through a material medium (e.g., sounds, earthquakes, tidal waves), or by electromagnetic waves (e.g., light, microwaves). The observed wavelength of a wave depends on the relative motion of the source and the observer and can be shorter or longer than the actual wavelength, depending on whether the relative motion is towards the source or away from the source respectively. This apparent change is called the Doppler Effect.</p> <p>3.33 Mass is converted to large quantities of energy in the processes of nuclear fission and fusion. The energy released can be calculated using the equation $E=mc^2$. The total of energy and mass is constant in these processes.</p> <p>Interactions of Energy with Materials</p> <p>3.41 Energy waves may interact with materials leading to the formation of heat or other forms of energy. These interactions, which depend upon the nature of the material and the wavelength of the radiation, can be used to create practical devices such as electric heaters, solar cells, remote control units, and optical communication devices.</p> <p>3.42 When radiation energy is absorbed or emitted by individual atoms or molecules, the changes in energy involve the jump of an electron from one distinct energy level to another. These energy changes, which are characteristic of the atom or molecule, can be used to identify the material.</p> <p>Production/Consumption/Application of Energy</p> <p>3.51 Demand for energy by society leads to continuous exploration in order to expand supplies of fossil fuels (e.g., drilling deeper oil and gas wells, drilling offshore). In addition, technology has been developed to create alternate energy sources (e.g., solar collection, ocean thermal energy conversion) and to increase the energy efficiencies of commonly used machines and appliances.</p> <p>3.52 Advances in the scientific understanding of synthetic materials have provided new devices (e.g., transistors, light emitting diodes, optical switches, super-conducting ceramics) used in electronic equipment. This has revolutionized many aspects of life (e.g., communications, manufacturing, information processing, and transportation). The increase in energy demand has environmental consequences, and societal expectations for a sustainable environment will require new, cleaner technologies for the production of energy.</p> <p>3.53 The increase in energy demand has environmental consequences, and societal expectations for a sustainable environment will require new, cleaner technologies for the production of energy.</p>
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SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
		<p>Topic: Accounting for Why Objects Move and Balance <i>Students will be able to:</i> 2.320 use an equal arm balance to weigh and compare a variety of objects and recognize that weighing is the process of balancing an object against a certain number of standard units. 2.321 predict the serial order for the weights of a variety of objects, and test these predictions by weighing the objects. 2.322 investigate and identify factors that affect balance such as the amount of weight, position of the weight, and position of the fulcrum. 2.323 present data about the weight of objects on record sheets, bar graphs, line plots, data tables, or Venn diagrams.</p>		<p>Topic: Using Models to Explain the Solar System <i>Students will be able to:</i> 4.305 use simple models to explain how light from the Sun travels in straight lines and interacts with objects in the solar system.</p> <p>Topic: Using Electricity in Everyday Life <i>Students will be able to:</i> 4.324 test objects for their conductivity and classify the objects based on whether they conduct electricity (conductors) or do not conduct electricity (insulators).</p>	<p>Topic: Explaining How Forces Produce Changes in Motion and Speed of Objects <i>Students will be able to:</i> 5.301 demonstrate that speed is the measure of the distance traveled by a moving object in a given period of time (distance divided by time). 5.302 use rulers, meter sticks, tapes, and watches to measure the distance objects travel in a given period of time; organize the measurements in tables; and construct graphs based on the measurements. 5.303 determine whether an object is moving slowly, quickly, or is stopped by collecting and recording data on the distance an object travels in regular time intervals, or how much time it takes for an object to travel a certain distance.</p>

SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
		<p>Topic: Accounting for Why Objects Move and Balance <i>Students will be able to:</i> 2.324 communicate ideas, observations, and experiences about balancing and weighing through writing, drawing, and discussion. 2.325 demonstrate how pushes or pulls (forces) can change the position, motion, and direction of an object. Explain how the greater the push or pull, the greater the change in position, motion, and direction of an object. 2.326 recognize that objects can exhibit different kinds of motion such as fast, slow, straight, back and forth, circular, and zigzag and identify the different ways in which a variety of objects (birds, fans, bicycles, baseballs, etc.) move or can be made to move. 2.327 recognize that some forces (e.g., magnetism and static electricity) can make objects move without touching them.</p>		<p>Topic: Using Electricity in Everyday Life <i>Students will be able to:</i> 4.325 demonstrate a variety of ways to construct a complete circuit using the same set of materials. 4.327 observe diagrams or pictures of a variety of circuits and demonstrate how the switch can be used to complete or interrupt a circuit. 4.329 describe how, when, and where electricity is generated for the local community and the sources of raw materials used to produce the community's electricity. 4.330 recognize the need for safety rules when working with electricity and identify specific precautions that should be taken to avoid injury when using electric appliances or gadgets.</p>	<p>Topic: Explaining How Forces Produce Changes in Motion and Speed of Objects <i>Students will be able to:</i> 5.304 demonstrate and explain how the force exerted upon an object can change the object's motion and speed. 5.305 predict, measure, and compare how the speed and motion of an object is influenced by the object's mass, structural design, and material composition. 5.306 explain how varying the conditions upon which an object moves (flat surface @ inclined plane, smooth surface @ rough surface) changes the speed of the object. 5.307 recognize magnetism as a force that moves objects and identify the physical properties of objects that would be affected by magnets. 5.309 develop appropriate vocabulary to describe the relationship among distance, time, and speed.</p>

**SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects**

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
					<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.313 trace the flow of matter and energy through an ecosystem by constructing simple diagrams (food chains or a web of food chains) that include the Sun, producers, consumers, and decomposers. 5.314 categorize the organisms within an ecosystem according to the function they serve: producers, consumers, or decomposers.</p>

SCIENCE STANDARD THREE

Performance Indicators

Energy and Its Effects

Grade Six	Grade Seven	Grade Eight
<p>Topic: Building an Understanding of Forces That Cause Motion <i>Students will be able to:</i></p> <p>6.324 conduct investigations to demonstrate that a force causes a resting object to move, brings a moving object to rest or changes the direction of a moving object.</p> <p>6.325 calculate an objects average speed (average speed = distance + time) when forces of different magnitudes are applied to initiate the objects motion.</p> <p>6.326 observe and compare the speed of objects when forces such as friction are varied.</p> <p>6.327 explain and demonstrate how common tools (e.g., pliers, crowbars, hammers, pulleys, can openers) incorporate simple machines in their designs. Discuss the forces and motions involved.</p> <p>6.328 use simple machine principles to design a device which performs a task (e.g., lift a weight, move a heavy object). Explain the forces and motions involved.</p> <p>6.329 conduct investigations to determine how invisible forces such as magnetism and static electricity can cause objects to move.</p> <p>6.330 construct series, parallel, and combination circuits to demonstrate the flow of electricity.</p>	<p>Topic: Investigating the Cellular Dimensions of Living Systems <i>Students will be able to:</i></p> <p>7.318 recognize that multi-cellular organisms, most interactions that sustain life take place at the cellular level. Explain how the energy and materials needed by cells to perform work and to build new materials are derived from the food and oxygen taken in by the organism.</p> <p>7.319 select several human body systems and explain how they interact to transport the food and oxygen required by all cells to perform work and to build new materials.</p>	<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes <i>Students will be able to:</i></p> <p>8.301 explain that the source of almost all of the Earth's energy is light from the Sun which travels to Earth in a range of wavelengths.</p> <p>8.302 identify and describe the differences in energy levels associated with visible light, infrared, and ultraviolet radiation.</p> <p>8.303 demonstrate the existence of the color components of visible light using a prism or diffraction grating. Explain the colors and their order in terms of energy and wavelengths.</p> <p>8.304 conduct simple investigations with a variety of materials (sand, water, cloth, objects) to describe and measure the effects (including both physical and chemical changes) of light energy on these materials.</p> <p>8.305 trace what happens when light energy from the Sun encounters various materials or mediums, such as, atmosphere, oceans, Earth's surface, objects, plants, and animals. Recognize that the effect of light energy on these materials or mediums is not uniform.</p>

SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects

Grade Six	Grade Seven	Grade Eight
<p>Topic: Building an Understanding of Forces That Cause Motion (continued) <i>Students will be able to:</i></p> <p>6.331 demonstrate that an electric current moving through a wire produces magnetism and that an electric current can be generated by placing a rotating coil of wire near a magnet.</p> <p>6.332 design simple investigations to determine the effect different variables (number of turns of wire around the core, the material that the core is made of, diameter of the core) have on electromagnetic strength.</p> <p>6.333 describe how the motors in electrical appliances operate to convert electricity into mechanical work.</p> <p>6.334 compile a list of ways electric motors can be used to perform different kinds of hard work and describe how the use of electricity has changed our lives.</p>		<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes (continued) <i>Students will be able to:</i></p> <p>8.306 conduct simple investigations to demonstrate that heat flows from one object to another in predictable ways, from warmer objects to cooler ones, until both reach the same temperature.</p> <p>8.307 explain how uneven heating of Earth's components – water, land, air – produces global atmospheric and oceanic movement. Describe how these global patterns of movement influence weather and climate.</p> <p>8.308 use models to explain how variations in the amount of Sun's energy hitting the Earth's surface results in seasons.</p> <p>8.309 use a variety of models, charts, diagrams or simple investigations to explain how the Sun's energy causes water to cycle through the Earth's crust, oceans, and atmosphere.</p> <p>8.310 describe and demonstrate how light energy interacts with a variety of materials by transmission (including refraction), absorption, and scattering (including reflection). Explain how interactions with materials account for a range of phenomena observed (colors of objects, changes of state, light from the Moon).</p>

**SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects**

Grade Six	Grade Seven	Grade Eight
		<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes (continued)</p> <p><i>Students will be able to:</i></p> <p>8.311 conduct investigations to determine how the physical (e.g., size, shape, color, texture, hardness) and characteristic properties (e.g., boiling points, melting points, solubility) of materials can account for the degree of change observed in the materials when they interact with the same amount of energy (for example: dark cloth absorbs more heat than light cloth, clear water transmits more light than murky water, water retains heat longer than sand, shiny material reflects more light than dull material).</p> <p>8.312 recognize that forces result from the transformation of energy and can be constructive or destructive. Both constructive forces (e.g., volcanic eruptions and deposition of sediment) and destructive forces (e.g., weathering and erosion) shape the earth's surface.</p> <p>8.313 conduct simple investigations to determine how constructive and destructive forces alter the surface of the Earth (e.g., build model glaciers, formation of river beds, stream tables that model weathering and erosion, model wind erosion, etc.).</p>

SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects

Grade Six	Grade Seven	Grade Eight
		<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes (continued) <i>Students will be able to:</i> 8.314 trace the transfer of energy across several events or sequence of actions to demonstrate an understanding that even though energy is transferred from one form to another, the total amount of energy is conserved (e.g., Sun's heat → unequal heating of air → wind → windmills → electricity → light bulb → light and heat → eye OR Sun energy → plant → sugar → food for horse → digested → particles going to cells → cells do work → use horse to plow fields → plant seeds → Sun energy → sugar etc., etc., etc.).</p> <p>Topic: Explaining How the Sun's Energy Drives Earth's Weather and Climate <i>Students will be able to:</i> 8.316 explain the role of the atmosphere's ozone layer in absorbing harmful ultraviolet radiation. 8.320 examine isobars on weather maps to describe how wind (moving air) travels from a region of high pressure to a region of low pressure. 8.321 examine maps of ocean currents and trace the origin and flow of such currents to explain the transfer of heat energy. Identify which currents have dominant influence on the Delaware Coast. 8.323 use diagrams or simulations of the hydrologic cycle to describe the Sun's effect on the water cycle and to describe the circulation of water through the Earth's crust, oceans, and atmosphere.</p>

SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects

Grade Six	Grade Seven	Grade Eight
		<p>Topic: Constructing Models That Explain the Visual and Physical Relationships Among the Earth, Sun, Moon, and the Solar System <i>Students will be able to:</i> 8.327 demonstrate an understanding of our solar system which includes the moon, the sun, eight other planets and their moons, and smaller objects such as asteroids and comets. Explain how the sun is the central and largest body in our solar system and the source of the light energy that hits our planet. 8.330 explain how the force of gravity keeps planets in orbit around the Sun.</p> <p>Topic: Tracking Growth, Change, and Adaptations in Ecosystems Over Time <i>Students will be able to:</i> 8.339 construct food webs and identify the relationships among producers, consumers, and decomposers. 8.340 design food webs and trace the flow of matter and energy (beginning with the Sun) through the food web. Recognize that energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis.</p>

SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effects

Grade Nine

Grade Ten

Grade Eleven

To view the **Performance Indicators** for **High School Science Level One** (Grade Nine), **Level Two** (Grade Ten), and **Level Three** (Grade Eleven) please refer to the **Teachers' Desk Reference Grades 9 – 12** the DOE website <http://www.doe.state.de.us>.

**SCIENCE STANDARD THREE
Performance Indicators
Energy and Its Effect**

Before selecting an Extended Performance Indicator* the IEP team should...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

- X.305** Demonstrate understanding of temperature.
- X.306** Accept/utilize/maintain task-related clothing, equipment, safety routines.
- X.307** Respond to universal safety symbols.
- X.308** Initiate/follow specific safety/hygiene procedures.
- X.309** Identify/respond to potential safety problems.
- X.310** Demonstrate appropriate safety using appliances/tools (e.g., cords, sharp items, hot items).
- X.311** Show protective reactions.
- X.312** Recognize, respond to and/or anticipate dangerous situations.
- X.313** Follow established routines during dangerous situations.

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.

SCIENCE STANDARD FOUR

Earth in Space

Topic: Earth in Space End of Cluster Expectations

By the end of grade 3 students will know that:

Solar System Models

- There are many objects in the solar system including the Sun, Moon, planets, and comets. Most of the objects are separated by vast space and enormous distances.
- The size of an object appears to change as the observer moves closer to or farther away from the object.

Interactions in the Solar System

- Every 24 hours the Earth makes a full rotation on its axis which causes the day and night cycle.
- There are many objects in the sky such as the Sun, Moon, stars, clouds, birds, and airplanes. The patterns of movement of some of these objects such as the Sun, Moon, and stars are cyclic.

Technology and Applications

- People who live and work in space need special clothing and equipment. Astronauts wear space suits, which are designed and constructed by Delaware scientists, to protect themselves from the extreme conditions of space.

By the end of grade 5 students will know that:

Solar System Models

- Earth's position relative to the Sun affects conditions on Earth. Earth's rotation on a tilted axis and its revolution around the Sun cause variations in the amount of solar energy hitting Earth's surface and such variations cause seasons.

Interactions in the Solar System

- The Earth is one of several planets that orbit the Sun. As the Earth orbits the Sun, different patterns of stars can be seen in different seasons.
- Rotation of Earth on its axis once every 24 hours causes day and night and makes the Sun, Moon, planets, and stars appear to move across the sky from east to west each day.

Technology and Applications

- Technology allows scientists to explore the Solar System and to observe and measure features and structures of the Earth, Moon, and other solar objects.

Science Standard Four

Topic: Earth in Space

End of Cluster Expectations

By the end of grade 8 students will know that:

Solar Systems Models

- The universe is composed of billions of stars. The Sun is a medium size star which is many millions of miles closer to Earth than the next nearest star.
- The solar system forms part of the Milky Way Galaxy, which is one of many galaxies that comprise the Universe. Some of the galaxies are so far away that their light takes billions of years to reach Earth.
- The nine planets, their respective moon(s), comets and many asteroids, and meteorites orbit the Sun which is the gravitational center of the solar system.
- The apparent shape of the Moon changes dramatically as it moves in its orbit. These shapes, called phases, relate to lunar visibility and the times at which the Moon rises and sets. The Moon produces no light of its own and shines only as a result of sunlight reflected from its surface.
- The yearly revolution of Earth in its orbit about the Sun and the tilt of Earth on its axis (23.5 degrees) cause the angle at which sunlight strikes the Earth to vary at different locations. This causes differences in the heating of Earth's surface which produce seasonal variations in weather and a variety of climates.

Interactions in the Solar System

- Nuclear processes that take place in the Sun continuously convert matter to energy. A small portion of this energy which is intercepted by Earth drives biological, chemical, and physical process on Earth.
- The gravitational attraction that exists between all forms of matter holds objects on Earth, causes tides, keeps the solar system and galaxy together, and controls the movement of the planets in the solar system.

Technology and Applications

- Close-up pictures and data received from space probes allow scientists to compare the physical properties of planets (e.g., size, surface features, number of rings) and to speculate about conditions on other planets.

By the end of grade 12 students will know that:

Solar System Models

- 4.11 The Solar System is a very small part of a constantly changing Universe. Stars, including the Sun, appear to go through cycles that are characterized by birth, development, and death. Existence of gas and dust around nearby stars supports the theory that planetary systems continue to evolve.
- 4.12 The stars in the Milky Way Galaxy are separated by vast distances. Although it takes light from the Sun eight minutes to reach the Earth, it takes the light from the next nearest star four years to reach Earth. Light which reaches Earth from distant galaxies is millions of years old and is actually a view of the past.
- 4.13 The distance from the center of the nebula to points of condensation determined the position of the planets in the Solar System. The masses of the condensed proto-planets determined which elements were retained, as well as their physical state.
- 4.14 The tilt of the Earth's axis relative to its orbital plane does not change as the Earth orbits the Sun during a year. Seasonal variations of the apparent path of the Sun through the sky determine how directly the Sun's rays strike and warm different areas of the Earth.

Interactions in the Solar System

- 4.21 Gravitation pulls planets toward the Sun balancing each planet's energy of motion. The gravitational pull of the Sun and the Moon determine the times for high tides and the intensity of these tides on Earth.
- 4.22 Solar energy radiates through space and is distributed on Earth by radiation, conduction, and convection. Energy transfer powers atmospheric and oceanic circulation.

Technology and Application

- 4.31 Space exploration expands our knowledge of the Universe and advances the technological sophistication of society.

SCIENCE STANDARD FOUR
Performance Indicators
Earth in Space

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
	<p>Topic: Weather Patterns and Their Influence on Living Things <i>Students will be able to:</i> 1.301 keep daily records of temperature and weather conditions and use these records to identify patterns over short and long periods of time.</p>		<p>Topic: Earth, Moon, and Sun: Patterns of Movement in the Sky <i>Students will be able to:</i> 3.301 construct and use simple solar system models to demonstrate and explain that the Sun, Moon, and planets are separated by a vast space and enormous distance. 3.302 describe the Earth's 24-hour day/night rotation using simple models. 3.303 observe the day and night sky for at least a one month period of time and identify those objects such as the Sun, Moon, and stars whose patterns of movement are cyclic. 3.304 identify and explain how the inventions and contributions of Delaware scientists and businesses have contributed to the success of the Nation's space program.</p>	<p>Topic: Using Models to Explain the Solar System <i>Students will be able to:</i> 4.301 design and construct simple models to demonstrate how the Earth's movement and position alter the visibility of constellations. 4.302 observe and record the apparent path of the Sun and chart the times and directions of sunrise and sunset over an extended period of time. 4.303 demonstrate through the use of simple models why the Sun, Moon, and stars appear to move across the sky from east to west each day.</p>	

**SCIENCE STANDARD FOUR
Performance Indicators
Earth in Space**

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Using Models to Explain the Solar System <i>Students will be able to:</i> 4.304 analyze NASA photographs and satellite images of the Earth, Moon, and other planets and identify similar and dissimilar features. 4.305 use simple models to explain how light from the Sun travels in straight lines and interacts with objects in the solar system. 4.306 use simple models to explain how the Earth's position relative to the Sun determines the length of daylight.</p>	

**SCIENCE STANDARD FOUR
Performance Indicators
Earth in Space**

Grade Six	Grade Seven	Grade Eight
		<p>Topic: Constructing Models that Explain the Visual and Physical Relationships Among the Earth, Sun, Moon, and the Solar System</p> <p><i>Students will be able to:</i></p> <p>8.327 demonstrate an understanding of our solar system which includes the Moon, the Sun, eight other planets and their moons, and smaller objects such as asteroids and comets. Explain how the Sun is the central and largest body in our solar system and the source of the light energy that hits our planet.</p> <p>8.328 use models, charts, illustrations, and other suitable representations to predict regular patterns of motion for most objects in the solar system.</p> <p>8.329 model and explain how the regular and predictable motion of most objects in the solar system is responsible for observed phenomena such as day/night and the year. Use models to show how the motion of the Moon about the Earth and the location of the Sun relative to the Earth and its Moon explains the regular patterns of phases of the Moon, eclipses, and tides.</p> <p>8.330 explain how the force of gravity keeps planets in orbit around the sun.</p>

**SCIENCE STANDARD FOUR
Performance Indicators
Earth in Space**

Grade Six	Grade Seven	Grade Eight
		<p>Topic: Constructing Models that Explain the Visual and Physical Relationships Among the Earth, Sun, Moon, and the Solar System (continued) <i>Students will be able to:</i></p> <p>8.331 construct scale models of the solar system in order to describe the relative sizes of planets (as viewed from Earth) and their distances from the Sun. Understand how a telescope magnifies the appearance of certain objects in the sky, including the Moon and the planets.</p> <p>8.332 use a variety of resources (e.g., NASA photographs, computer simulations, satellite images) to compare and contrast the physical properties (e.g., temperature, size, composition, surface features) of planets. Use this information to explain why Earth is a suitable planet for life.</p> <p>8.333 study a space probe mission and the evidence it provides scientists that either confirms or refutes theories about conditions on other planets.</p> <p>8.334 observe and demonstrate that patterns of stars only appear to move across the sky and that different stars can be seen at different times of the year.</p> <p>8.335 investigate how some people have used the movement of objects in the sky in order to tell time and location.</p> <p>8.336 use scale drawings, models, or triangulation to determine the distance between specific points in the solar system.</p>

SCIENCE STANDARD FOUR
Performance Indicators
Earth in Space

Grade Nine

Grade Ten

Grade Eleven

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**SCIENCE STANDARD FOUR
Performance Indicators
Earth in Space**

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Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

X.314 Demonstrate an overall understanding of temporal concepts (e.g., seasons, am/pm, week by week, yesterday/today, first/last).

X.315 Demonstrate an understanding of temperature.

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.

SCIENCE STANDARD FIVE

Earth's Dynamic Systems

Topic: Earth's Dynamic Systems End of Cluster Expectations

By the end of grade 3 students will know that:

Components of Earth

- Earth's materials include rocks, soil, water, and air. Differences exist in all these materials and these differences can be used to sort and classify them.
- The surface of Earth is surrounded by the atmosphere, a thin layer of air that supports life and has physical properties that are measurable and predictable.
- Water exists in different states (solid, liquid, gas) and in different forms such as rain, snow, hail, and vapor. Water is stored in reservoirs, lakes, oceans, ponds, bays, and ice and is a valuable natural resource essential to all living things.

Interactions Among Earth's Systems

- The surface of the Earth changes constantly. Some of these changes happen slowly and are difficult to detect on a daily basis. Other changes happen quickly and result from events such as heavy rain storms, ice storms, hurricanes, and tornados.
- Repeating patterns can be found in weather and seasonal changes. Plant, animal, and human activities are influenced by these patterns.

Technology and Applications

- Technology enables meteorologists to predict changing weather patterns. Weather forecasts influence decisions concerning human activity.

By the end of grade 5 students will know that:

Components of Earth

- Rocks are natural combinations of one or more minerals and are formed under a variety of conditions. Rocks, minerals, and soils are classified according to their physical properties
- Soil is composed of rock material broken down by weathering and erosion and organic material that is decomposed. A soil's composition varies from place to place and helps determine which plants grown in a particular area.
- Water exists in the air as water vapor (e.g., clouds and fog) and is found on the surface as a liquid or solid, and below the surface as ground water. Water moves throughout Earth's systems by changing phase as a result of condensation and evaporation.

Interactions Among Earth's Systems

- Geologic features of Earth's surface such as mountains, plateaus, plains, lakes, streams, oceans, and glaciers are constantly changing, making the surface of the land different from location to location.

Technology and Applications

- Many of Earth's resources are limited or non-renewable. Careful planning and use are necessary to extend their availability.

Science Standard Five

Topic: Earth's Dynamic Systems

End of Cluster Expectations

By the end of grade 8 students will know that:

Components of Earth

- Rocks and minerals are classified according to their chemical and physical properties. Rocks also are classified according to how they are formed.
- Sedimentary rocks, which are made of particles from other rocks and organic remains, are laid down in horizontal layers. Fossilized remains and successive layering of sedimentary rocks provide evidence of the Earth's history. Absolute age is determined by radioactive dating.
- The atmosphere has properties that can be observed, measured, and used to predict changes in weather and to identify climatic patterns.
- Water falling to Earth flows over the surface as run-off and collects in ocean basins, rivers, lakes, ice caps, and underground. Water stored underground (subsurface) and water stored above ground (surface) form a continuum, each supplying water to the other. Human activity and natural events can introduce chemicals affecting the quality of water supply.

Interactions Among Earth's Systems

- Volcanoes, earthquakes, and other mountain-building processes are responsible for most major features of the Earth's crust.
- Rocks are changed by erosion and deposition and by exposure to heat and pressure. There are a variety of physical and chemical processes that lead to the decomposition and breakdown of rocks and the eventual formation of soils and sediments. These soils and sediments can then be transported to other places by wind, flowing water, waves, and ice.
- The cycling of water in the atmosphere is driven by energy transfer processes, such as convection and radiation, and is constantly changing the location and phase of water.
- Uneven heating and cooling of Earth's surface produce various air masses which differ in density, humidity, and temperature. The origin, movement, and interaction of these air masses result in significant weather changes.
- Ocean currents affect the weather and long-term climatic patterns of a region. Large bodies of water (oceans, the Great Lakes, inland seas) can also affect the weather and climate of an area.

Technology and Applications

- Instrumentation (e.g., pH meters, water analysis kits) and computer models enable the measurement and analysis of environmental pollution. Sources of environmental pollution can be tracked using maps and satellite imagery.

By the end of grade 12 students will know that:

Components of Earth

- 5.11 Long term exposure of rocks to different environments results in weathering and decomposition and the production of soils and sediments. Differences in the geographical origin of rock materials lead to variations in the physical properties and chemical composition of soil.
- 5.12 A mixture of gases, water vapor, and solid particles comprise the Earth's atmosphere. Variations in atmospheric composition caused by either natural or human activities influence life on Earth.
- 5.13 Sub-surface water is a limited resource and must be judiciously managed. The rate of movement of sub-surface water is controlled by differences in elevation and the porosity and permeability of the rock and soil through which it moves.

Interactions Among Earth's Systems

- 5.21 The theory of plate tectonics is supported by structural evidence (volcanoes, plateaus, mountain ranges) geophysical evidence (earthquake waves, magnetic reversals in rock), and paleontological evidence (biological similarities between flora and fauna of widely separated continents).
- 5.22 Movement of tectonic plates releases energy, bringing new materials to Earth's surface, which balances the effects of erosion and weathering.
- 5.23 Physical features of Earth result from a balance of processes that elevate and wear down land surfaces and move materials from higher to lower elevations.
- 5.24 Radiation from the Sun drives the circulation of air and water around the Earth leading to a variety of weather phenomena and regional climates.

Technology and Applications

- 5.31 The understanding of global and local changes that result from the interactions of ocean systems has increased substantially as a result of continuous advances in science and technology.
- 5.32 Both relative and absolute means are used to determine the ages of rocks and the sequence of geological events. The relative age of sedimentary rock is determined by the chronological record of geological strata and fossils, and the absolute age is determined by radioactive dating.

SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.301 observe and describe the properties of a variety of living and non-living things using the 5 senses. K.303 use the physical properties of living and non-living things (e.g., prickliness, slickness, stretchiness, and squishiness) to describe their similarities and differences. K.304 sort, group, and regroup a variety of familiar living and non-living things based on their physical properties (e.g., shape, color, texture, taste, size, etc.). K.305 identify the hand lens (magnifier) as an appropriate instrument for observing and discussing living and non-living things in greater detail.</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.308 conduct short-term and long-term investigations on selected outdoor plots or natural systems such as aquariums or terrariums and identify the living and non-living components of the plot or systems. 1.309 identify the number of different kinds of living things in an outdoor plot or natural system and compare the similarities and differences in these living things.</p> <p>Topic: Weather Patterns and Their Influence on Living Things <i>Students will be able to:</i> 1.301 keep daily records of temperature and weather conditions and use these records to identify patterns over short and long periods of time.</p>	<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.308 conduct simple tests to identify the three basic components of soil and to compare and contrast the unique properties of each of the components. 2.309 select and use appropriate instruments (e.g., hand lens/magnifier, droppers, funnels, filter paper, sieves) to analyze soil samples. 2.310 interpret test results and draw conclusions about soil composition. 2.311 record and organize the results of soil tests and explain these results through writing, drawing, and discussion. 2.312 reflect on the test results and predict how plants will grow in different soils.</p>	<p>Topic: Earth: A Rock Planet <i>Students will be able to:</i> 3.305 observe a variety of Earth's materials such as rocks, sand, and soil and sort the materials into groups based on similar physical properties. 3.306 examine an assortment of rocks and use appropriate measuring tools (balances, meter tapes, syringes) to gather data about the rocks' physical properties (length, circumference, weight). 3.307 examine rocks in order to identify their composition and to recognize that they are made up of more than one component. 3.308 recognize that rocks are composed of Earth materials called minerals that cannot be physically broken apart any further.</p>	<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.307 analyze materials that make up land and describe these on the basis of their properties. 4.308 sort and classify samples of Earth materials according to physical properties such as color, luster, weight relative to size, particle size, and hardness. 4.309 recognize that wearing away and moving soil and rock is erosion; the settling of eroded materials is deposition.</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.317 identify changes to a particular ecosystem as resulting from either natural or human-made events and explain whether the changes are beneficial or harmful. 5.318 conduct simple investigations to determine the effects different conditions, factors, or pollutants (e.g., pH of water, road salt, fertilizer run off) could possibly have on an ecosystem.</p>

SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.306 use a hand lens (magnifier) to inspect a variety of living and non-living things and demonstrate through discussion or drawings how the lens extends the sense of sight. K.307 demonstrate, through a variety of ways (e.g., matching the picture to the word, applying thematic vocabulary), development of appropriate vocabulary used to describe living and non-living things. K.310 use non-standard units of measure (e.g., string around trees, paper clips to measure length of leaves) to compare the size and weight of living and non-living things.</p>	<p>Topic: Weather Patterns and Their Influence on Living Things <i>Students will be able to:</i> 1.302 organize weather data on graphs and on long-term data collection charts. 1.303 interpret and summarize long-term weather data. 1.305 select and use appropriate instruments such as wind scales (e.g., flags, pinwheels), thermometers and rain gauges to measure different features of weather. 1.306 describe different weather conditions (e.g., sunny, foggy, rains, and seasonal patterns) and identify the impact these conditions have on plant, animal, and human activity. 1.307 recognize that meteorologists are scientists who study, observe, and record information about the weather and who use this information to forecast the weather.</p>	<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.313 explain how composting is an effective method to recycle plants and other discarded organic matter.</p>	<p>Topic: Earth: A Rock Planet <i>Students will be able to:</i> 3.309 sort and group an assortment of minerals based on similarities and differences in their physical properties. 3.310 order or serrate a group of minerals based on such physical properties as hardness, color, and luster. 3.311 conduct simple tests (e.g., scratch test, fizz test) to identify rocks' mineral composition and record and discuss the test results. 3.312 recognize that fossils or fossil imprints contained in rocks provide evidence of living organisms that have inhabited the Earth.</p>	<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.310 use stream tables (e.g., inclined tray) to model natural processes and to compare the changes in land created by water flowing over and through soil. 4.311 use stream tables (e.g., inclined tray) to model natural processes and to determine the effects of slope, flow, and land formation caused by erosion and deposition. 4.312 select and use a variety of appropriate instruments for collecting, recording, and analyzing data obtained from stream table investigations. 4.313 communicate the results of stream table investigations through record sheets, oral and written observations, and drawings.</p>	

**SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems**

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Examining the Rate at which Forces Change Earth</p> <p>4.314 conduct simple investigations to determine how different types of soil (sand, clay, humus) affect plant growth and develop and use the results of the investigation to support an individual's choice to fertilize, irrigate a parcel of land, etc.</p> <p>4.315 select a current or past issue that has been discussed in the media such as the building of Delaware Route 1, damming of various rivers, replenishing coastal beaches, expanding urban development to determine how human activity affects the interaction between land and water.</p> <p>4.316 recognize the role that plants play in curbing erosion and run off and determine the degree to and manner in which Delawareans are working to preserve the natural areas such as wetlands, forests, and sand dunes.</p>	

SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems

Grade Six	Grade Seven	Grade Eight
<p>Topic: Investigating the Rock Cycle as Evidence of a Changing Earth <i>Students will be able to:</i></p> <p>6.313 identify and classify rocks and minerals according to their physical and chemical properties.</p> <p>6.314 explain the difference between minerals (a relatively pure substance that occurs in the Earth and has a crystalline form) and rocks (a combination of different minerals).</p> <p>6.315 create models of rock formation to investigate how igneous, sedimentary, and metamorphic rocks are formed.</p> <p>6.316 classify unknown rock samples (e.g., igneous, sedimentary, or metamorphic) based on identifiable characteristics. Explain how this method of classifying is related to the rock's formation.</p> <p>6.317 investigate factors that cause weathering of rocks. (e.g., exposure to wind, precipitation, temperature changes, plant growth, acid rain, etc.).</p>	<p>Topic: Understanding the Importance of Protecting Delaware Watersheds <i>Students will be able to:</i></p> <p>7.336 use maps to locate Delaware watersheds and to identify the bodies of water into which they drain.</p> <p>7.337 use models or diagrams to explain how water stored underground and water stored above ground form a continuum each supplying water to the other.</p> <p>7.338 use diagrams of the hydrologic cycle to describe the circulation of water through the Earth's crust, oceans, and atmosphere.</p> <p>7.339 recognize that water is a solvent and as it passes through the water cycle it dissolves minerals, gases, and pollutants and carries them to surface water and ground water supplies.</p> <p>7.340 identify the sources of drinking water for the citizens of Delaware.</p>	<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes <i>Students will be able to:</i></p> <p>8.307 explain how uneven heating of earth's components – water, land, air – produce global atmospheric and oceanic movement. Describe how these global patterns of movement influence weather and climate.</p> <p>8.308 use models to explain how variations in the amount of Sun's energy hitting the Earth's surface results in seasons.</p> <p>8.309 use a variety of models, charts, diagrams, or simple investigations to explain how the Sun's energy causes water to cycle through the Earth's crust, oceans, and atmosphere.</p> <p>8.312 recognize that forces result from the transformation of energy and can be constructive or destructive. Both constructive forces (e.g., volcanic eruptions and deposition of sediment) and destructive forces (e.g., weathering and erosion) shape the Earth's surface.</p>

**SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems**

Grade Six	Grade Seven	Grade Eight
<p>Topic: Investigating the Rock Cycle as Evidence of a Changing Earth (continued) <i>Students will be able to:</i></p> <p>6.318 survey the local area (e.g., walk around the school building, visit a cemetery) to observe, describe and explain the visual and structural effects of weathering on both natural and manmade rock structures.</p> <p>6.319 examine soil samples to identify and discuss factors that determine soil composition and structure (type of underlying rocks, climate, sorts of vegetation present).</p> <p>6.320 investigate how rocks are cycled through the processes of weathering, erosion, transport, and deposition.</p> <p>6.321 conduct simulations to demonstrate how erosion (e.g., beach erosion) and deposition of rock and soil (e.g., beach formation) lead to the development of land forms.</p> <p>6.322 recognize that successive layers of sedimentary rock and the fossilized remains found in those layers confirm Earth's long history.</p>	<p>Topic: Understanding the Importance of Protecting Delaware Watersheds (continued) <i>Students will be able to:</i></p> <p>7.341 conduct tests (e.g., pH, dissolved oxygen) or surveys (e.g., macroinvertebrate) to determine the ecological health and potability of local water samples.</p> <p>7.342 conduct investigations to determine the extent to which the permeability and porosity of a soil sample effect water percolation.</p> <p>7.343 describe the role of wetlands and streamside forests (riparian) in filtering water as it runs off into local streams, rivers, and bays or seeps into ground water.</p> <p>7.344 distinguish between point source water pollutants and non-point source water pollutants.</p> <p>7.345 explain the impact of human activities (e.g., farming, building roads, fertilizing golf courses, etc.) on the quality of Delaware's waters.</p> <p>7.346 research the processes used by municipalities to ensure water taken from local reservoirs is safe to drink.</p>	<p>Topic: Investigating How Energy Transformations Drive Physical, Chemical, and Biological Processes (continued) <i>Students will be able to:</i></p> <p>8.313 conduct simple investigations to determine how constructive and destructive forces alter the surface of the earth (e.g., build model glaciers, formation of river beds, stream tables that model weathering and erosion, model wind erosion, etc.).</p> <p>Topic: Explaining How the Sun's Energy Drives Earth's Weather and Climate <i>Students will be able to:</i></p> <p>8.315 verify that the atmosphere has properties that can be observed, measured, and used to predict changes in weather. Recognize that the atmosphere has different properties at different elevations.</p> <p>8.316 explain the role of the atmosphere's ozone layer in absorbing harmful ultraviolet radiation.</p> <p>8.317 record and interpret daily weather measurements over an extended period of time using a variety of instruments (e.g., barometer, anemometer, sling psychrometer, etc.) in order to predict and to identify weather patterns.</p>

SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems

Grade Six	Grade Seven	Grade Eight
<p>Topic: Investigating the Rock Cycle as Evidence of a Changing Earth (continued) <i>Students will be able to:</i> 6.323 compare and contrast fossils and anatomical models to draw reasonable conclusions regarding evolutionary change over time (e.g., trilobites → horseshoe crabs, belemnites → squid).</p>	<p>Topic: Understanding the Importance of Protecting Delaware Watersheds (continued) <i>Students will be able to:</i> 7.347 investigate the extent to which legislation such as the Clean Water Act has impacted the quality of Delaware water.</p>	<p>Topic: Explaining How the Sun's Energy Drives Earth's Weather and Climate (continued) <i>Students will be able to:</i> 8.318 classify clouds according to their characteristics and explain how clouds formed by condensation affect weather and climate. 8.319 use weather maps to describe the movement of air masses, fronts, and storms and to predict their influence on local weather. 8.320 examine isobars on weather maps to describe how wind (moving air) travels from a region of high pressure to a region of low pressure. 8.321 examine maps of ocean currents and trace the origin and flow of such currents to explain the transfer of heat energy. Identify which currents have dominant influence on the Delaware coast. 8.322 compare and contrast weather and climate. 8.323 use diagrams or simulations of the hydrologic cycle to describe the Sun's effect on the water cycle and to describe the circulation of water through the Earth's crust, oceans, and atmosphere. 8.324 discuss the origin of the great storms of the east coast (e.g. hurricanes, "nor Easters", snow, and ice storms). Describe the environmental, economic, and human impact of these storms. 8.325 examine satellite imagery pictures and describe the use of these images in photographing weather systems and producing forecasts. 8.326 identify factors that increase the acidity of rain water and explain the effects of acid rain on buildings, cars, plants, animals, lakes, etc.</p>

**SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems**

Grade Nine

Grade Ten

Grade Eleven

To view the **Performance Indicators** for **High School Science Level One** (Grade Nine), **Level Two** (Grade Ten), and **Level Three** (Grade Eleven) please refer to the **Teachers' Desk Reference Grades 9 – 12** the DOE website <http://www.doe.state.de.us>.

**SCIENCE STANDARD FIVE
Performance Indicators
Earth's Dynamic Systems**

Before selecting an Extended Performance Indicator* the IEP team should...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.

SCIENCE STANDARD SIX

Life Processes

Topic: Life Processes End of Cluster Expectations

By the end of grade 3 students will know that:

Characteristics of Living Things

- Plants and animals are alive and have characteristics that make them different from each other and non-living things.

Requirements for Survival

- Plants and animals need food, water, air, light, and a suitable environment for survival.

Regulation and Behavior

- The human body has parts that perform many different functions such as legs for walking, eyes for seeing, a mouth for talking and eating, and hands for holding. The human brain sends messages to all body parts so that they work properly and work together.

Health and Technology Application

- A well-balanced diet, adequate rest, exercise, and good hygiene are essential for people to stay healthy.

By the end of grade 5 students will know that:

Structure/Function Relationship

- Living things have structures that function to help them reproduce, grow, and survive in different kinds of places.

Flow of Matter and Energy

- All living organisms interact with the living and non-living parts of their surroundings to meet their needs for survival. These interactions lead to a constant exchange of matter and energy. Plants derive energy from the Sun for growth and survival. Animals eat plants or other animals that have also eaten plants to satisfy their energy needs. When plants and animals die, they are eaten by decomposers.

Regulation and Behavior

- Living organisms are composed of parts that work together to ensure the survival of the whole organism. The behavior of an organism is influenced by internal clues such as hunger and external clues such as air temperature.

Health and Technology Application

- Technological advances in medicine, the development of various safety devices and protective equipment, and improvements in hygiene have helped in the diagnosis and treatment of illness and have reduced the number of damaging and life threatening injuries.

Science Standard Six

Topic: Life Processes

End of Cluster Expectations

By the end of grade 8 students will know that:

Structure/Function Relationship

- The basic unit of all living organisms is the cell. In multicellular organisms, different cells are specialized to perform various tasks, and cells similar in shape and function are organized into groups (e.g., muscle cells, motor nerve cells).
- Cells contain a set of observable structures called organelles (e.g., cell wall, cell membrane, nucleus, chloroplast, and vacuole) that control the various functions of the cell, such as structural support, exchange of materials, photosynthesis, and storage of essential materials.
- Unicellular organisms perform, within a single cell, all of life's specific functions, such as water regulation, digestion, locomotion, and circulation, using specialized structures for each function.

Matter and Energy Transformations

- Plants make their food by the process of photosynthesis. Using light energy, green plants convert water and carbon dioxide into energy-rich simple sugars and oxygen. Sugar is the source of food used by most plants and ultimately, by all other consumers. Oxygen produced during photosynthesis is required for the survival of most plants and animals.
- All living things obtain energy from food. Energy is needed for living cells to carry out all the processes of life, such as growing, disposing of wastes, making new cells, and using food

Regulation and Behavior

- All organisms obtain and use resources to grow, reproduce, and maintain a relatively stable internal environment while living in a constantly changing external environment. Regulation of an organism's internal environment involves sensing external changes in the environment and changing physiological activities to keep within the range required to survive. (National Science Foundation Standards, 1994)
- Behavior is one kind of response an organism makes to environmental stimuli. Behavioral responses require coordination and communication at many levels including cells, organ systems, and whole organisms.

Health and Technology Applications

- The functioning and health of organisms, including humans, are influenced by heredity, diet, lifestyle, bacteria, viruses, parasites, and the environment. Certain body structures and systems function to protect against disease and injury.
- Sanitation measures such as the use of sewers, landfills, quarantines, and safe food handling are important in controlling the spread of organisms that cause disease.

By the end of grade 12 students will know that:

Structure/Function Relationship

- 6.11 Cells are the fundamental structural and functional units of all living organisms. Cells take highly varied forms in different plants, animals, and microorganisms. Structural variations among cells determine the function each cell performs.
- 6.12 Cells have distinct and separate structures (organelles) which perform and monitor processes essential for survival of the cell (e.g., energy production, waste disposal, synthesis of new molecules, storage of genetic material). The highly specific function of each organelle is directly related to its structure.
- 6.13 The cell membrane defines the boundary of the cell and regulates the passage of materials into and out of the cell. Transport mechanisms across the membrane are dependent on membrane structure and concentration gradients.
- 6.14 Cells store and use information to guide their functions. DNA molecules in each cell carry coded instructions for synthesizing protein molecules. The protein molecules have important structural and regulatory functions.

Matter and Energy Transformations

- 6.21 Cells carry out a variety of chemical transformations which allow conversion of energy from one form to another, the breakdown of molecules into smaller units, and the building of larger molecules from smaller ones. Most of these transformations are made possible by protein catalysts called enzymes.
- 6.22 Plant cells contain plastids which convert light energy into chemical energy through the process of photosynthesis. This chemical energy is used by the plants to convert carbon dioxide and water into high energy food molecules such as lipids and carbohydrates. Photosynthesis adds oxygen to the atmosphere and removes CO₂.
- 6.23 All organisms including plants, use the process of cellular respiration to transform high energy food molecules produces during photosynthesis into energy. The energy produces is stored in the phosphate linkages of ATP and is used by organisms to conduct their life processes. Cellular respiration may require oxygen and adds carbon dioxide to the atmosphere.
- 6.24 Photosynthesis and cellular respiration are complimentary processes to the flow of energy and the cycling of matter in ecosystems.

Science Standard Six

Topic: Life Processes

End of Cluster Expectations

By the end of grade 12 students will know that:

Regulation and Behavior (continued)

- 6.31 In multi-cellular organisms, cells perform specialized functions as parts of sub-systems (e.g., tissues, organs, and organ networks) which work together to maintain optimum conditions for the benefit of the whole organism. Coordination of these functions is accomplished by a specialized cells or groups of cells that monitor stimuli from the organism's internal and external environment enabling the organism to respond to changing environmental conditions.
- 6.32 Behavioral responses result from interactions between organisms of the same species or different species as well as from environmental changes. These responses can be innate or learned and have evolved to insure reproductive success of the species.

Health and Technology Applications

- 6.41 Certain chemicals, pathogens, and high energy radiation seriously impair normal cell functions and the health of the organism. The scientific investigation of cellular chemistry enables the biotechnology industry to produce medicines, foods, and other products for the benefit of society.
- 6.42 The scientific investigation of cellular chemistry enables the biotechnology industry to produce medicines, foods, and other products for the benefit of society.

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.301 observe and describe the properties of a variety of living and non-living things using the 5 senses. K.302 identify the 5 sense organs and explain which sense is associated with which organs. K.303 use the physical properties of living and non-living things (e.g., prickliness, slickness, stretchiness, and squishiness) to describe their similarities and differences. K.304 sort, group, and regroup a variety of familiar living and non-living things based on their physical properties (e.g., shape, color, texture, taste, size, etc.).</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.308 conduct short-term and long-term investigations on selected outdoor plots or natural systems such as aquariums or terrariums and identify the living and non-living components of the plot or systems. 1.309 identify the number of different kinds of living things in an outdoor plot or natural system and compare the similarities and differences in these living things. 1.310 observe a variety of living organisms (plants and animals) and identify basic needs common to the organisms such as food, water, air, shelter, etc.</p>	<p>Topic: Healthy Growth and Development of Humans <i>Students will be able to:</i> 2.301 use simple devices such as watches, thermometers, stethoscopes, scales, and measuring tapes to collect, record, and graph personal health data and to discuss individual, group, or class trends or patterns. 2.302 examine a variety of food items, including ones targeted especially for young students, and sort items based on their benefits for growing and staying healthy. 2.303 identify technologies (e.g., refrigerator, cooler, vacuum packaging, plastic wrap) which are used to keep foods fresh and explain why spoiled foods are dangerous to the health and well being of humans.</p>	<p>Topic: Human Body: How Form Relates to Function <i>Students will be able to:</i> 3.313 identify different parts of the body (eyes, bones, muscles, heart, etc.) and explain what function the specific body parts perform. 3.314 select several body parts and explain how the parts work together to perform different body functions (eating, walking). 3.315 recognize that the human brain sends messages to all body parts so that they work properly and work together. 3.316 conduct simple investigations to determine and explain how different body parts respond to different kinds of visual, auditory, and tactile stimuli. 3.317 explain how health is influenced by the proper functioning of different body parts.</p>	<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.314 conduct simple investigations to determine how different types of soil (sand, clay, humus) affect plant growth and develop and use the results of the investigation to support an individual's choice to fertilize, irrigate a parcel of land, etc.</p> <p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.317 observe and describe structures in living organisms (plants and animals) that enable them to reproduce, grow, and survive in their environment.</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.315 observe a variety of living organisms within natural or simulated ecosystems and identify structures, features, and behaviors of the organisms that enable them to survive in their ecosystems. 5.316 identify those factors that affect the growth and reproduction of organisms in an ecosystem such as light, water, temperature, and soil. 5.317 identify changes to a particular ecosystem as resulting from either natural or human-made events and explain whether the changes are beneficial or harmful.</p>

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.305 identify the hand lens (magnifier) as an appropriate instrument for observing and discussing living and nonliving things in greater detail. K.306 use a hand lens (magnifier) to inspect a variety of living and non-living things and demonstrate through discussion or drawings how the lens extends the sense of sight. K.307 demonstrate, through a variety of ways (e.g., matching the picture to the word, applying thematic vocabulary), development of appropriate vocabulary used to describe living and nonliving things. K.310 use non-standard, units of measure (e.g., string around trees, paper clips to measure length of leaves) to compare the size and weight of living and non-living things.</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.312 recognize that organisms grow, change and die over time and record and communicate various changes observed in living things through writings, drawings, and discussions. 1.313 select the hand lens as an appropriate instrument for observing greater detail of organisms. 1.314 sort and group plants and animals based on their physical properties or behavioral characteristics.</p>	<p>Topic: Healthy Growth and Development of Humans <i>Students will be able to:</i> 2.304 explain how childhood injuries and illnesses can be prevented or avoided, by reducing threatening situations such as coughing or sneezing on others, not wearing a helmet when cycling, attending school with a fever, and swimming unattended. 2.306 identify various ways to exercise (running, raking leaves, walking the dog, biking) and discuss the benefits of regular exercise for maintaining a healthy body. 2.307 discuss precautions that should be taken to minimize the risk of spreading or contracting an illness (coughing or sneezing on others, drinking from someone's glass, attending school with a fever).</p>		<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.318 develop simple classification systems (properties of germination, territorial behavior) based on similarities and differences in the structures or behavior of living organisms. 4.319 observe, compare, and record variations within a species (e.g., crayfish, grass hoppers, bean plants, tree seedlings) and predict how the variations may affect the ability of the organism to survive. 4.321 select a living organism and develop descriptions of how the organism responds to a variety of stimuli, based on multiple observations and data collection.</p>	<p>Topic: The Human Body and Healthy Living <i>Students will be able to:</i> 5.328 describe how the interaction of body systems contributes to healthy growth and development. 5.329 explain the effect one organ can have on another organ and how each organ contributes to the well being of a person. 5.330 investigate and describe how a variety of external stimuli (e.g., temperature, bright light, smells) trigger different body responses. 5.331 explain how life style and heredity as well as pathogens are related to the cause or prevention of disease and other health problems. 5.332 set a personal health goal and track progress toward its achievement.</p>

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
		<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.312 reflect on the test results and predict how plants will grow in different soils.</p> <p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.315 maintain a record of an organism's growth and change over time and identify both the basic and specific survival needs of this organism. 2.316 identify and describe specific features of an organism that help it survive in its environment. 2.317 observe parents and offspring from a selected species of organism and identify characteristics that offspring have in common with their parents and characteristics which are different from their parents.</p>		<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.323 develop reasonable, testable scientific questions about the life cycle of organisms (e.g., the effect of variations within species, how the structure of an organism relates to the function it performs, etc.) and plan and conduct a simple investigation to answer the questions.</p>	<p>Topic: The Human Body and Healthy Living <i>Students will be able to:</i> 5.333 analyze and describe how science and technology have contributed to healthy living. 5.334 identify local community agencies that advocate for healthy individuals, families, and communities.</p>

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
		<p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.318 identify evidence of changes in growth and development of an organism such as shedding of skin, increase in body size, increase in excrement, decrease in the amount of food eaten. 2.319 observe growth and change in the life cycle of an organism and relate this to change and growth in their (students) own bodies.</p>			

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Grade Six	Grade Seven	Grade Eight
<p>Topic: Investigating the Rock Cycle as Evidence of a Changing Earth <i>Students will be able to:</i> 6.323 compare and contrast fossils and anatomical models to draw reasonable conclusions regarding evolutionary change over time (e.g., trilobites horseshoe crabs®, belemnites squid®).</p>	<p>Topic: Investigating the Cellular Dimensions of Living Systems <i>Students will be able to:</i> 7.311 identify and apply criteria for determining whether specimens or samples are living or non-living. 7.312 observe both unicellular and multi-cellular organisms to identify common life processes. Recognize that the more complex the organism, the greater the extent of cellular specialization. 7.313 identify and describe how specific structures of living organisms are responsible for particular life processes. 7.314 compare and contrast the interactive systems of unicellular and multi-cellular organisms. 7.315 use microscopes and other appropriate tools and technology to observe and compare a variety of unicellular organisms. Explain how specific cellular structures perform such specialized functions as water regulation, digestion, locomotion, and circulation. 7.316 use microscopes and other appropriate tools and technology to observe multi-cellular organisms (plant and animal cells) and explain how the structures of the major organelles are related to the functions they perform. 7.317 demonstrate an understanding of structure/function relationships at the cellular level using a variety of appropriate representations (e.g., analogy of a city or a factory performing a variety of specialized jobs, analogy of an automobile doing work, space stations at work, etc.). 7.318 recognize that for multi-cellular organisms, most interactions that sustain life take place at the cellular level. Explain how the energy and materials needed by cells to perform work and to build new materials are derived from the food and oxygen taken in by the organism.</p>	<p>Topic: Tracking Growth, Change and Adaptations in Ecosystems Over Time Students will be able to: 8.339 construct food webs and identify the relationships among producers, consumers, and decomposers. 8.340 design food webs and trace the flow of matter and energy (beginning with the sun) through the food web. Recognize that energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis.</p>

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Grade Six	Grade Seven	Grade Eight
	<p>Topic: Investigating the Cellular Dimensions of Living Systems (continued) <i>Students will be able to:</i></p> <p>7.319 select several human body systems and explain how they interact to transport the food and oxygen required by all cells to perform work and to build new materials.</p> <p>7.320 conduct simple investigations (how the body reacts to exercise, changes in temperature, etc.) to determine how the systems in the human organism respond to various external stimuli to maintain stable internal conditions.</p> <p>7.321 explain how the systems of the human body interact to protect against disease and injury.</p> <p>7.322 research the sequence of events that lead to formulation of the cell theory and explain how the events correlate with technological advancements.</p>	

SCIENCE STANDARD SIX
Performance Indicators
Life Processes

Grade Nine

Grade Ten

Grade Eleven

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**SCIENCE STANDARD SIX
Performance Indicators
Life Processes**

Before selecting an Extended Performance Indicator* the IEP team should...

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Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

X.316 Accept/participate in a variety of personal care routines (e.g., toileting, feeding, grooming, dressing, using tissues, taking medications, other health related activities).

X.317 Initiate/complete/maintain personal care routines.

X.318 Accept/participate in personal health management (e.g., taking medicine, using tissue).

X.319 Accept/participate in domestic routines.

X.320 Initiate/follow domestic routine when presented with written, pictorial, or tactile symbols.

X.321 Identify, obtain, and/or operate appropriate equipment for housekeeping tasks.

X.322 Initiate and/or complete housekeeping tasks.

X.323 Participate, plan and/or prepare meals/snacks.

X.324 Follow an established emergency plan.

X.325 Demonstrate appropriate safety using appliances/tools (e.g., cords, sharp items, hot items).

X.326 Plan domestic activities by sequencing a schedule (e.g., visual, tactile, auditory).

X.327 Indicate food groups, healthy choices and/or balanced meals.

X.328 Demonstrate ability to perform first-aid techniques.

X.329 Arrange for appointments for personal care/health (e.g., haircuts, doctor, dentist).

- Activities, coming soon!

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SCIENCE STANDARD SEVEN

Diversity and Continuity of Living Things

Topic: Diversity and Continuity of Living Things End of Cluster Expectations

By the end of grade 3 students will know that:

Heredity and Reproduction

- The offspring of plants and animals resemble their parents in many ways although they are not exactly like their parents or each other.
- The offspring of some plants and animals look very different from their parents when there are first born. Similarities between parents and their offspring become more apparent after the offspring develops.
- The phases in the life cycle of plants and animals (i.e., birth, growth, reproduction, and death) are predictable and describable but differ from species to species.

Diversity

- Many different kinds of plants and animals live throughout the world and can be classified or sorted into groups based upon appearance and behavior.

Evolution

- Plants and animals have features that help them survive and reproduce in different places.
- Fossils provide evidence that present day plants and animals are both similar to and different from those that lived in the past. These fossil records indicate that some plants and animals that once lived on Earth no longer exist.

Biotechnology and Its Application

- Humans have always applied their knowledge of the varied characteristics of plants and animals to satisfy their needs for food, shelter, and clothing.

By the end of grade 5 students will know that:

Heredity and Reproduction

- Physical characteristics are passed on from parent to offspring. Organisms with two parents inherit characteristics of both

Diversity

- Organisms have many distinct and unique features which they use for finding food, building shelters, evading predators, and reproducing. Scientists use similarities and differences in these features to classify and group organisms.

Evolution

- Organisms of the same species have variations which may provide an advantage in reproduction and survival.

Biotechnology and Its Application

- The climate and soils in Delaware are ideal for growing a great variety of fruits and vegetables. Delaware scientists continue to explore ways to improve the growing conditions and quality of these crops.

Science Diversity and Continuity of Living Things

End of Cluster Expectations

By the end of grade 8 students will know that:

Heredity

- Chromosomes, which are components of cells, occur in pairs and carry hereditary information. The subunits of chromosomes are genes which direct the formation of an organism's traits.

Reproduction and Development

- In asexual reproduction, a new organism grows from a single cell or a cluster of cells provided by the parent and results in offspring genetically identical to the parent.
- In sexual reproduction, gametes (egg and sperm), which are produced in specialized structures of the parents, fuse during fertilization to form an organism. Since each gamete contributes a set of chromosomes, the offspring have traits of both parents.
- After the egg is fertilized, it undergoes an orderly series of changes involving cell division and differentiation as a new organism is formed. Each of the new cells in the developing organism receives an exact copy of the genetic information contained in the fertilized egg.

Evolution

- Natural selection is the process by which some individuals with certain traits are more likely to survive and produce greater numbers of offspring than other organisms of the same species. Conditions in the environment can affect which individuals survive in order to reproduce and pass their traits on to future generations. Small differences between parents and offspring accumulate over many generations and ultimately new species may arise.
- Anatomical comparisons and fossils provide evidence for evolution and indicate that the first organisms originated on the Earth between three and four billion years ago. The Earth's present-day species evolved from earlier, distinctly different species.

Diversity

- Organisms are currently classified into five kingdoms (monera, protista, fungi, plantal, animalia) based on similarities in structure and behavior.
- A species is an important biological grouping of organisms whose members have similar structures, normally interbreed, and produce fertile offspring.

By the end of grade 12 students will know that:

Heredity

- 7.11 Heredity/genetic information in chromosomes is contained in molecules of DNA that consist of various combinations of four different subunits (nucleotides) that encode this information. Genes are sections of DNA that direct syntheses of specific proteins associated with traits in organisms.
- 7.12 Principles of Mendelian genetics are useful in determining the pattern of inheritance for many traits.
- 7.13 Gene mutations are alterations in normal DNA structure which can be caused by coding error in DNA synthesis, heat, radiation and certain chemicals. Mutations may be beneficial, harmful, or neutral to cell function and can be passed on to an organism's offspring. Somatic mutations are not heritable.

Reproduction and Development

- 7.21 During the cell cycle, DNA of the parent cell replicates to form identical chromosomes and genes and the cell divides into two identical offspring cells.
- 7.22 During the cell division process that forms gametes (meiosis), the number of chromosomes is reduced by one-half and genes are shuffled and recombined. The sorting and recombination of genes in sexual reproduction result in a great variety of possible gene combinations in the offspring.
- 7.23 Embryological development in plants and animals involves a series of orderly changes in which cells divide and differentiate. Development is controlled by genes whose expression is influenced by many internal and external factors.

Evolution

- 7.31 The process of natural selection occurs when some heritable variations that arise from mutation and recombination give individuals within a species some survival advantages over others. These advantaged offspring are more likely to survive and reproduce, thus increasing the proportion of individuals with advantageous characteristics. New species may form when populations become isolated from each other.

Diversity (continued)

- Each structure in an organism is uniquely adapted to perform a particular function for enhancing the ability of the organism to survive. The great variety of body forms found in different species enables organisms to survive in diverse environments.

Health and Technology Application:

- Selective breeding is used to produce new varieties of cultivated plants and domesticated animals with enhanced traits.
- Knowledge gained from research in genetics is being applied to areas of human health.

Evolution (continued)

- 7.32 Evolution does not proceed at the same rate in all organisms; nor does it progress in some set direction. Some organisms have remained relatively unchanged for millions of years while other have died out altogether. In addition, some complex organisms have evolved from simple unspecialized forms of life (e.g., green algae to vascular plants), while other species are the result of complex life forms evolving to simple forms (e.g., winged birds to flightless birds). Environmental changes have a strong influence on this whole process.

Diversity

- 7.41 Organisms are classified into a hierarchy of groups and subgroups, based on structural similarities and evolutionary relationships.
- 7.42 Similarities in DNA and protein structure are used to classify and determine degrees of kinship among organisms.
- 7.43 Variations of organisms within a species and diversity among species increase the likelihood that at least some organisms will survive major changes in the environment.

Health and Technology Applications

- 7.51 The expanding ability to manipulate genetic material, reproductive processes, and embryological development are being used to diagnose and treat human abnormalities as well as manufacture new consumer products. These applications raise many ethical, legal, social, and public policy questions.
- 7.52 Recombinant DNA technology, which is a form of genetic engineering, involves the insertion of DNA from one cell into another cell where the inserted DNA is expressed. Genetic engineering is being applied in many areas of biology, agriculture, and medicine.
- 7.53 DNA is analyzed to study populations, identify individuals, and diagnose genetic disorders.

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.301 observe and describe the properties of a variety of living and non-living things using the 5 senses. K.303 use the physical properties of living and non-living things (e.g., prickliness, slickness, stretchiness, and squishiness) to describe their similarities and differences. K.304 sort, group, and regroup a variety of familiar living and non-living things based on their physical properties (e.g., shape, color, texture, taste, size, etc.). K.305 identify the hand lens (magnifier) as an appropriate instrument for observing and discussing living and non-living things in greater detail.</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.312 recognize that organisms grow, change, and die over time and record and communicate various changes observed in living things through writings, drawings, and discussions.</p>	<p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.314 observe the life cycle of a selected organism (e.g., plant, butterfly, frog, etc.) and recognize that the phases of the life cycle are predictable and describable. 2.315 maintain a record of an organism's growth and change over time and identify both the basic and specific survival needs of this organism. 2.316 identify and describe specific features of an organism that help it survive in its environment.</p>		<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.317 observe and describe structures in living organisms (plants and animals) that enable them to reproduce, grow, and survive in their environment. 4.318 develop simple classification systems (properties of germination, territorial behavior) based on similarities and differences in the structures or behavior of living organisms.</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.315 observe a variety of living organisms within natural or simulated ecosystems and identify structures, features, and behaviors of the organisms that enable them to survive in their ecosystem. 5.316 identify those factors that affect the growth and reproduction of organisms in an ecosystem such as light, water, temperature, and soil.</p> <p>Topic: The Human Body and Healthy Living <i>Students will be able to:</i> 5.331 explain how life style and heredity as well as pathogens are related to the cause or prevention of disease and other health problems.</p>

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.306 use a hand lens (magnifier) to inspect a variety of living and non-living things and demonstrate through discussion or drawings how the lens extends the sense of sight. K.307 demonstrate, through a variety of ways (e.g., matching the picture to the word, applying thematic vocabulary), development of appropriate vocabulary used to describe living and non-living things. K.310 use non-standard units of measure (e.g., string around trees, paper clips to measure length of leaves) to compare the size and weight of living and non-living things.</p>		<p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.317 observe parents and offspring from a selected species of organism and identify characteristics that offspring have in common with their parents and characteristics which are different from their parents. 2.318 identify evidence of changes in growth and development of an organism such as shedding of skin, increase in body size, increase in excrement, decrease in the amount of food eaten. 2.319 observe growth and change in the life cycle of an organism and relate this to change and growth in their (students) own bodies.</p>		<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.319 observe, compare, and record variations within a species (e.g., crayfish, grass hoppers, bean plants, tree seedlings) and predict how the variations may affect the ability of the organism to survive. 4.320 differentiate between an organism's habitat (where an animal lives) and its territory (an area claimed by its own space). 4.321 select a living organism and develop descriptions of how the organism responds to a variety of stimuli based on multiple observations and data collection.</p>	

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.322 maintain journals to record systematically the growth and development of a selected organism and compare and discuss journal entries with classmates. 4.323 develop reasonable, testable scientific questions about the life cycle of organisms (e.g., the effect of variations within species, how the structure of an organism relates to the function it performs, etc.) and plan and conduct a simple investigation to answer the questions.</p>	

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Grade Six	Grade Seven	Grade Eight
<p>Topic: Developing Criteria for Classifying Living and Nonliving Things <i>Students will be able to:</i></p> <p>6.335 identify and apply criteria for determining whether specimens or samples are living or nonliving.</p> <p>6.336 recognize that there is a standard system of classifying and naming species that is used throughout the world.</p> <p>6.337 identify “kingdom” as the first main level of the standard classification system. Observe a variety of living organisms and determine into which kingdom they would be classified.</p> <p>6.338 examine an assortment of plants and animals and use simple classification keys, based on observable features, to sort and group the organisms.</p> <p>6.339 investigate appropriate methods that could be used to obtain samples of plants and animals from a specific area. Design and conduct a survey of the area to explain the diversity of local plants and animals.</p> <p>6.340 discuss how the different species of plants and animals, from the area surveyed, might be classified. Develop classification flow charts (dichotomous keys) to group and classify the observed species.</p>	<p>Topic: Genetics: The Key to Inheritance and Diversity <i>Students will be able to:</i></p> <p>7.323 recognize that reproduction is a characteristic of all living systems and is essential to the continuation of the species.</p> <p>7.324 compare and contrast asexual and sexual reproduction.</p> <p>7.325 use models or diagrams to explain why sexually produced offspring are never identical to their parents.</p> <p>7.326 use models or diagrams to identify the structures of a flowering plant that produce eggs and sperm and explain that plants also reproduce sexually.</p> <p>7.327 distinguish between dominant and recessive traits.</p> <p>7.328 use models to demonstrate that chromosomes and genes come in pairs and that chromosomes are composed of many genes. Use these same models to discuss how genetic material is transmitted from cell to cell or from parent to offspring.</p>	<p>Topic: Tracking Growth, Change, and Adaptations in Ecosystems Over Time <i>Students will be able to:</i></p> <p>8.337 survey the diversity of organisms in a local or model ecosystem and recognize that a population consists of all individuals of a species that occur together at a given place and time.</p> <p>8.344 conduct a natural selection simulation to demonstrate how a specific trait has selective advantages for an organism.</p> <p>8.345 investigate and discuss how short-term physiological adaptations of an organism (e.g., skin tanning, muscle development, formation of calluses) differ from long-term evolutionary adaptations (e.g., white coloration of polar bears, seed formation in plants) that occur in a group of organisms over generations.</p>

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Grade Six	Grade Seven	Grade Eight
	<p>Topic: Genetics: The Key to Inheritance and Diversity (continued) <i>Students will be able to:</i></p> <p>7.329 construct Punnett squares and pedigree charts to demonstrate and predict how single gene traits such as seed shape in peas and tongue rolling in humans are transmitted to offspring.</p> <p>7.330 use a variety of resources to develop a report on selective breeding. Select an organism (e.g., super sweet corn, oven stuffed roaster) and trace its history of development and the traits of the plant or animal that were enhanced by selective breeding.</p> <p>7.331 select one area of biotechnology (genetic, reproduction, or embryonic research) and explain the human benefits as well as the economic, social, and ethical issues raised by such research.</p> <p>7.332 recognize that species acquire many of their unique characteristics through biological adaptations, which involve the selection of naturally occurring variations in populations.</p> <p>7.333 observe a variety of organisms and explain how a specific trait could increase an organism's chances of survival.</p> <p>7.334 conduct a natural selection simulation to demonstrate that a specific trait has selective advantages for an organism.</p> <p>7.335 Explain how the extinction of a species occurs when the environment changes and the adaptation of a species is insufficient to allow for its survival.</p>	

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Grade Nine

Grade Ten

Grade Eleven

To view the **Performance Indicators** for **High School Science Level One** (Grade Nine), **Level Two** (Grade Ten), and **Level Three** (Grade Eleven) please refer to the **Teachers' Desk Reference Grades 9 – 12** the DOE website <http://www.doe.state.de.us>.

SCIENCE STANDARD SEVEN
Performance Indicators
Diversity and Continuity of Living Things

Before selecting an Extended Performance Indicator* the IEP team should...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.

SCIENCE STANDARD EIGHT

Ecology

Topic: Ecology End of Cluster Expectations

By the end of grade 3 students will know that:

Interactions Within the World Around Us

- The Earth consists of living and non-living things. All living things interact with each other and the non-living parts of their surroundings – air, water, soil, and Sun.
- Living things depend on each other in many ways. Animals use plants for shelter, and eat plants and other animals for food. Plants depend on animals to carry their pollen and to disperse their seeds.
- People depend on living and non-living resources to satisfy the need for food, clothing, shelter, and fuel. Care must be exercised in the use of these resources since, in many cases, their supply is limited.

Changes in Environments

- Living things change the area in which they live.

Technology and Its Influence on the Environment

- Technology continues to be developed which allows many different kinds of materials to be reduced, recycled, and reused. Recycling and reuse extend the life of material and reduce the amount of discarded products in landfills.
- Modern technology enables farmers to increase crop production. Technology also allows food to be stored for long periods and transported long distances without spoiling.

By the end of grade 5 students will know that:

Interactions Within the World Around Us

- All living organisms interact with the living and non-living parts of their surroundings to meet their needs for survival. These interactions lead to a constant exchange of matter and energy. Plants derive energy from the Sun for growth and survival. Animals eat plants or other animals that have also eaten plants to satisfy energy needs. Dead plants and animals are eaten by decomposers.

Changes in Environments

- Organisms adapt in order to live and reproduce in certain environments. Those organisms that are best suited for a particular environment have adaptations that allow them to compete for available resources and cope with the physical conditions of their immediate surroundings.
- Changes in an organism's environment can be either beneficial or harmful. Organisms may be affected by other organisms, by various physical factors (e.g., rainfall, temperature), by physical forces (e.g., storms, earthquakes), and by daily, seasonal, and annual cycles.
- Pollution and human activities can change the environment and adversely affect the health and survival of humans and other species. Careful planning and safe practices are required in waste disposal, recycling and waste management, pest control, and use of resources to ensure the well being of humans and the environment.

Technology and Its Influence on the Environment

- Various technologies are used to access resources or create conveniences needed by society. In many cases, there are significant environmental impacts and resource limitations that need to be considered. Such activities include logging; building of highways, shopping centers, and dams; introduction of one species to control another species; spraying of insects; as well as some aspects of farming.

Science Standard Eight

Topic: Ecology

End of Cluster Expectations

By the end of grade 8 students will know that:

Flow of Matter and Energy in an Ecosystem

- An ecosystem consists of all the organisms that live together and interact with each other and their physical environment.
- Interactions in an ecosystem result from the transfer of matter and energy from producers to consumers and eventually to decomposers. The total amount of matter and energy in the system remains the same even though its form and location changes.
- Matter is recycled in an ecosystem, and energy which enters the system as sunlight is stored in the bodies of organisms, used by consumers to support their activities, or dissipated to the environment as heat energy. Loss of heat from an ecosystem is compensated for by continuous input of solar energy.

Change in Ecosystems

- Changes in the physical or biological conditions of an ecosystem can alter the diversity of species in the system. As the ecosystem changes, populations of organisms must adapt to these changes, move to another ecosystem, or become extinct.
- The size of populations in an ecosystem may increase or decrease as a result of the interrelationships among organisms, availability of resources, natural disasters, habitat changes, and pollution.

Technology and Its Influence on the Environment

- Agriculture relies heavily on technology to increase productivity. Advances in irrigation allow crops and to control damage done by rodents, fungi, insects, and weeds. The need to increase agricultural production results in environmental trade-off (e.g., saltwater intrusion, water table lowering, agricultural runoff into rivers/streams, elimination of beneficial insects, desertification).

Interaction of Humans Within Ecosystems

- The extinction or introduction of species can affect the stability of ecosystems. With careful planning, humans may be able to sustain ecosystems for their use as well as preserve their biodiversity and natural beauty.
- Decisions about the use of natural resources are often determined by a society's short-term needs for the resources with little regard for long-term consequences. The supply of natural resources such as water and petroleum is finite. Nonmaterial resources (e.g., tranquility, beautiful scenery) cannot be easily quantified but must be preserved.

By the end of grade 12 students will know that:

Flow of Matter and Energy in Ecosystems

- 8.11 The supply of nutrients and the efficiency of solar energy transformations are two major factors which ultimately determine the number of organisms and species in an ecosystem.
- 8.12 The law of conservation of matter applies to ecosystems. Matter needed to sustain life in ecosystems is continually recycled (e.g., carbon cycle, water cycle, nitrogen cycle, mineral cycles) among organisms and between organisms and the environment.
- 8.13 The law of conservation of energy applies to ecosystems. All energy is conserved as it passes from the Sun through an ecosystem. During energy transformations some energy is converted to biologically unusable waste heat which is eventually lost and replenished by a continual input of solar energy.
- 8.14 Each species in an ecosystem occupies the niche for which it is best suited. In general, no two species occupy the same niche. This allows different species to coexist successfully and helps to maintain the stability of the ecosystem.

Changes in Ecosystems

- 8.21 Earth's ecosystems are interconnected by biological, chemical, and physical processes. Changes in one ecosystem may have local or global consequences.
- 8.22 Ecosystems are reasonably stable over long periods of time and tend to have cyclic fluctuations around a point of equilibrium. An ecosystem can react to stabilize conditions (e.g., pH, nutrient reduction, temperature, disease) and restore itself to its original state. Ecosystems undergo major changes as a result of such factors as climatic change, introduction of new species, and habitat destruction.
- 8.23 Ecosystems have a carrying capacity for each species. Overpopulation can lead to depletion of resources and elimination of species.

Interaction of Humans Within Ecosystems

- 8.31 All organisms are dependent upon the Earth's finite supply of material resources to sustain life. Human decision concerning the use of resources alters the stability and the biodiversity of ecosystems and adversely affect the natural recycling processes which maintain the quality of air, water, and land.
- 8.32 The availability of and access to natural resources shape the economic policies of society and form a basis for international trade agreements. Unequal distribution of resources and increased demand for natural resources require global cooperation and long-term planning to satisfy the resource needs of successive generations.
- 8.33 People manage the Earth and its resources by preservation, conservation, appropriate utilization, and restoration. There is a wide variety of national laws (e.g., CLEAN AIR ACT, CLEAN WATER ACT, ENDANGERED SPECIES

ACT) and state laws (e.g., COASTAL ZONE ACT) that exist to protect the environment.

Technology and Its Influence on the Environment (continued)

- 8.41 Continuous growth in human population and depletion of land suitable for farming require farmers to rely on modern agricultural technologies to meet demands for increased crop yields. The use of these technologies, however, involves economic and environmental tradeoffs.
- 8.42 The development of massive transportation systems has enabled the movement of population and goods by air, land, and water and has led to major changes in demographics and land use.

SCIENCE STANDARD EIGHT
Performance Indicators
Ecology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.301 observe and describe the properties of a variety of living and non-living things using the 5 senses. K.303 use the physical properties of living and non-living things (e.g., prickliness, slickness, stretchiness, and squishiness) to describe their similarities and differences. K.304 sort, group, and regroup a variety of familiar living and non-living things based on their physical properties (e.g., shape, color, texture, taste, size, etc.). K.305 identify the hand lens (magnifier) as an appropriate instrument for observing and discussing living and non-living things in greater detail.</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.308 conduct short-term and long-term investigations on selected outdoor plots or natural systems such as aquariums or terrariums and identify the living and non-living components of the plot or systems. 1.309 identify the number of different kinds of living things in an outdoor plot or natural system and compare the similarities and differences in these living things. 1.310 observe a variety of living organisms (plants and animals) and identify basic needs common to the organisms such as food, water, air, shelter, etc. 1.311 recognize that in addition to common basic needs, organisms also have specific needs such as type of water, range of temperature, type of food.</p>	<p>Topic: Explaining How the Properties of Soils Affect Living Things <i>Students will be able to:</i> 2.312 reflect on the test results and predict how plants will grow in different soils. 2.313 explain how composting is an effective method to recycle plants and other discarded organic matter.</p> <p>Topic: Life Cycles of Living Things <i>Students will be able to:</i> 2.315 maintain a record of an organism's growth and change over time and identify both the basic and specific survival needs of this organism. 2.316 identify and describe specific features of an organism that help it survive in its environment.</p>		<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.314 conduct simple investigations to determine how different types of soil (sand, clay, humus) affect plant growth and develop and use the results of the investigation to support an individual's choice to fertilize, irrigate a parcel of land, etc. 4.315 select a current or past issue that has been discussed in the media such as the building of Delaware Route 1, damming of various rivers, replenishing coastal beaches, expanding urban development to determine how human activity affects the interaction between land and water.</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.310 recognize that models that simulate an ecosystem can be used to learn about the complex relationships that exist within ecosystems throughout the world. 5.311 use pictorial models to explain relationships within an ecosystem such as food chains or simple food webs. 5.312 use appropriate equipment such as hand lens, pH paper, and measuring devices to conduct, record, and organize long-term daily observations of a natural or simulated ecosystem. 5.313 trace the flow of matter and energy through an ecosystem by constructing simple diagrams (food chains or a web of food chains) that include the Sun, producers, consumers, and decomposers.</p>

SCIENCE STANDARD EIGHT
Performance Indicators
Ecology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
<p>Topic: Using the Senses to Observe Living and Non-Living Things <i>Students will be able to:</i> K.306 use a hand lens (magnifier) to inspect a variety of living and non-living things and demonstrate through discussion or drawings how the lens extends the sense of sight. K.307 demonstrate, through a variety of ways (e.g., matching the picture to the word, applying thematic vocabulary), development of appropriate vocabulary used to describe living and non-living things. K.310 use non-standard units of measure (e.g., string around trees, paper clips to measure length of leaves) to compare the size and weight of living and non-living things.</p>	<p>Topic: Requirements for Living Things to Survive in Their Habitats <i>Students will be able to:</i> 1.314 sort and group plants and animals based on their physical properties or behavioral characteristics.</p> <p>Topic: Weather Patterns and Their Influence on Living Things <i>Students will be able to:</i> 1.306 describe different weather conditions (e.g., sunny, foggy, rains, and seasonal patterns) and identify the impact these conditions have on plant, animal, and human activity.</p>			<p>Topic: Examining the Rate at which Forces Change Earth <i>Students will be able to:</i> 4.316 recognize the role that plants play in curbing erosion and run off and determine the degree to and manner in which Delawareans are working to preserve natural areas such as wetlands, forest, sand dunes.</p> <p>Topic: Using Electricity in Everyday Life <i>Students will be able to:</i> 4.329 describe how, when, and where electricity is generated for the local community and the sources of raw materials used to produce the community's electricity.</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.314 categorize the organisms within an ecosystem according to the function they serve: producers, consumers, or decomposers. 5.315 observe a variety of living organisms within natural or simulated ecosystems and identify structures, features, and behaviors of the organisms that enable them to survive in their ecosystems. 5.316 identify those factors that affect the growth and reproduction of organisms in an ecosystem, such as light, water, temperature, and soil. 5.317 identify changes to a particular ecosystem as resulting from either natural or human-made events and explain whether the changes are beneficial or harmful.</p>

SCIENCE STANDARD EIGHT
Performance Indicators
Ecology

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.317 observe and describe structures in living organisms (plants and animals) that enable them to reproduce, grow, and survive in their environment. 4.318 develop simple classification systems (properties of germination, territorial behavior) based on similarities and differences in the structures or behavior of living organisms. 4.319 observe, compare, and record variations within a species (e.g., crayfish, grass hoppers, bean plants, tree seedlings) and predict how the variations may affect the ability of the organism to survive. 4.320 differentiate between an organism habitat (where an animal lives) and its territory (an area claimed by its own space).</p>	<p>Topic: Interactions Between Living Things and Their Environment <i>Students will be able to:</i> 5.318 conduct simple investigations to determine the effects different conditions, factors, or pollutants (e.g., pH of water, road salt, fertilizer run off) could possibly have on an ecosystem. 5.320 use evidence obtained from experiments to inform those ecosystem decisions that may be expressed in writings, drawings, discussions, or presentations.</p>

**SCIENCE STANDARD EIGHT
Performance Indicators
Ecology**

Kindergarten	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
				<p>Topic: Relating Structures of Living Things to Their Function <i>Students will be able to:</i> 4.321 select a living organism and develop descriptions of how the organism responds to a variety of stimuli based on multiple observations and data collection. 4.322 maintain journals to record systematically the growth and development of a selected organism and compare and discuss journal entries with classmates. 4.323 develop reasonable, testable scientific questions about the life cycle of organisms (e.g., the effect of variations within species, how the structure of an organism relates to the function it performs, etc.) and plan and conduct a simple investigation to answer the questions.</p>	

SCIENCE STANDARD EIGHT
Performance Indicators
Ecology

Grade Six	Grade Seven	Grade Eight
	<p>Topic: Genetics: The Key to Inheritance and Diversity <i>Students will be able to:</i></p> <p>7.332 recognize that species acquire many of their unique characteristics through biological adaptations, which involve the selection of naturally occurring variations in populations.</p> <p>7.333 observe a variety of organisms and explain how a specific trait could increase an organism's chances of survival.</p> <p>7.334 conduct a natural selection simulation to demonstrate that a specific trait has selective advantages for an organism.</p> <p>7.335 explain how the extinction of a species occurs when the environment changes and the adaptation of a species is insufficient to allow for its survival.</p> <p>Topic: Understanding the Importance of Protecting Delaware Watersheds <i>Students will be able to:</i></p> <p>7.336 use maps to locate Delaware watersheds and to identify the bodies of water into which they drain.</p> <p>7.337 use models or diagrams to explain how water stored underground and water stored above ground form a continuum, each supplying water to the other.</p> <p>7.338 use diagrams of the hydrologic cycle to describe the circulation of water through the Earth's crust, oceans, and atmosphere.</p>	<p>Topic: Tracking Growth, Change and Adaptations in Ecosystems Over Time <i>Students will be able to:</i></p> <p>8.337 survey the diversity of organisms in a local or model ecosystem and recognize that a population consists of all individuals of a species that occur together at a given place and time.</p> <p>8.338 categorize populations of organisms according to the functions they serve in an ecosystem.</p> <p>8.339 construct food webs and identify the relationships among producers, consumers, and decomposers.</p> <p>8.340 design food webs and trace the flow of matter and energy (beginning with the Sun) through the food web. Recognize that energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis.</p> <p>8.341 describe factors (e.g., space, food, water, disease) that limit the number of organisms an ecosystem can support.</p> <p>8.342 construct data tables or line graphs to show population changes of a selected species over time.</p>

SCIENCE STANDARD EIGHT

Performance Indicators

Ecology

Grade Six	Grade Seven	Grade Eight
	<p>Topic: Understanding the Importance of Protecting Delaware Watersheds (continued) <i>Students will be able to:</i></p> <p>7.339 recognize that water is a solvent and as it passes through the water cycle it dissolves minerals, gases, and pollutants and carries them to surface water and ground water supplies.</p> <p>7.340 identify the sources of drinking water for the citizens of Delaware.</p> <p>7.341 conduct tests (e.g., pH, dissolved oxygen) or surveys (e.g., macroinvertebrate) to determine the ecological health and potability of local water samples.</p> <p>7.342 conduct investigations to determine the extent to which the permeability and porosity of a soil sample effect water percolation.</p> <p>7.343 describe the role of wetlands and streamside forests (riparian) in filtering water as it runs off into local streams, rivers, and bays or seeps into ground water.</p> <p>7.344 distinguish between point source water pollutants and non-point source water pollutants.</p> <p>7.345 explain the impact of human activities (e.g., farming, building roads, fertilizing golf courses, etc.) on the quality of Delaware's waters.</p> <p>7.346 research the processes used by municipalities to ensure water taken from local reservoirs is safe to drink.</p> <p>7.347 investigate the extent to which legislation such as the Clean Water Act has impacted the quality of Delaware water.</p> <p>7.348 explain how sanitation measures such as sewers, landfills, and water treatment are important in controlling the spread of organisms that contaminate water and cause disease.</p>	<p>Topic: Tracking Growth, Change, and Adaptations in Ecosystems Over Time <i>Students will be able to:</i></p> <p>8.343 observe graphs or data tables showing both the population growth of a species and the consequences of resource depletion on the population. Analyze the data and explain how exponential growth can have a dramatic effect on resources.</p> <p>8.344 conduct a natural selection simulation to demonstrate how a specific trait has selective advantages for an organism.</p> <p>8.345 investigate and discuss how short-term physiological adaptations of an organism (e.g., skin tanning, muscle development, formation of calluses) differ from long-term evolutionary adaptations (e.g., white coloration of polar bears, seed formation in plants) that occur in a group of organisms over generations.</p> <p>8.346 investigate local areas, disturbed and undisturbed, that are undergoing natural cycles of succession, such as abandoned gardens; uncut areas beneath power lines; areas along ditch banks, fences, and the edge of a forest. Predict how plant communities that grow in the area may change over time and how their presence determines what kinds of animals may move into and out of the areas.</p> <p>8.347 research and analyze data on human population changes that have occurred in a specific Delaware area or county. Discuss reasons for changes in human population and explain how these changes have affected biodiversity and availability of natural resources (e.g., habitat loss, water quality, reservation/concentration efforts).</p> <p>8.348 investigate some of the economic and environmental tradeoffs given Delaware's short-term and long-term resource management plans.</p> <p>8.349 contact the Department of Natural Resources or a wildlife agency to acquire information on animals or plants that have been introduced to Delaware. Investigate issues that relate to the introduction or reintroduction of a species into a local habitat (e.g., Norway Maple, Delmarva Fox Squirrel, Gypsy Moth).</p>

SCIENCE STANDARD EIGHT
Performance Indicators
Ecology

Grade Nine

Grade Ten

Grade Eleven

To view the **Performance Indicators** for **High School Science Level One** (Grade Nine), **Level Two** (Grade Ten), and **Level Three** (Grade Eleven) please refer to the **Teachers' Desk Reference Grades 9 – 12** the DOE website <http://www.doe.state.de.us>.

**SCIENCE STANDARD EIGHT
Performance Indicators
Ecology**

Before selecting an Extended Performance Indicator* the IEP team should...

First, review and select, if appropriate, performance indicators from the grade level for which the student is currently enrolled.

Second, if appropriate, modify a performance indicator from the grade level for which the student is currently enrolled (e.g., 4.216 round money as an estimation strategy could be modified as round money to the next highest dollar).

Third, if needed, review performance indicators from prior grade levels (working in a reverse grade order) and modify if needed (e.g., K.4.05 Take turns and demonstrate how to work cooperatively through sharing and taking turns could be modified as take turns or share).

EXTENDED PERFORMANCE INDICATORS

Using their mode of communication, with or without assistance, student will be able to:

X.330 Sorts items to recycle (e.g., newspaper, office paper, cans, glass).

X.331 Participates in recycling tasks (e.g., gather and crush cans, take cans to recycling center, prepare paper for recycling).

- Activities, coming soon!

*Extended Performance Indicators presented are only a sample list and should not be considered exhaustive. These Extended Performance Indicators may be modified or additional Extended Performance Indicators can be developed.