

VAST Kits Correlation to the Iowa Core Curriculum <i>last updated 12/2010</i>		Air & Weather	Balance & Motion	Balls & Ramps	Fabric	Habitats	Life C of Butterflies	Living Things	New Plants	Pebbles, Sand, Silt	Soils	Solids & Liquids	Trees	Wood & Paper		
															Principles that Underlie the Concepts	
Content Categories	Concepts & Skills														Principles that Underlie the Concepts	
Science as Inquiry	Ask questions about objects, organisms, and events in the environment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should answer their questions by seeking information from reliable sources of scientific information and from their own observations and investigations
Science as Inquiry	Plan and conduct simple investigations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	In earliest years, investigations are largely based on direct observations. As students develop, they design and conduct simple experiments to answer questions. It is important to follow appropriate safety procedures when conducting investigations.
Science as Inquiry	Use tools to gather data to extend the senses	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students use rulers, thermometers, watches, balances, spring scales, magnifiers and microscopes to extend their senses and their abilities to gather data.
Science as Inquiry	Use mathematics in scientific inquiry	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Mathematics is used to gather, organize and present data and to construct convincing explanations.
Science as Inquiry	Use data to construct reasonable explanations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should learn what constitutes evidence. Students' explanations should reflect the evidence they have obtained.
Science as Inquiry	Communicate investigations and explanations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should begin to develop the abilities to communicate, critique and analyze their work and the work of other students. Students should communicate orally, through writing or through drawings.
Physical Science	Understand and apply observable and measurable properties of objects.	X		X	X						X	X	X	X	X	Objects have many observable properties including size, weight, shape, color, temperature and the ability to react with other substances. Those properties can be measured using tools such as rulers, balances and thermometers. Objects are made of one or more materials such as paper, wood, and metal. Objects can be described by the properties of the materials from which they are made. Properties can be used to separate or sort a group of objects or materials.
Physical Science	Understand and apply characteristics of liquids and solids.	X		X							X		X			Materials can exist in different states – solid, liquid, and gas. Some common materials, such as water, can be changed from one state to another by heating or cooling.
Physical Science	Understand and apply the positions and motions of objects.	X	X	X												The position of an object can be described by locating it relative to another object or the background. An object's motion can be described by observing and measuring its position over time. An object's motion can be described by observing and measuring its position over time. An object's position or movement can be changed by pushing or pulling

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															Principles that Underlie the Concepts
Life Science	Understand and apply the characteristics of living things and how living things are both similar to and different from each other and from non-living things.					X	X	X	X		X		X		Living things share some common characteristics that are both similar to and different from non-living things. Different species of plants and animals have different observable characteristics by which they can be classified.
Life Science	Understand and apply life cycles of plants and animals.						X	X	X				X		Plants and animals have life cycles that include being born, developing into adults, reproducing, and eventually dying. Plants and animals closely resemble their parents.
Life Science	Understand and apply the basic needs of plants and animals and how they interact with each other and their physical environment.					X		X	X		X		X		Organisms have basic needs. For example, animals need air, water, and food; plants require air, water, nutrients, and light. Organisms interact with each other and their physical environment. Organisms can survive only in environments in which their needs can be met. The world has many different environments, and distinct environments support the life of different types of organisms.
Life Science	Understand and apply ways to help take care of the environment.						X						X	X	Chapter 12 of the Iowa Administrative Code states that science instruction shall include conservation of natural resources; and environmental awareness: Humans depend on their natural and constructed environments. Humans change environments in ways that can be either beneficial or detrimental to themselves or other organisms.
Life Science	Understand and apply fundamental human body structures (human body parts and their functions)														Humans have distinct body structures for functions including but not limited to walking, holding, seeing and talking.
Life Science	Understand and apply knowledge of good health habits.	X													See 21 st Century Skills core curriculum

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Earth & Space Science	Understand and apply properties of earth materials	X								X	X	X			Earth materials are solid rocks and soils, water and the gases of the atmosphere. The varied materials have different physical and chemical properties. Soils have properties of color and texture, capacity to retain water, and ability to support the growth of many kinds of plants, including those in our food supply.
Earth & Space Science	Understand and apply knowledge of daily and seasonal weather conditions	X											X		Weather changes from day to day and over the seasons. The sun provides the light and heat necessary to maintain the temperature of the earth.
Earth & Space Science	Understand and apply knowledge of events that have repeating patterns	X													Seasons of the year, day and night are events that are repeated in regular patterns. The sun's position in the sky can be observed and described. The sun can only be seen during our daylight hours. We are unable to see the sun at night because of the rotation of the earth.

Intermediate 3-4		VAST Kits Correlation to the Iowa Core Curriculum <i>last updated 3/2011</i>											
		Earth Materials	Electric Circuits	Human Body	Ideas & Inventions	Lifting Heavy Things	Motion & Design	Physics of Sound	Plant Growth & Dev	Structures of Life	Water		
Content Categories	Concepts & Skills												Principles that Underlie the Concepts
Science as Inquiry	Identify and generate questions that can be answered through scientific investigations	X	X	X	X	X	X	X	X	X	X	X	Students ask questions that they can answer with scientific knowledge combined with their own observations. Students recognize that different questions lead to different types of investigations.
Science as Inquiry	Recognize that scientists perform different types of investigations.	X	X	X	X	X	X	X	X	X	X	X	Types of investigations include describing objects, events, and organisms; classifying them; and doing a fair test (experimenting), depending on the types of questions they want to answer.
Science as Inquiry	Plan and conduct scientific investigations	X	X	X	X	X	X	X	X	X	X	X	Students should engage in systematic observation, making accurate measurements, and identifying and controlling variables. Students understand the concept of a fair test. Students follow appropriate safety procedures when conducting investigations.
Science as Inquiry	Use appropriate tools and techniques to gather, process, and analyze data.	X	X	X	X	X	X	X	X	X	X	X	Students enhance their skills with tools such as rulers, thermometers, balances, spring scales, magnifiers and microscopes. Students are introduced to the use of computers and calculators for conducting investigations. Students' use of appropriate tools is guided by the questions asked and the investigations students design.
Science as Inquiry	Incorporate mathematics in science inquiries.	X	X	X	X	X	X	X	X	X	X	X	Mathematics is used to gather, organize and present data and to construct convincing explanations
Science as Inquiry	Use evidence to develop reasonable explanations.	X	X	X	X	X	X	X	X	X	X	X	Students should determine what constitutes evidence. Students should judge the merits or strengths of the data and information used to make explanations. Students' explanations should reflect the evidence they have obtained in their investigations. Students should check their explanations against scientific knowledge, their own experiences, and observations of others.
Science as Inquiry	Communicate scientific procedures and explanations.	X	X	X	X	X	X	X	X	X	X	X	Students should communicate, critique, and analyze their work and the work of other students. Students should share procedures and explanations through various means of communication.

Intermediate 3-4		Earth Materials	Electric Circuits	Human Body	Ideas & Inventions	Lifting Heavy Things	Motion & Design	Physics of Sound	Plant Growth & Dev	Structures of Life	Water	
VAST Kits Correlation to the Iowa Core Curriculum <i>last updated 3/2011</i>												
Content Categories	Concepts & Skills											Principles that Underlie the Concepts
Physical Science	Understand and apply knowledge of how to describe and identify substances based on observable properties.	X	X		X	X		X		X	X	It may be necessary to use magnification to observe the component parts of some materials. A substance has characteristic properties. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties. The properties of a substance can be measured using tools and technology. When a new material (compound) is made by chemically combining two or more materials, it has properties that are different from the original materials. For that reason, many different materials can be made from a small number of basic materials.
Physical Science	knowledge of states of matter and changes in states of matter.										X	Materials can exist in different states – solid, liquid and gas. Some common materials can be changed from one state to another by heating or cooling.
Physical Science	Understand and apply knowledge of the concept of conservation of mass/matter.											When something is broken into parts, the parts have the same total mass as the original item.
Physical Science	Understand and apply knowledge of sound, light, electricity, magnetism, and heat.		X		X			X			X	Sound is produced when vibrations from objects travel through a medium and are received. Sound can vary in volume. The pitch of a sound can be varied by changing the rate of vibration. Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by an object. Electricity in circuits can produce light, heat, sound, and magnetic effects. Electricity can only flow through a closed circuit. Magnets attract and repel each other and certain kinds of other materials. Heat can be produced in many ways, such as burning, rubbing, or mixing one substance with another. Heat can move from one object to another by conduction.
Physical Science	Understand and apply knowledge of motion and forces					X	X				X	The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph. Changes in speed or direction of motion are caused by forces. The greater the force, the greater the change in motion. The more massive an object, the less effect a given force will have in changing its motion.

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Content Categories	Concepts & Skills											Principles that Underlie the Concepts
Life Science	Understand and apply knowledge of organisms and their environments			X				X	X	X	X	Animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. An organism's patterns of behavior are related to the nature of that organism's environment, including the kinds and numbers of other organisms present, the availability of food and resources, and the physical characteristics of the environment. When the environment changes, some plants and animals survive and reproduce, others die or move to new locations. All organisms cause changes in the environment in which they live. Some of these changes are detrimental to the organism or other organisms, whereas others are beneficial.
Life Science	Understand and apply knowledge of environmental stewardship.								X	X	X	Humans change environments in ways that can be either beneficial or detrimental to themselves or other organisms.
Life Science	knowledge of basic human body systems and how they work together			X								The human organism has systems which interact with one another. These systems include circulatory, respiratory, digestive, musculoskeletal, etc
Life Science	Understand and apply knowledge of personal health and wellness issues											See 21 st Century Skills Core Curriculum: (Grades 3-5) Obtain, interpret, understand and use basic health concepts to enhance personal, family, and community health. Utilize interactive literacy and social skills to establish personal family, and community health goals. Demonstrate critical literacy/thinking skills related to personal, family, and community wellness. Recognize that media and other influences affect personal, family and community health. Demonstrate behaviors that foster healthy, active lifestyles for individuals and the benefit of society.
Earth & Space Science	Understand and apply knowledge of properties and uses of earth materials.	X			X							The different physical and chemical properties of earth materials make them useful in different ways, for example, as building materials, as sources of fuel, or for growing the plants we use as foods.
Earth & Space Science	Understand and apply knowledge of processes and changes on or in the earth's land, oceans, and atmosphere.	X										The surface of the earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes such as landslides, volcanic eruptions, floods and earthquakes.

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Content Categories	Concepts & Skills											Principles that Underlie the Concepts
Earth & Space Science	Understand and apply knowledge of fossils and the evidence they provide of past life on earth											Fossils provide evidence of plants and animals that lived long ago and the nature of the environment at that time.
Earth & Space Science	Understand and apply knowledge of weather and weather patterns.											Weather is always changing and can be described by measurable quantities such as temperature, wind direction and speed and precipitation. Large masses of air with certain properties move across the surface of the earth. The movement and interaction of these air masses is used to forecast the weather
Earth & Space Science	Understand and apply knowledge of the properties, movements, and locations of objects in our solar system.											Most objects in the solar system are in regular and predictable motion. The rotation of the earth on its axis every 24 hours produces the day-and-night cycle. To people on the earth this turning of the planet makes it seem as though the sun, planets, and stars are orbiting the earth once a day. The sun appears to move across the sky in the same way every day. Its apparent path changes slowly across the seasons. The moon's orbit around the earth once in about 28 days changes what part of the moon is lighted by the sun and how much of that part can be seen from the earth – the phases of the moon. Eight planets and many other objects revolve around our sun in predictable patterns. These planets and objects are composed of varied materials.

Intermediate 5-6		Animal Studies	Environments	Experiments w/Plants	Float & Sink	Food & Nutrition	Landforms	Levers & Pulleys	Magnets & Motors	Measuring Time	MicroWorlds	Mixtures & Solutions	Models & Designs	Mysterious Powder	Structures	Variables		
VAST Kits Correlation to the Iowa Core Curriculum <i>last updated 12/2010</i>																		
Content Categories	Concepts & Skills															Principles that Underlie the Concepts		
Science as Inquiry	Identify and generate questions that can be answered through scientific investigations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students ask questions that they can answer with scientific knowledge combined with their own observations. Students recognize that different questions lead to different types of investigations.
Science as Inquiry	Plan and conduct scientific investigations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should engage in systematic observation, making accurate measurements, and identifying and controlling variables. Students understand the concept of a fair test. Students follow appropriate safety procedures when conducting investigations
Science as Inquiry	Use appropriate tools and techniques to gather, process, and analyze data.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students enhance their skills with tools such as rulers, thermometers, balances, spring scales, magnifiers and microscopes. Students are introduced to the use of computers and calculators for conducting investigations. Students' use of appropriate tools is guided by the questions asked and the investigations students design.
Science as Inquiry	Incorporate mathematics in science inquiries.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Mathematics is used to gather, organize and present data and to construct convincing explanations
Science as Inquiry	Use evidence to develop reasonable explanations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should determine what constitutes evidence. Students should judge the merits or strengths of the data and information used to make explanations. Students' explanations should reflect the evidence they have obtained in their investigations. Students should check their explanations against scientific knowledge, their own experiences, and observations of others.
Science as Inquiry	Communicate scientific procedures and explanations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should communicate, critique, and analyze their work and the work of other students. Students should share procedures and explanations through various means of communication.

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Physical Science	Understand and apply knowledge of properties of substances											X		X			<p>often can be separated into the original substances using one or more of the characteristic properties. The properties of a substance can be measured using tools and technology. When a new material (compound) is made by chemically combining two or more materials, it has properties that are different from the original materials. For that reason, many different materials can be made from a small number of basic materials.</p> <p>Materials may be composed of parts that are too small to be seen.</p>
Physical Science	Understand and apply knowledge of states of matter and changes in states of matter.																<p>Materials can exist in different states – solid, liquid and gas. Some common materials can be changed from one state to another by heating or cooling.</p>
Physical Science	Understand and apply knowledge of the concept of conservation of mass/matter.																<p>When something is broken into parts, the parts have the same total mass as the original item.</p>
Physical Science	Understands and applies knowledge of the characteristic properties of sounds, light, electricity, magnetism, and heat.							X		X							<p>Sound is produced when vibrations from objects travel through a medium and are received. Sound can vary in volume. The pitch of a sound can be varied by changing the rate of vibration. Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by an object.</p> <p>Electricity in circuits can produce light, heat, sound, and magnetic effects. Electricity can only flow through a closed circuit.</p> <p>Magnets attract and repel each other and certain kinds of other materials.</p> <p>Heat can be produced in many ways, such as burning, rubbing, or mixing one substance with another. Heat can move from one object to another by conduction.</p>
Physical Science	Understand and apply knowledge of motion and forces							X					X		X	X	<p>The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph. Changes in speed or direction of motion are caused by forces. The greater the force, the greater the change in motion. The more massive an object, the less effect a given force will have in changing its motion.</p>

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Life Science	Understand and apply knowledge of organisms and their environments		X								X						Animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. An organism's patterns of behavior are related to the nature of that organism's environment, including the kinds and numbers of other organisms present, the availability of food and resources, and the physical characteristics of the environment. When the environment changes, some plants and animals survive and reproduce, others die or move to new locations. All organisms cause changes in the environment in which they live. Some of these changes are detrimental to the organism or other organisms, whereas others are beneficial.
Life Science	Understand and apply knowledge of environmental stewardship.		X														Chapter 12 of the Iowa Administrative Code states that science instruction shall include conservation of natural resources; and environmental awareness
Life Science	Understand and apply knowledge of basic human body systems		X														The human organism has systems which interact with one another. These systems include circulatory, respiratory, digestive, musculoskeletal, etc
Life Science	Understand and apply knowledge of personal health and wellness issues					X	X										See 21 st Century Skills Core Curriculum: (Grades 3-5) Obtain, interpret, understand and use basic health concepts to enhance personal, family, and community health. Utilize interactive literacy and social skills to establish personal family, and community health goals. Demonstrate critical literacy/thinking skills related to personal, family, and community wellness. Recognize that media and other influences affect personal, family and community health. Demonstrate behaviors that foster healthy, active lifestyles for individuals and the benefit of society.
Earth & Space Science	Understand and apply knowledge of properties and uses of earth materials.						X										The different physical and chemical properties of earth materials make them useful in different ways, for example, as building materials, as sources of fuel, or for growing the plants we use as foods.

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Earth & Space Science	Understand and apply knowledge of evidence of past life on earth																Fossils provide evidence of plants and animals that lived long ago and the nature of the environment at that time.
Earth & Space Science	Understand and apply knowledge of weather and weather patterns.																Weather is always changing and can be described by measurable quantities such as temperature, wind direction and speed and precipitation. Large masses of air with certain properties move across the surface of the earth. The movement and interaction of these air masses is used to forecast the weather
Earth & Space Science	Understand and apply knowledge of the properties, movements, and locations of objects in our solar system.																Most objects in the solar system are in regular and predictable motion. The rotation of the earth on its axis every 24 hours produces the day-and-night cycle. To people on the earth this turning of the planet makes it seem as though the sun, planets, and stars are orbiting the earth once a day. The sun appears to move across the sky in the same way every day. Its apparent path changes slowly across the seasons. The moon's orbit around the earth once in about 28 days changes what part of the moon is lighted by the sun and how much of that part can be seen from the earth – the phases of the moon. Eight planets and many other objects revolve around our sun in predictable patterns. These planets and objects are composed of varied materials.

Middle 5-6		Animal Studies	Environments	Experiments w/Plants	Float & Sink	Food & Nutrition	Landforms	Levers & Pulleys	Magnets & Motors	Measuring Time	MicroWorlds	Mixtures & Solutions	Models & Designs	Mysterious Powder	Structures	Variables		
VAST Kits Correlation to the Iowa Core Curriculum last updated 12/2010																		
Content Categories	Concepts & Skills															Principles that Underlie the Concepts		
Science as Inquiry	Identify and generate questions that can be answered through scientific investigations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should develop the ability to refine and refocus broad and ill-defined questions. An important aspect of this ability consists of clarifying questions and inquiries and directing them toward objects and phenomena that can be described, explained, or predicted by scientific investigations. Students should develop the ability to connect their questions with scientific ideas, concepts, and quantitative relationships that guide investigations.
Science as Inquiry	Design and conduct different kinds of scientific investigations.	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	Students understand that different kinds of questions suggest different kinds of scientific investigations. Students should develop general abilities such as making systematic observations, taking accurate measurements, and identifying and controlling variables. Students should develop the ability to clarify ideas that are influencing and guiding their inquiry, and to understand how those ideas compare with current scientific knowledge.
Science as Inquiry	Select and use appropriate tools and techniques to gather, analyze, and interpret data.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	The use of tools and techniques, including computers, will be guided by the questions asked and the investigations students design. Students should be able to access, gather, store, retrieve, and organize data, using computer hardware and software designed for these purposes.
Science as Inquiry	Incorporate mathematics in science inquiry.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Mathematics is used to gather, organize and present data and to construct convincing explanations.
Science as Inquiry	Use evidence to develop descriptions, explanations, predictions and models.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should base their explanations on observations and they should be able to differentiate between description and explanation. Developing explanations establishes connections between the content of science and the contexts in which students develop new knowledge. Models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or are too vast to be changed deliberately, or are potentially dangerous. Different models can be used to represent the same thing.
Science as Inquiry	Think critically and logically to make the relationships between evidence and explanations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students decide what evidence should be used and develop the ability to account for anomalous data. Students should be able to review data from an experiment, summarize the data, and form a logical argument between cause and effect relationships. Students should begin to state some explanations in terms of relationships between two or more variables.
Science as Inquiry	Recognize and analyzes alternative explanations and predictions.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should develop the ability to listen to and respect the explanations proposed by other students. They should remain open to and acknowledge different ideas and explanations, be able to accept the skepticism of others, and consider alternative explanations.

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Science as Inquiry	Communicate and defend procedures and explanations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Students should become competent in communicating experimental methods, describing observations and summarizing the results of investigations. Explanations can be communicated through various methods.
Physical Science	Understand and apply knowledge of properties and changes of properties in matter				X						X	X		X			A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties. Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; metals is an example of such a group. Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances that we encounter.
Physical Science	Understand and apply knowledge of forms of energy and energy transfer									X		X					<p>Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways. Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.</p> <p>Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object-emitted by or scattered from it- must enter the eye.</p> <p>Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.</p> <p>In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion, or electricity might all be involved in such transfers.</p> <p>The sun is a major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches the earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.</p>

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Content Categories	Concepts & Skills															Principles that Underlie the Concepts	
Physical Science	Understand and applies knowledge of forces and motion							X					X				<p>The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph. An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.</p> <p>If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in speed or direction of an object's motion.</p>
	Life Science	Understand and apply knowledge of the components of organ systems				X											<p>mature of structure and function. Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems. All organisms are composed of cells—the fundamental unit of life. Most organisms are single cells; other organisms, including humans are multicellular. Cells carry on the many functions needed to sustain life. They grow and divide, thereby producing more cells. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs. Specialized cells perform specialized functions in multicellular organisms. Groups of specialized cells cooperate to form a tissue, such as muscle. Different tissues are in turn grouped together to form larger functional units, called organs. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</p>
Life Science	Understand and apply knowledge of heredity	X									X						<p>Every organism requires a set of instructions for specifying its traits. Heredity is the passage of these instructions from one generation to another. Hereditary information is contained in genes, located in the chromosomes of each cell. Each gene carries a single unit of information. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait. A human cell contains many thousands of different genes. The characteristics of an organism can be described in terms of a combination of traits. Some traits are inherited and others result from interactions with the environment.</p>

Middle 5-6		Animal Studies	Environments	Experiments w/Plants	Float & Sink	Food & Nutrition	Landforms	Levers & Pulleys	Magnets & Motors	Measuring Time	MicroWorlds	Mixtures & Solutions	Models & Designs	Mysterious Powder	Structures	Variables	
Content Categories	Concepts & Skills															Principles that Underlie the Concepts	
Life Science	Understand and apply knowledge of populations and ecosystems	X	X														<p>All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment. Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Behavior is one kind of response an organism can make to an internal or environmental stimulus. A behavioral response requires coordination and communication many levels, including cells, organ systems, and whole organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience. An organism's behavior evolves through adaptation to its environment. How a species moves, obtains food, reproduces, and responds to danger are based in the species' evolutionary history. For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.</p>
Life Science	Understand and apply knowledge of the social and personal implications of environmental issues.		X														<p>Chapter 12 of the Iowa Administrative Code states that science instruction shall include conservation of natural resources; and environmental awareness. The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.</p>
Life Science	Understand and apply knowledge of the interconnections of the major human body systems																<p>The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection from disease. These systems interact with one another. Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system. Others are the result of damage by infection by other organisms.</p>

Middle 5-6		Animal Studies	Environments	Experiments w/Plants	Float & Sink	Food & Nutrition	Landforms	Levers & Pulleys	Magnets & Motors	Measuring Time	MicroWorlds	Mixtures & Solutions	Models & Designs	Mysterious Powder	Structures	Variables	
VAST Kits Correlation to the Iowa Core Curriculum last updated 12/2010																	
Content Categories	Concepts & Skills														Principles that Underlie the Concepts		
Earth & Space Science	Understands and applies knowledge of the structure and processes of the earth system						X										<p>The solid earth is layered with a lithosphere, hot convecting mantle and dense metallic core. Tectonic plates constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions. Land forms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deformation, volcanic eruption, and deposition of sediment, while destructive forces include weathering and erosion. Some changes in the earth can be described as the "rock cycle." Rocks at the earth's surface weather, forming sediments that are buried, then compacted, heated, and often recrystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues.</p> <p>Soil consists of weathered rocks and decomposed organic matter from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition and texture. Living organisms have played many roles in the earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks.</p>
	Understands and applies knowledge of the water cycle																<p>Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle." Water evaporates from the earth's surface, rises and cools as it rises to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil and in rocks underground. Water is a solvent. As it passes through the water cycle it dissolves minerals and gases and carries them to the oceans.</p> <p>Natural and human forces can contribute to contamination of surface water and groundwater.</p>

Middle 5-6		Animal Studies	Environments	Experiments w/Plants	Float & Sink	Food & Nutrition	Landforms	Levers & Pulleys	Magnets & Motors	Measuring Time	MicroWorlds	Mixtures & Solutions	Models & Designs	Mysterious Powder	Structures	Variables	
Content Categories	Concepts & Skills															Principles that Underlie the Concepts	
Earth & Space Science	Understand and demonstrate knowledge of the earth's history																<p>The earth processes we see today including erosion, movement of tectonic plates, and changes in atmospheric composition are similar to those that occurred in the past. Earth history is also influenced by occasional catastrophes such as the impact of an asteroid or a comet.</p> <p>Fossils provide important evidence of how life and environmental conditions have changed.</p>
Earth & Space Science	Understand and apply knowledge of atmospheric properties																<p>The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations. Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate because water in the oceans holds a large amount of heat.</p> <p>Clouds, formed by the condensation of water vapor, affect weather and climate.</p>
	Understands and applies knowledge of the components of our solar system									X							<p>The earth is the third planet from the sun in a system that includes the moon, the sun, seven other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system. Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity alone holds us to the earth's surface and explains the phenomena of the tides.</p> <p>The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.</p> <p>Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.</p>

Middle 6-8		VAST Kits Correlation to the Iowa Core Curriculum <i>last updated 12/2010</i>									
		Chemical Interactions	Diversity of Life	Earth History	Force & Motion	Human Brain & Senses	Planetary Science	Populations & Ecosystems	Weather & Water		
Content Categories	Concepts & Skills										Principles that Underlie the Concepts
Science as Inquiry	Identify and generate questions that can be answered through scientific investigations	X	X	X	X	X	X	X	X	X	Students should develop the ability to refine and refocus broad and ill-defined questions. An important aspect of this ability consists of clarifying questions and inquiries and directing them toward objects and phenomena that can be described, explained, or predicted by scientific investigations. Students should develop the ability to connect their questions with scientific ideas, concepts, and quantitative relationships that guide investigations.
Science as Inquiry	Understand that different kinds of questions suggest different kinds of scientific investigations.	X	X	X	X	X	X	X	X	X	Some investigations involve observing and describing objects, organisms and events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.
Science as Inquiry	Select and use appropriate tools and techniques to gather, analyze, and interpret data.	X	X	X	X	X	X	X	X	X	The use of tools and techniques, including computers, will be guided by the questions asked and the investigations students design. Students should be able to access, gather, store, retrieve, and organize data, using computer hardware and software designed for these purposes.
Science as Inquiry	Incorporate mathematics in science inquiry.	X	X	X	X	X	X	X	X	X	Mathematics is used to gather, organize and present data and to construct convincing explanations.
Science as Inquiry	Use evidence to develop descriptions, explanations, predictions and models.	X	X	X	X	X	X	X	X	X	Students should base their explanations on observations and they should be able to differentiate between description and explanation. Developing explanations establishes connections between the content of science and the contexts in which students develop new knowledge. Models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or are too vast to be changed deliberately, or are potentially dangerous. Different models can be used to represent the same thing.
Science as Inquiry	Think critically and logically to make the relationships between evidence and explanations.	X	X	X	X	X	X	X	X	X	Students decide what evidence should be used and develop the ability to account for anomalous data. Students should be able to review data from an experiment, summarize the data, and form a logical argument between cause and effect relationships. Students should begin to state some explanations in terms of relationships between two or more variables.
Science as Inquiry	Recognize and analyze alternative explanations and predictions.	X	X	X	X	X	X	X	X	X	Students should develop the ability to listen to and respect the explanations proposed by other students. They should remain open to and acknowledge different ideas and explanations, be able to accept the skepticism of others, and consider alternative explanations.

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Content Categories	Concepts & Skills									Principles that Underlie the Concepts
Science as Inquiry	Communicate and defend procedures and explanations.	X	X	X	X	X	X	X	X	Students should become competent in communicating experimental methods, describing observations and summarizing the results of investigations. Explanations can be communicated through various methods.
Physical Science	Understand and apply knowledge of: * elements, compounds, mixtures, and solutions based on the nature of their physical and chemical properties. * physical and chemical changes and their relationship to the conservation of matter and energy.	X								<p>A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties. Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; metals is an example of such a group.</p> <p>Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances that we encounter.</p>
Physical Science	Understand and apply knowledge of forms of energy and energy transfer	X			X	X			X	<p>Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways. Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.</p> <p>Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object- emitted by or scattered from it- must enter the eye.</p> <p>Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.</p> <p>In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion, or electricity might all be involved in such transfers.</p> <p>The sun is a major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches the earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light,</p>

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Content Categories	Concepts & Skills								Principles that Underlie the Concepts
Physical Science	Understand and applies knowledge of forces and motion				X				<p>The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph. An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.</p> <p>If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in speed or direction of an object's motion.</p>
Life Science	Understand and apply knowledge of the basic components and functions of cells, tissues, organs, and organ systems.		X			X			<p>and function. Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems. All organisms are composed of cells—the fundamental unit of life. Most organisms are single cells; other organisms, including humans are multicellular. Cells carry on the many functions needed to sustain life. They grow and divide, thereby producing more cells. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs. Specialized cells perform specialized functions in multicellular organisms. Groups of specialized cells cooperate to form a tissue, such as muscle. Different tissues are in turn grouped together to form larger functional units, called organs. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</p>
Life Science	Understand and apply knowledge of how different organisms pass on traits (heredity).		X					X	<p>Every organism requires a set of instructions for specifying its traits. Heredity is the passage of these instructions from one generation to another. Hereditary information is contained in genes, located in the chromosomes of each cell. Each gene carries a single unit of information. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait. A human cell contains many thousands of different genes. The characteristics of an organism can be described in terms of a combination of traits. Some traits are inherited and others result from interactions with the environment.</p>
Life Science	Understand and apply knowledge of the complementary nature of structure and function and the commonalities among organisms.		X					X	<p>Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems. Organisms are classified according to common characteristics.</p>

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Content Categories	Concepts & Skills								Principles that Underlie the Concepts
Life Science	<p>Understand and apply knowledge of:</p> <ul style="list-style-type: none"> * interdependency of organisms, changes in environmental conditions, and survival of individuals and species. * the cycling of matter and energy in ecosystems. 		X					X	<p>internal conditions while living in a constantly changing external environment.</p> <p>Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive.</p> <p>Behavior is one kind of response an organism can make to an internal or environmental stimulus. A behavioral response requires coordination and communication on many levels, including cells, organ systems, and whole organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience.</p> <p>Species acquire many of their unique characteristics through biological adaptation which involves the selection of naturally occurring variations in populations.</p> <p>Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.</p> <p>For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.</p>
Life Science	<p>Understand and demonstrate knowledge of the social and personal implications of environmental issues.</p>							X	<p>The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.</p>

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Content Categories	Concepts & Skills								Principles that Underlie the Concepts
Life Science	Understand and apply knowledge of the functions and interconnections of the major human body systems including the breakdown in structure or function that disease causes.						X		<p>The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection from disease. These systems interact with one another.</p> <p>Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system. Others are the result of damage by infection by other organisms.</p>
Earth & Space Science	Understand and apply knowledge of the structure and processes that change the earth and and its surface						X		<p>The solid earth consists of layers including a lithosphere; a hot, convecting mantle and a dense metallic core. Tectonic plates constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, are results of these plate motions. Land forms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deformation, volcanic eruption, and deposition of sediment, while destructive forces include weathering and erosion. Some changes in the earth can be described as the "rock cycle." Rocks at the earth's surface weather, forming sediments that are buried, then compacted, heated, and often re-crystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues. Soil consists of weathered rocks and decomposed organic matter from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition and texture. Living organisms have played many roles in the earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks.</p>
Earth & Space Science	Understand and apply knowledge of the water cycle, including consideration of events that impact groundwater quality.							X	<p>Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle." Water evaporates from the earth's surface, rises and cools as it rises to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil and in soil and rocks underground.</p> <p>Water is a solvent. As it passes through the water cycle, especially as it moves on the earth's surface and underground, it dissolves minerals and gases and carries them to the oceans, rivers, and other surface water.</p> <p>Natural and human forces can contribute to contamination of surface water and groundwater.</p>

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Content Categories	Concepts & Skills								Principles that Underlie the Concepts
Earth & Space Science	Understand and apply knowledge of earth history based on physical evidence.								<p>The earth processes we see today including erosion, movement of tectonic plates, and changes in atmospheric composition are similar to those that occurred in the past.</p> <p>Earth history is also influenced by occasional catastrophes such as the impact of an asteroid or a comet.</p> <p>X Fossils provide important evidence of how life and environmental conditions have changed.</p>
Earth & Space Science	Understand and apply knowledge of the earth's atmospheric properties and how they influence weather and climate.								<p>The atmosphere is a mixture of nitrogen, oxygen, and trace gasses that include water vapor. The atmosphere has different properties at different elevations.</p> <p>Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate because water in the oceans holds a large amount of heat.</p> <p>X Clouds, formed by the condensation of water vapor, affect weather and climate.</p>
Earth & Space Science	Understand and apply knowledge of the components of our solar system							X	<p>The earth is the third planet from the sun in a system that includes the moon, the sun, seven other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system. Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity alone holds us to the earth's surface and explains the phenomena of the tides.</p> <p>The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.</p> <p>Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.</p>