Montessori Cultural Curriculum Map
(Interdisciplinary Social Studies and Science)

Sussex Montessori School

This Curriculum is based on:
Montessori Cultural Curriculum
Delaware Content Standards Science
Delaware Content Standards Social Studies
Delaware Recommended Units of Instruction

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Introduction to the Cultural Curriculum Framework

Sussex Montessori School has signed the MOU for the Delaware Science and Social Studies Coalitions. This documents serves as description of how the work of these coalitions will support the Montessori Cultural Curriculum. The themes in this document provide the framework for the overall classroom studies.

The Montessori Cultural Curriculum (Integrated Science/Social Studies), requires that teachers have knowledge of "Over-Arching Big Ideas and Thought Processes," related to their course areas. They also need tools to assess when students demonstrate the development of the big ideas, human potentials, and thought processes as they work within various integrated projects and classroom experiences. Teachers also need a clear understanding of the knowledge goals for thinking within the various content strands of Science and Social Studies. The Montessori Cultural Curriculum Framework (Integrated Science/Social Studies) provides teachers with goals for each of these strands at each multi-age stage of development (5-7, 7-9, and 9-12 year-olds). Consistent with the goals of the Delaware Recommended Curriculum (2006), the framework is designed to support a learning environment in which students will:

- Be engaged in authentic and purposeful activities.
- Be instructed using materials appropriate to their individual and developmental needs.
- Be active participants in gathering information from a variety of sources.
- Be engaged in integrated and meaningful communication
- Be assessed through ongoing instructional activities which require them to solve problems, gather and use resources, work collaboratively, and assume responsibility for their learning.
- Access, organize, and communicate information using modern technology.
- Experience a multicultural perspective.
- Reflect on their own development and set goals for learning.
- Be constructive and critical members of a community of life-long learners.

Teachers use **Understanding by Design (UbD)** model of instructional planning, teachers use that framework to develop specific long-term studies connected around "enduring understandings" of the Montessori Cultural Curriculum. These are explained on the charts that follow, and include the "unity of humans," the "unity of all living things on earth," and the "unity of the earth itself." These enduring understandings align with the enduring understandings of the Delaware Science and Social Studies Content

Standards. For the K-1st (ages 5-7) and the 2nd-3rd (ages 7-9) multi-age programs, the children focus on two essential questions that arise from these three enduring understandings. This creates two-year-long cycles for each two-year multi-age program integrating science and social studies content standards together under each essential question. This integration extends to the Mathematics and English Language Arts standards as children use these tools to communicate and evaluate their understandings of the world.

The first year, or cycle, is devoted to the concept of "What does it mean to be Human?" and the second year, or cycle, to "How does the World Work?" During the K-3 years, students study these questions within the context of continent studies. In other words, they explore what it means to be human and how the world works through the lens of various cultures on each continent. In the 4th-6th (ages 9-12) multi-age program, the children focus on three cycles, adding a third essential question, "What is Culture?" Children learn to use language, mathematics, scientific inquiry, and research to develop their inquiry-based studies.

The Curriculum Framework provides the teacher with the standards that must be addressed within the context of the unit developed and the projects in which the children engage. Instructional strategies are used in small group and individual lessons/projects. These include hands-on Montessori materials, the Science Coalition Kits and resources, various resources such as the National Geographic lessons, Delaware Social Studies Standards, books, and other media to meet the individual instructional needs of children. These materials are not provided to limit resources available, but to offer a starting place for the development of instructional units. Small group lessons, individual lessons, and projects provide opportunities for teachers to observe children and to evaluate their progress towards the goals for learning across each strand of the science and social studies curriculum, as well as their understanding and demonstration of the "Over-arching Big Ideas and Thought Processes." The Framework provides various formative and summative assessment tools for teachers to confirm their observations and to make adjustments in instruction as a result of those observations. These tools include daily observations, teacher designed assessments, Science Kit assessments, etc. The RTI model of assessment/instruction allows teachers to adjust instructional strategies and follow more closely the progress of children who are off-track learners.

The development of the child in the Montessori Cultural Curriculum (Integrated Science/Social Studies) is embedded within the context of a classroom that supports the best educational practices. It is generally accepted that the workforce of the future will require skills such as creative and innovative thinking, comfort with ideas and abstraction, as well as a global worldview and vibrant imagination. Research (Adams, 2005) shows that children develop these skills in classrooms designed to promote intrinsic motivation, classrooms that provide choice, time for focus and deep study in areas of interest, opportunities to experiment and

discover, and a focus on "what did you learn?" rather than "how well did you do?" The overall Montessori Program is designed to support the following:

- Focus on big ideas and essential questions with extended work periods that allow for depth of understanding and development of habits of mind.
- Child-centered inclusive learning environments that utilize differentiated instruction and flexible grouping to meet individual children's learning needs.
- Classroom-based assessment and observation that informs instructional decision making as the basis for RTI.
- Hands-on interactive curricular materials and classroom environment that supports children developing from concrete to abstract thinking.
- Academic development supported by an emphasis on the social/emotional development of the child within a multi-age community of learners.
- Collaborative learning and community service leading to mutual respect of others and the development of the child's global perspective.

This document is designed to support this type of teaching and learning experience.

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Sussex Montessori School
Interdisciplinary Science/Social Studies Curriculum
K-1st Grade

The K-1st (ages 5-7) Cultural Curriculum (Social Studies/Science)

This document is the core of the curriculum plan for the K-1st (ages 5-7) child. This document allows teachers to plan rich interdisciplinary units to ensure that the content standards are addressed, to determine where children are on the continuum of learning, to match instruction to learning goals, and to use assessment as a tool to monitor progress.

Social Studies and Science—K—1st (Ages 5-7)
Transfer Knowledge

Transfer Skills in the Integrated Social Studies/ Science curriculum, known as the Montessori Cultural curriculum, are not based on the transfer of a specific body of knowledge, but rather of several key conceptual understandings and the development of what Maria Montessori called the human potentials. These understandings and potentials transfer throughout the child's school and later life experiences.

Montessori Great Lessons tied to what it means to live in the world.	**Human Potentials**	**Research Skills**	**Self-expression**
Unity of Human Beings: Students understand the similarities and differences of cultures across the world; that people interact with the natural world in distinct ways that produce cultural uniqueness; that people, places, and environments are integrated; that life involves producing and consuming. **Unity of all Living Things on Earth:**	**Students will:** Understand the role the human potentials play in both their school community and their everyday lives. **Character** – Students are trustworthy, compassionate, and demonstrate integrity. **Leadership** – Students combine vision, ethics, and courage to empower others to make a difference in the community.	**Students will:** Understand what makes a question which leads to inquiry and investigation. Plan investigations to address a question or problem. Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results. Synthesize information from various resources and	**Students will:** Discover and express ideas, feelings, beliefs and values. Reflect on how these ideas effect the way they interact with the world. Acquire the skills necessary to successfully participate in groups, which includes defining the objective, dividing responsibilities and working cooperatively.

Students will show respect for the beauty and wonder of nature. They develop an understanding of how, through science, we learn how nature works. They understand that all people use natural resources to meet a variety of human needs. This use of resources defines many cross cultural human interactions. **Unity of the Universe Itself:** Students develop an understanding of their relationship and place in the development of the universe, how the earth has changed over time through physical, chemical and geological processes.	**Thinking Skills** – Students develop flexibility, perseverance, curiosity, imagination, inventiveness, wonder, and the ability to reflect on process and product which support lifelong and collaborative learning in order to address real life challenges. **Life Management** - Students develop self-awareness so that in the long run they make responsible, healthy and balanced life/work choices. **Creative and Artistic** - Students discover and develop creative gifts o that in the long run they will be able to express themselves creatively and artistically, recognize and respect creativity in others, utilize the creativity of others and preserve flexibility of thought and open-mindedness to look at and meet challenges. **Service and Responsibility -** Students learn the value of service and responsibility so that in the long run they will be able to demonstrate empathy, compassion, social responsibility	experiences to develop inquiries about the world around them. Determine ways to gather data and use various tools (experiments, surveys, logs, journals, etc.). Understand what constitutes evidence. Understand when you have enough evidence. Interpret evidence and present logical inferences and conclusions to others from the evidence.	Demonstrate cooperation, assertion, responsibility, empathy and self-control when communicating with others. Utilize and explore their own creativity. Learn to appreciate the aesthetic. Use various technology tool to gather, organize and communicate with others. Use various visual print and artistic mediums to communicate with others. Adapt presentation style and speech for the audience. Present claims and findings in a logically sequenced way, developing concepts to support a position.

	and appreciation for others and the world around them.		

Standards Embedded Across Both Years of the K-1st (Ages 5-7) Program		
Enduring Understanding Embedded in all three studies	**Essential Questions Embedded in all three studies**	**Standards Embedded in all Three Studies**
Social Studies	**Social Studies**	**Social Studies**
The question a historian chooses to guide historical research that creates accurate chronologies will affect which events will go into the chronology and which will be left out. Many different types of sources exist to help us gather information about the past, such as artifacts and documents. Mental maps summarize differences and similarities about places. Mental maps change as the scale moves from local to global; we know more about our home area than more distant places; and these differences affect how we feel and behave towards places that are distant versus those that are close. Effective participation in global leads to effective Democratic governments.	Why is when an event happens important? How can words, models and graphics help us learn about the world? What does it mean to participate effectively in a group? Why does where matter? Why does when matter?	Students will use clocks, calendars, schedules and written records to record or locate events in time (**H.1.K-3A**). Students will understand the nature and uses of maps, globes and other geo-graphics. (**G.1.k-3a**) Students will use artifacts and documents to gather information about groups and their histories (**H.2.k-3A**) Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities and working cooperatively (**C.4.K-3Aa**)

Science and Inquiry	Science and Inquiry	Science and Inquiry
Scientific inquiry is a method by which humans seek to understand the natural world. Scientific inquiry involves asking scientifically-oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying the explanation. In a science investigation, a fair test is one in which all of the conditions are kept constant, except the one condition being investigated. The purpose of accurate observations and data collection is to provide evidence. Scientists use tools to enhance their senses in order to obtain more evidence. Scientists use observations and data collection is to provide evidence, Scientists use tools to enhance their senses in order to obtain more evidence. Scientists use observations form investigations and knowledge that is already known to develop an explanation. The purpose of communicating with others is to share evidence and conclusions Scientists communicate the results of their investigation to others. The use of mathematic, reading, writing and technology are important in conducting scientific inquiries. The development of technology and	What makes a question scientific? What constitutes evidence? When do you know you have enough evidence? Why is it necessary to justify and communicate an explanation?	Generate questions and predictions using observations and exploration about the natural world. **S1.1A (K-3)** Generate and follow simple plans using systematic observations to explore questions and predictions **S1.1B (K-3)** Collect data using observations, simple tools and equipment. Record data in tables, charts, and bar graphs. Compare data with others to examine and question results. **S1.1C (K-3)** Construct a simple explanation by analyzing observational data. Revise the explanation when given new evidence or information gained from other resources or from further investigation. **S1.1D (K-3)** Share simple plans, data and explanations with an audience, and justify the results using the evidence from the investigation. **S1.1E (K-3)** Use mathematics, reading, writing and technology when conducting an investigation, and communicating the results. **S1.1F (K-3)** Tools are useful in science to help gather data for observations and measurements, and provide a safe means of conducting an investigation. **S.1.2B (K-3)** People from all parts of the world practice science and make many important scientific contributions. **S.1.3A(K-3)**

advancement in science influence each other and drive each other forward.		

Year One: What Does It Mean to Be Human?
Continent Study of North and South America

Children understand that humans think in various ways through their use of language, mathematics, scientific inquiry and research. Thinking like a scientist or a geographer, a historian or a social scientist, they use methods of scientific inquiry and research tools to learn about the natural and human world around them within the context of continent studies. Each program year is comprised of three time-periods or studies which spiral, building complexity throughout the subsequent grade levels. These studies are laid out in this document by use of color coding for each study.

Study One - September, October, November

K-1st (Ages 5-7) Membership is Groups/Diversity and Continuity of Living Things	2nd-3rd (Ages 7-9) Responsibility to group Membership / Diversity and Continuity of Living Things	4th-6th (Ages 9-12) The Purpose of Governments and Scientific Advances
Children understand that everyone holds membership in a variety of groups, beginning with the family. They consider how groups shape our lives, how we, in turn, can shape groups, and they develop a sense of civic and social responsibility. Through this study, children will see themselves as holding membership in a variety of groups from their family, to the classroom, t the larger community. As children explore the diversity and continuity of all living things, they understand that all species belong to groups based on their characteristics; these characteristics are hereditary. All species,	Humans have established systems that structure their participation in groups. Children learn the various ways that governments are structured, develop and understanding of the principles of a representative democracy and the responsibilities they have as citizen holding both rights and responsibilities in society. They are challenged to be a good citizen in their school and beyond, and to understand that group membership means having responsibilities, as well as rights. Building on the study of the 5-7 program, children continue to explore the diversity and	This study builds on the understandings of group functioning, rights and responsibilities from the K-1st (ages 5-7) and the 2nd-3rd (ages 7-9) programs. The study focuses specifically on civic responsibility. Children learn the various ways that governments are structured, develop and understanding of the principles of a representative democracy and the responsibilities they have a citizen holding both rights and responsibilities in society, they are challenged to be a good citizen in their school and beyond and to understand that citizenship in groups and the U.S. means having responsibilities, as well as

including humans, have cycle of life.	continuity of living things, and the relationship of humans to the natural world. They understand how humans as organisms are similar and different from other organisms, and that each has a place in the natural world.	rights. Children explore various scientific advances, laws that have been instituted related to scientific knowledge, and how government influences the uses of our natural resources.
Study Two - December, January, February, March		
K-1st (Ages 5-7) **Study Two - Fundamental Needs** All species, including humans have basic fundamental needs. Children distinguish wants from needs, and understand that due to scarcity, individuals, families, classrooms, must make choices in their activities and consumption of their goods and services. Science has provided ways that humans can better meet their needs. As humans use natural resources to meet their needs, they may have long term impacts on the environment and the future availability of resources. Children discover the importance of carefully using the precious resources of our earth, becoming responsible producers, and conservers.	**2nd-3rd (Ages 7-9)** **Study Two - Economics of wants and fundamental needs** Children distinguish human wants from needs, and understand that due to scarcity, individuals, families, communities, and societies as a whole, must make choices in their activities and consumption of their goods and services. People make decisions about production and consumption by considering the costs and benefits of various choices. Science has provided ways that humans can better meet their needs. As humans use natural resources to meet their needs, they may have long term impacts on the environment and the future availability of resources. Children discover the importance of carefully using he precious resources of our earth, becoming responsible producers, consumers and conservers.	**4th-6th (Ages 9-12)** **Study Two** **Place in Time and Space - The Universe through the eyes of science and history** Building on the concept that humans seek to place themselves in time and space, children will develop an appreciation for the earth in relationship to the universe. Humans have always sought to explore and understand our place in the universe. Combining scientific thinking and the lens of the historian, children will develop and understanding of the solar system and track the history of human discovery related to space exploration beginning with the earliest scientist and moving to man's most recent explorations.

Study Three - April, May, June		
K-1st (Ages 5-7) **Study Three - Place in Time and Space** Humans have always had a capacity to place themselves in time and space. Students explore the intergenerational connections of the various groups they belong to. They learn about the history and traditions of their own cultures. They gain perspective about where they are located spatially on the planet and in the universe.	**2nd-3rd (Ages 7-9)** **Study Three - Place in Time and Space** **Geological History, Human History** Humans have always had a capacity to place themselves in time and space. Students develop and understanding of the concept of regions, how regions and places are defined both by landforms and by human interactions and characteristics (cultures, linguistics, etc.). Students understand that they are part of a larger history of humanity and the geological history of the earth.	**4th-6th (Ages 9-12)** **Study Three** In the 4th- 6th (Ages 9-12) children are able to use their skills to delve more deeply into an academic study. As such, there are two focus studies in the course of a year, not three.

Year One: What Does It Mean to Be Human? K-1st (Ages 5-7) Continent Study of North and South America in September, October, November		
Study One - Membership in Groups / Diversity and Continuity of Living Things - Children understand that everyone holds membership in a variety of groups, beginning with the family. They consider how groups shape our lives, how we, in turn, can shape groups, and they develop a sense of civic and social responsibility. Through this study, children will see themselves as holding membership in a variety of groups from their family, to the classroom, to the larger community. As children explore the diversity and continuity of all living things, they understand that all species belong to groups based on their characteristics; these characteristics are hereditary. All species including humans have a cycle of life.		
Enduring Understanding	**Essential Questions**	**Standards Tied to Study 1**
Social Studies	**Social Studies**	**Social Studies**
People belong to some groups by birth and others by function. Groups of communities can include family, schools, classrooms, cultures, and countries. Governments are structured to address the basic needs of the people in a society.	How are groups formed? Why are groups important? How many members are in a group? What makes a group? Is working in a group better than working alone? What does it take to be a good member of a group? What is the nature of a privilege? What do you have to do to earn or lose a privilege? How should an elected official represent the interests of the people?	Acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively **(C.4.K-3a)** Develop an understanding of the similarities between families now and in the past (daily life and in other times) cultural origins of customs and beliefs around the world **(H.4.K-3a)** Leaders are sometimes chosen by election, and that elected officials are expected to represent the interests of the people who elected them **(C.1.K-3a)** Positions of authority, whether elected, appointed, or familial carry responsibilities and should be respected **(C.1.K-3b)**
Science	**Science**	**Science**

Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring. he diversity and changing of life forms over many generations is the result of natural selection, or in which organisms with advantageous traits survive, reproduce, and pass those traits to offspring. The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants.	Why do offspring resemble their parents? How are organisms of the same kind different from each other? How does this help them reproduce and survive? How does the understanding and manipulation of genetics, reproduction, development and evolution affect the quality of human life?	The offspring of some plants and animals resemble the parents (i.e., a tree seedling resembles a mature tree). **S7.1A (K-3)** The offspring of some plants and animals do not resemble the parents. Similarities between parents and their offspring become more apparent as their life cycle continues (i.e., caterpillars become butterflies). **S7.1B (K-3)** All plants and animals go through a life cycle of birth, growth, development, reproduction and death. This cycle is predictable and describable, but differs from organism to organism. **S7.1C (K-3)** Many different kinds of plants and animals live throughout the world. These plants and animals can be grouped according to the characteristics they share. **S7.2A (K-3)**

Year One: What Does It Mean to Be Human? K-1st (Ages 5-7) Continent Study of North and South America in December to March

Study Two - Fundamental Needs - All species, including humans have basic fundamental needs. Children distinguish wants from needs and that due to scarcity, individuals, families, communities, and societies as a whole, must make choices in their activities and consumption of their goods and services. Science has provided ways that humans can better meet their needs. As humans use natural resources to meet their needs, they may have long term impacts on the environment and the future availability of resources. Children discover the importance of carefully using the precious resources of our earth, becoming responsible producers, consumers and conservers.

Enduring Understanding in Study Two	Essential Question in Study Two	Standards Tied to Study Two
Social Studies	**Social Studies**	**Social Studies**

Maps, globes and other geographics are tools that help us understand the resources available to humans in various regions. A region is a concept rather than a real object on the ground, used to simplify the diversity of places. Because resources are scarce, societies must organize the production, distribution, and allocation of goods and services. Due to scarcity, individuals as producers and consumers, families, communities and societies as a whole must make choices in their goods and services.	How do maps, globes and other geographics help us to understand where groups are located and how they meet their needs? Why does where matter? How should people use what they have to get what they want? Why can't I have everything I want?	Students will understand the nature and uses of maps, globes, and other geo-graphics. **(G.1.k-3a)** Students will use the concepts of place and region to explain simple patterns of connections between and among places across the country and world. (**G.3.K-3a** Introduced in relation to the use of resources and continent study) Students will understand that individuals and families with limited resources undertake a wide variety of activities to satisfy their wants. **(E.1Ak-3)** Students will identify human wants and the various resources and strategies which have been used to satisfy them over time. **E.3A (K-3)**
Science	**Science**	**Science**
Groups meet their fundamental needs in a variety of ways. The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants. As humans seek to meet their needs, they can alter the living and non-living factors within an ecosystem, thereby creating changes to the overall system. People develop new materials as a response to	How do humans have an impact of the diversity and stability of ecosystem? What is a "responsible" use of energy? Are there alternative forms that will serve our needs or better ways of using traditional forms of energy? What is technology? How has technology helped people solve problems? How do humans have in impact on the diversity and stability of ecosystems as	People use the variety of plants and animals found throughout the world for food, clothing and shelter (e.g., silk for clothing, wood for building shelters). **S7.3A (K-3)** The ability of an organism (People) to meet its needs for survival is dependent upon its environment. Manipulation of the environment can positively or negatively affect the wellbeing of various organisms that live there. **S6.4C (K-3)** Humans use devices and specialized

the needs of society and pursuit of knowledge. This development may have risks and benefits to humans and the environment. People use a variety of resources to meet the basic and specific needs of life. Some of these resources can-not be replaced. Others can be replenished or exist in such vast quantities they are in no danger of becoming depleted. Humans use technology to solve problems and meet their needs.	they seek to meet their needs? Why should people consider the risks and benefits before the production of new materials and/or the implementation of a new process? Are there alternative sources of energy to meet human needs? What can we do to benefit the health of humans and other organisms?	equipment to ensure safety and to improve their quality of life (e.g., goggles, glasses, hearing aids, and wheelchairs). **S6.4B (K-3)** People have invented new technologies to solve problems. **S1.2A (K-3)** Technology has created new materials that can help people solve problems. **S.2.4B(K-3)** Many natural resources are limited. The amount available can be made to last longer by decreasing the use of some resources or by reusing or recycling certain materials. **S8.3A (K-3)** The properties of materials influence their use. Some materials are more suitable for making a particular product or device. **S2.4A (K-3)** Moving air, moving water, and sunlight contain energy that can be put to our use. **S3.4A (K-3)**

Year One: What Does It Mean to Be Human? K-1st (Ages 5-7) Continent Study of North and South America in April, May, June

Study Three - Place in Time and Space - Humans have always had a capacity to place themselves in time and space. Students explore the intergenerational connections of the various groups they belong to. They learn about the history and traditions of their own cultures. They gain perspective about where they are located spatially on the planet and in the universe.

Enduring Understandings in Study Three	Essential Questions in Study Three	Standards Tied to Study Three
Social Studies	**Social Studies**	**Social Studies**
History is often messy, yet a historian must logically organize events, recognize patterns and trends, explain cause and effect, make	Why does when matter? To what extent does one event lead to another event?	Use artifacts and documents to gather information about the past **(H.2.K-3a)** Understand that historical accounts are

inferences, and draw conclusions from those sources which are available at the time. The questions a historian chooses to guide historical research that creates accurate chronologies will affect which events will go into the chronology and which will be left out. Competing chronologies can both be accurate, yet may not be equally relevant to the specific topic at hand. Understanding past process and contributions is essential in building scientific knowledge. Mental maps summarize differences and similarities about places. These differences and similarities lead to conflict or cooperation and the exchange of goods and ideas between people. A region is a concept rather than a real object on the ground, used to simplify the diversity of places. Regions must have boundaries to exist, yet there are advantages and disadvantages associated with any real or abstract feature used to draw a boundary.	What can I learn about the past from studying artifacts and documents? What can't I learn? How do artifacts and documents influence how history is written? Is this source credible? What questions should I ask before I use this source? How could there be different explanations of the same event in history? What role do technological advances play in history? Why does where matter? To what extent do the differences between flat maps and globes affect understanding of places in the world and their relationship to each other? Why are there different kinds of maps? How can they be "read" to discover the nature and contents of the real world? Why might places differ from regions? How can regions be used to simplify an understanding of place discovery? How might differences and similarities and similarities among regions results in connections between them? Why is a place founded where it is? Why might these reasons change?	constructed by drawing logical inferences from artifacts and documents (H.3.K-3a) Utilize clocks, calendars, schedules and written records or locate events in time **(H.1.K-3a)** Students will understand the nature and uses of maps, globes, and other geo-graphics. **(G.1.k-3a)** Students will use the concepts of place and region to explain simple patterns of connections between and among places across the country and the world. **(G.4.K-3a Introduced)** The shape of the Earth is similar to a spear. **S4.1A (K-3)** From Earth many objects may be seen in the sky including the Sun, The Moon, stars and man-made objects. **S4.1B (K-3)** The Sun and Moon appear to move slowly across the sky. **S4.1C (K-3)** The pattern of day and night repeats every 24 hours. The Sun can only be seen in the daytime **S4.1AD (K-3)** The Moon can be observed sometimes at night and sometimes during the day. **S4.1E (K-3)** The appearance of the Moon changes in a cycle that takes about a month. **S4.1F (K-3)** Binoculars and telescopes allow people to observe objects in the sky from Earth. **S.4.3A(K-3)**

		Technology expands the range of human senses. **S6.4A (K-3)**
Science	**Science**	**Science**
There are observable, predictable patterns of movement in the Sun, Earth and Moon system that account for day/night. Technology expands our knowledge of the Earth, Moon, and Sun System.	How have past scientific contributions influenced current scientific understanding of the world? What do we mean in science when we say that we stand on the shoulders of giants? What predictable, observable patterns occur as a result of the interaction between the Earth, Moon and Sun? How has technology expanded our knowledge of the Earth, Moon and Sun System?	The shape of the Earth is similar to a sphere. **S4.1A (K-3)** From Earth many objects may be seen in the sky including the Sun, the Moon, stars, and man-made objects. **S4.1B (K-3)** The Sun and Moon appear to move slowly across the sky. **S4.1C (K-3)** The pattern of day and night repeats every 24 hours. The Sun can only be seen in the daytime **S4.1 AD (K-3)** The Moon can be observed sometimes at night and sometimes during the day. **S4.1E (K-3)** The appearance of the Moon changes in a cycle that takes about a month. **S4.1F (K-3)** Binoculars and telescopes allow people to observe objects in the sky from Earth. **S.4.3A (K-3)** Technology expands the range of human senses. **S6.4A (K-3)**

Instructional Strategies and Performance Projects/Assessments
Year One K-1st (Ages 5-7) - What Does It Mean to Be Human?

Montessori Great Lessons

The Montessori Great lessons are impressionistic lessons which provide a "whole" for the three studies of What Does It Mean to Be Human? These lessons are shared each year with various levels of details according to the children's development. Particular emphasis should be given to the parts of the story that reinforce the content standards being developed in the K-1st (Ages 5-7) study of What Does It Mean to Be Human. The same lessons will be shared in the 2nd - 3rd (Ages 7-9) program expanding on concepts introduced at the K-1st (Ages 5-7) level. (See page 5 for full details of Montessori Great Lessons)

First Great Lesson - Coming of the Universe and the Earth
The Second Great Lesson: Coming of Life
The Third Great Lesson: Coming of Human Beings
The Fourth Great Lesson: The Story of Language
The Fifth Great Lesson: The Story of Numbers

Continent studies

Montessori classrooms focus on a study of each continent and the various cultures and geography of those continents as children discover what it means to be human, how geography impacts how cultures meet their human needs, and how the various cultures interact. While presented separately in this document, the concepts of what it means to be human and the Delaware Content standards are closely interwoven throughout the year through the continent studies. These Integrated units developed through the **Understanding by Design (UbD) process** (see planning sheet page 30). Possible instructional materials and strategies teachers may use are listed below.

Montessori lessons and materials related to:

- Responsive Classroom lessons and activities to build community and teach social skills, responsibilities, rights and privileges
- Create fair classroom rules
- Timelines of Individual lives
- Set up the process to carry out a mock election within the classroom
- Working in Groups

- Fundamental needs of man and how various cultures meet these needs (food, clothing, shelter, water, communication, spirituality)
- Geography maps, globes, landform models
- Cultural traditions and celebrations
- Set up the process to carry out a mock election within the classroom
- Hands on materials developing concepts of time, quantity, linear measurement, volume, weight, and money
- Specific lessons on the earth, sun and moon
    - Describe the shape of the Earth as being like a sphere and describe how a globe models this shape.
    - Name and identify objects that can be observed in the sky including the Sun, Moon, and stars and man-made objects such as airplanes.
    - Describe the repeating cyclic pattern of day and night and include in this description that we can see the Sun only during the daytime.
    - List objects that can be observed in the sky in the daytime and objects that can be observed in the sky at nighttime. Discuss which objects are on which lists (e.g., the Moon can be observed sometimes in the day and sometimes at night).
    - Safely observe the location of the Sun at the same time in the morning, noon, and afternoon over several days. Describe the sun's movement across the sky over the course of the day.
    - Observe the Moon in the day sky over several months. Draw a sequence of pictures that shows the repeating cyclic pattern of the moon.
    - Use simple models to demonstrate how Earth's rotation causes day and night.

Science Kits

As related to the UBD Units, Teachers will utilize the following science kits to address the science standards across the two year cycle of the 5-7 program.

- Trees - Exploring how trees are alive and different from non-living things, their basic needs, and functions of structures.
- Five Senses - Using the five senses to observe and describe the world
- Wood and Paper - Examining the properties of wood and paper
- Weather and Me - Weather patterns and their influence on living things
- Solids and Liquids - Comparing/Testing the Properties of Solids and Liquids
- Organisms - Requirements or living things to survive in their habitats

Delaware Recommended Curriculum units that might be used in the studies.
Participating in a Group (Word) (PDF) December 15, 2009
Schedules (Word) (PDF)
Thinking About Maps and Globes (Word)

Classroom projects leading to the performance assessments as listed below:

- Using a world migration map, identify migration patterns around the world determining Americas roots, while tracking students' family migration path to the US or within the US
- Compare/contrast the migration paths of student's families to the migration patterns on the world map.
- Through a family interview, identify reasons ancestors migrated to the U.S. and traditions they brought with them to their new home/country.
- Photojournalism project - students will photograph people and places that represent cultural markers in our community,
- Create a dramatic enactment depicting the migratory path of a selected species
- Create a recycling and composting program for the classroom
- Create a structured market place wherein students will buy and sell chosen materials with all profits donated to a charity to e determined by the group's consensus

Resources

Montessori Albums - Resources obtained through MACTE approved Montessori training courses
http://missbarbara.net/ - Web sites related to each area of the Montessori Great lessons and the Delaware Content Standards.
http://www.thinkfinity.org/ -
http://education.nationalgeographic.com/education/
http://sciencenetlinks.com/
http://www.econedlink.org/
http://historyexplorer.americanhistory.si.edu/
www.nsta.org
PALS is an on-line, standard-based, continually updated resource bank of science performance assessment tasks indexed via the National Science Education Standards (NSES) and various other standards frameworks.

Kindergarten/ First Grade - Year Two How Does the World Work?
Continent Study – Africa and Australia

Children understand that humans think in various ways through their use of language, mathematics, scientific inquiry and research. Thinking like a scientist or a geographer, a historical or a social scientist, they use methods of scientific inquiry and research tools to learn about the natural and human world around them within the context of continent studies. Each program year is comprised of three time-periods or studies which spiral, building complexity throughout the subsequent grade levels. These studies are laid out in this document by use of color coding for each study.

Study One - September, October, November

K-1st (Ages 5-7) **Man's Impact on Life Cycles and Systems**	**2nd-3rd (Ages 7-9)** **Life Cycles and Systems/ Historian's perspective**	**4th-6th (Ages 9-12)** **Energy exchanges and Systems / The Historical Perspective Science**
The natural world works in a series of cycles and systems. Children understand that human life has a beginning, a time of growth, and an ending. They acquire a basic knowledge of the body's needs and its functions and adopt personal habits that promote wellness. Extending this concept, children learn that species within an ecosystem have unique structures that allow them to survive in that ecosystem. Children will see the cycle of life around them in nature. This understanding extends to an understanding that all organisms are all connected as a part of the larger ecosystem. Children develop an understanding that man's decisions can impact the balance of the	The natural world works in a series of cycles and systems. This understanding extends to an understanding that we are all connected as a part of the larger ecosystem. This ecosystem depends on a system of consumers and producers. Species within an ecosystem have unique structures that allow them to survive in that ecosystem. As one part of the ecosystem changes, other parts will be affected. Children develop an understanding that man's decisions can impact the balance of the larger ecosystems and the sustainability of resources. The perspective of the historian can help us to understand how man has impacted the	Children discover that the flow of energy drives processes of change in all biological, chemical, and physical systems. In this study children learn that energy stored in a variety of systems can be transformed into their energy forms, which influence many facets of daily life. People use a variety of resources to meet the basic energy needs of life. Some of these resources cannot be replaced and others exist in vast quantities. The structure of materials influences their physical properties, chemical reactivity, and use. The exchange of energy can change matter from one form to another making a material more suitable for a specific purpose. Many

larger ecosystems and the sustainability of resources. Beginning with their families and classrooms, children understand that people have a civic and global responsibility to use the earth's resources wisely.	regions around them and how the resulting changes in ecosystems have impacted communities.	scientists have contributed to our understandings of the biological, chemical and physical nature of energy. Historians contribute to our understanding of how these scientists worked, their culture, society's responses to their work, and the resources they had for their work.
Study Two – December, January, February, March		
K-1st (Ages 5-7) **Earth Systems and Human Interactions** **Weather/Soils** Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. These changes also impact human groups and their survival. Some of the changes can be measured on a human time scale, but others occur so slowly that they must be inferred from geological evidence.	**2nd-3rd (Ages 7-9)** **Producing and Consuming** All people engage in making and using things. Children recognize the value and dignity of work. They learn that human economic systems serve to provide a method for people to distribute goods and services to meet their wants and needs. They understand that due to scarcity, individuals, families, and communities and societies as a whole must make choices in their activities and consumption of their goods and services. Life for all of us involves producing and consuming. Knowledge of materials and their properties helps man to match materials to products for consumption.	**4th-6th (Ages 9-12)** **Producing and Consuming** Production and consumption occurs as a human interaction among humans and as a natural interaction in ecosystems. All people engage in making and using things. Children learn the various ways that different cultures produce goods, what they value for production, how they structure economic systems that support production and consumption, and how cultures use the regional resources and trade globally to meet various needs of different societies. They understand that due to scarcity, communities and societies must make choices in their activities and consumption of goods and services. Various aspects of science contribute to decisions about production and consumption. The ecosystem is dependent on the concept of producers and consumers. When man utilizes the natural resources around him, he may

		impact the balance of the ecosystem impacting his long-term ability to meet man's needs. The production and consumption of energy impacts the ability of a society to produce goods and services to meet their needs. Knowledge of materials and their properties helps man to match materials to products.
Study Three – April, May, June		
K-1st (Ages 5-7) **The Flow of Energy and Human Needs** Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. In this study, children understand that energy takes many forms. People use energy to do work. There are various sources of energy that people can harness to use. Some are renewable sources and others will be depleted at some point. People also seek to understand materials and their properties. The transfer of energy can change materials into different forms (water, ice, steam). Different materials are best suited to various uses by man because of their properties.	**2nd-3rd (Ages 7-9)** **Earth's Energy and Geological Systems** Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. Some of the changes can be measured on a human time scale, but others occur so slowly that they must be inferred from geological evidence. These changes also impact human groups and the energy and mineral resources in various regions available to humans to meet their needs.	**4th-6th (Ages 9-12)** **Study Three** In the 4th – 6th (ages 9-12) children are able to use their skills to delve more deeply into an academic study. As such, there are two focus studies in the course of a year not three.

Year Two: How Does the World Work? K-1st (Ages 5-7) Continent Study – Africa and Australia: September, October, November		
Study One – Man's Impact on Life Cycles and Systems The natural world works in a series of cycles and systems. Children understand that human life has a beginning, a time of growth, and an ending. They acquire a basic knowledge of the body's needs and its functions, and adopt personal habits that promote wellness. Extending this concept, children learn that species within an ecosystem have unique structures that allow them to survive in that ecosystem. Children will see the cycle of life around them, in nature. This understanding extends to an understanding that all organisms are all connected as a part of the larger ecosystem. Children develop and understanding that man's decisions can impact the balance of the larger ecosystems and the sustainability of resources. Beginning with their families and classrooms, children understand that people have a civic and global responsibility to use the earth's resources wisely.		
Enduring Understanding in Study One	**Essential Questions in Study One**	**Standards Tied to Study One**
Social Studies	**Social Studies**	**Social Studies**
Effective citizens are committed to protecting rights for themselves, other citizens, and future generations, by upholding their civic responsibilities and are aware of the potential consequences of inaction. Distinctions between a citizen's rights, responsibilities, and privileges help to define the requirements and limits of personal freedom.	How do one's civic responsibilities relate to our use of natural resources and our interactions with the natural world? What rights, responsibilities, and privileges do humans have to use the world's resources wisely? Why is it important that groups work together to use resources well?	Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively. **C4AK-3**
Science	**Science**	**Science**
Life Processes	**Life Processes** What do all living things need?	**Life Processes**

Living systems demonstrate the complementary nature of structure and function. All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism. Organisms respond to internal and external cues which allow them to survive. The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation. Organisms and their environments are interconnected. Changes in one part of the system will affect other parts of the system. **Ecology** Organisms and their environments are interconnected. Matter needed to sustain life is continually recycled among and between organisms and the environment. Energy from the sun flows irreversibly through ecosystems and is conserved as organisms use and transform it.	How does structure relate to function in living systems from the cellular to the organismic level? How is matter transferred and energy transferred/transformed in living systems? How do responses to internal and external cues aid in an organism's survival? What can we do to benefit the health of humans and other organisms? **Ecology** How can change in one part of an ecosystem affect change in other parts of the ecosystem? How do matter and energy link organisms to each other and their environments? Why is sunlight essential to life on earth? How do humans have an impact on the diversity and stability of ecosystems?	Plants & animals are similar to, and different from, each other in observable structures & behavior. These characteristics distinguish them from each other and from nonliving things. **S6.1A (K-3)** Each plant or animal has different structures that serve different functions in growth, survival & reproduction. **S6.1B(K-3)** In animals, the skeletal-muscular system provides structure, support and enables movement. **S6.1C(K-3)** Plants and animals are living things. All living things have basic needs for survival including air, water, food (nutrients), space, shelter, and light. **S6.2A (K-3)** Senses help humans and other organisms detect internal and external cues. **S6.3A (K-3)** **Ecology** Interconnectedness exists among the living and nonliving parts of an environment. This interconnectedness can be observed by the changes made by plants and animals in their environment. **S8.1A(K-3)** Plants & animals need enough space & resources to survive. Overcrowding leads to an increased need for resources. **S8.1B(K-3)** All animals depend on plants. Some animals eat plants for food, others eat animals that have eaten plants. **S8.2A(K-3)** Plants need energy from the Sun, water and nutrients for growth and survival. **S8.2A(4-5)**

Year Two: How Does the World Work? K-1st (Ages 5-7) Continent Study – Africa and Australia: December, January, February, March		
Study Two: Earth Systems and Human Interactions – Weather/Soils Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. These changes also impact human groups and their survival. Some of the changes can be measured on a human time scale, but others occur so slowly, that they must be inferred from Geological evidence.		
Enduring Understanding in Study Two	**Essential Question in Study Two**	**Standards**
Social Studies	**Social Studies**	**Social Studies**
The ways mapped patterns are analyzed and used help solve societal problems. (apply to weather) The human response to the characteristics of a physical environment comes with consequences for both the human culture and the physical environment.	Why are there different types of maps? How can they be "read" to discover the nature and contents of the real world? (apply to weather and soils) To what extent do differences between flat maps and globes affect understanding of places in the world and their relationship to each other? (apply to weather and soils) To what extent do differences in climate and landforms across the earth affect how and where people live?	Students will understand the nature and uses of maps, globes, and other geo-graphics. Students will distinguish different types of climate and landforms and explain why they occur. **G2A(K-3)**
Science	**Science**	**Science**

Earth's Systems Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth locally and globally. Technology enables us to better understand Earth's systems. It also allows us to analyze the impact of human activities on Earth's systems and the impact of Earth's systems on human activity. Earth's systems can be broken down into individual components which have observable measurable properties.	**Earth's Systems** How do changes in one part of the Earth system affect other parts of the system? In what ways can Earth processes be explained as interactions among spheres? How does technology extend human senses and understanding? How does understanding the properties of Earth materials and the physical laws that govern their behavior lead to prediction of Earth events?	**Earth's Systems** Weather influences plants, animals and human activity. **S5.2A (K-3)** People who work or play outdoors often dress and base their activities on the speed of the wind and the temperature of the air. **S5.2B (K-3)** Water from rain, lakes, and underground is needed by plants, animals and people for their everyday activities. **S5.2C (K-3)** Clouds are shaped by winds and are made of small water droplets or ice crystals. Cloud shapes can be used to help forecast weather. **S5.2D (K-3)** Weather can be observed, measured and described through the use of simple tools such as a thermometer, rain gauge and wind vane. **S5.3B (K-3)** Components of Earth's system include minerals, rocks, soil, water and air. These materials can be observed, sorted and/or classified based on their physical properties. **S5.1A (K-3)** Water can exist as a solid, liquid or gas and in different forms such as rain, snow and ice. **S5.1B (K-3)** Sand, clay and humus have distinct physical properties and are components of soils. **S5.1C (K-3)** A soil's composition varies from environment to environment. **S5.1D (K-3)**

Year Two: How Does the World Work? K-1st (Ages 5-7) Continent Study – Africa and Australia: April to June		
Study Three – The Flow of Energy and Human Needs – Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. In this study, children understand that energy takes many forms. People use energy to do work. There are various sources of energy that people can harness to use. Some are renewable sources and others will be depleted at some point. People also seek to understand materials and their properties. The transfer of energy can change materials into different forms (water, ice, steam). Different materials are best suited to various uses by man because of their properties.		
Enduring Understanding in Study Three	**Essential Questions in Study Three**	**Standards Tied to Study Three**
Social Studies	**Social Studies**	**Social Studies**
Effective citizens are committed to protecting rights for themselves, other citizens, and future generations, by upholding their civic responsibilities and are aware of the potential consequences of inaction. Distinctions between a citizen's rights, responsibilities, and privileges help to define the requirements and limits of personal freedom.	How do one's civic responsibilities relate to our use of natural resources and our interactions with the natural world? What rights, responsibilities, and privileges do humans have to use the world's resources wisely? Why is it important that groups work together to use resources well?	K-3a: Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively. **C4AK-3**
Science	**Science**	**Science**
Energy Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with	**Energy** How do we know that things have energy? How can energy be transferred from one material to another? What happens to a material when energy is transferred to it? **Materials and Their Properties**	**Energy** The Sun is a source of energy that lights and warms the Earth. **S3.1A (K-3)** Heat energy is a form of energy that makes things warmer. e.g. heat energy can come from burning wood. **S3.1C (K-3)**

the position of mass and with energy fields (potential energy). Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the transfer of the different forms of energy. Energy readily transforms from one form to another, but these transformations are not always reversible. The details of these transformations depend upon the initial form of the energy and the properties of the materials involved. **Materials and Their Properties** The structures of materials determine their properties. The properties of materials influence their use. Some materials are more suitable for making a particular product or device.	What determines if new materials need to be developed to meet group needs? How do the properties of materials determine their use? Why should people consider the risks and benefits before the production of new materials and/or the implementation of a new process?	Objects that move (e.g.., moving air, moving water) have energy because of their motion. **S3.1B (K-3)** The position of an object gives its location relative to where you are (e.g., above, below, in front, or behind). The motion of an object describes how its position is changing. Pushing or pulling on an object can change its position or motion. **S3.2A (K-3)** Transferring heat energy to an object will make it feel warmer by raising its temperature and it may cause a change in the object's physical properties. **S3.2D (K-3)** Materials and Their Properties Materials can be described and classified according to the following physical properties: size, shape, mass, texture, color, and material composition. Students can observe materials' physical properties by using tools that include rulers, balances, thermometers and hand lenses. **S.2 K-3A** Materials exist in one of three states – solid, liquid, or gas. Solids and liquids have easily observable properties and may change from one form to the other. **S.1 K-3B**

Instructional Strategies and Performance Projects/Assessments
Year Two K–1st (Ages 5-7) - How Does the World Work?

Montessori Great Lessons

The Montessori Great lessons are impressionistic lessons which provide a "whole" for the three studies of *What Does It Mean to Be Human*? These lessons are shared each year with various levels of detail according to the children's development. Particular emphasis should be given to the parts of the story that reinforce the content standards being developed in the K-1st (Ages 5-7) study of *What Does It Mean to Be Human.* The same lessons will be shared in the 2nd—3rd (Ages 7-9) program expanding on concepts introduced at the K-1st (Ages 5-7) level. (See page 5 for full details of Montessori Great Lessons)

First Great Lesson – Coming of the Universe and the Earth
The Second Great Lesson: Coming of Life
The Third Great Lesson: Coming of Human Beings
The Fourth Great Lesson: The Story of Language
The Fifth Great Lesson: The Story of Numbers

Continent studies

Montessori classrooms focus on a study of each continent and the various cultures and geography of those continents as children discover what it means to be human, how geography impacts the way cultures meet their human needs, and how the various cultures interact. While presented separately in this document, the concepts of what it means to be human and the Delaware Content Standards are closely interwoven throughout the year through the continent studies. These Integrated units developed through the **Understanding by Design (UbD) process** (see page 30). Possible Instructional materials and strategies teachers may use are listed below.

Montessori lessons and materials related to:

Living things: Botany and Zoology

- Life cycle of plants and animals
- Parts of a plant/animal.
- Classifying
- Comparing and contrasting the needs

- Fundamental needs of living things

My connection to the natural world: Science kits on Organisms and/or Solids and liquids:

- Ecology
- Botany
- Zoology
- Biomes
- Geography

Human needs and habits:

- Fundamental needs of humans lessons and activities
- Ecology
- Food chains/Ecosystem
- Nutrition

Civics, History, Geography:

- Responsive Classroom lessons and activities to build community and teach social skills, responsibilities, rights and privileges
- Create fair classroom rules
- Timelines of Individual lives
- Set up the process to carry out a mock election within the classroom
- Working in Groups
- Fundamental needs of man and how various cultures meet these needs (food, clothing, shelter, water, communication, spirituality)
- Geography maps, globes, landform models
- Cultural traditions and celebrations
- Set up the process to carry out a mock election within the classroom

Energy Lessons focusing on:

- Recognizing and identifying that the Sun warms and lights the Earth.
- Recognizing and identifying that air surrounds us and that moving air (wind) has energy that can make things move.
- Recognizing that heat energy can come from the burning of wood.
- Observing that heat energy makes things warmer.

- Observing that objects move in different ways such as fast, slow, sideways, zigzag, and swaying back and forth.
- Observing how the air makes the trees and other objects move. Describe how a fast-moving wind can make objects move more than a gentle breeze (i.e., trees swaying).
- Observing the evidence of the force of air pushing on objects and materials such as pinwheels and kites. Compare how the direction and speed (fast, slow) of the moving air affects the motion of the objects.
- Observing and measure the temperature of hot and cold water. Investigate what happens when hot and cold water are mixed. Record data on a graph and use the data to summarize the results.
- Demonstrating that the position of an object can be above or below, in front of or behind, or to the left or right of another object.
- Using the sense of touch, recognize that objects placed in direct sunlight feel warmer than objects in the shade.
- Investigating what happens to the temperature of an object when it is placed in direct sunlight. Record data and conclude that the energy in the sunlight was changed into heat energy in the object.
- Comparing what happens when sunlight strikes dark and light-colored objects.

Science Kits

As related to the UBD Units, teachers will utilize the following science kits to address the science standards across the two-year cycle of the 5-7 program.

- Trees—Exploring how trees are alive and different from non-living things, their basic needs, and functions of structures.
- Five Senses—Using the five senses to observe and describe the world
- Wood and Paper-Examining the properties of wood and paper
- Weather and Me-Weather patterns and their influence on living things
- Solids and Liquids-Comparing/Testing the Properties of Solids and Liquids
- Organisms-Requirements for living things to survive in their habitats

Instructional Strategies and Performance Projects/Assessments Year Two K– 1st (Ages 5-7) - How Does the World Work?

Delaware Recommended Curriculum units that might be used in the studies.

- Participating in a Group
- Schedules
- Thinking About Maps and Globes

- Thinking Chronologically

Classroom projects leading to the performance assessments as listed below: Through reflective journals, oral responses, and illustrations students will:

- Describe the life cycles of common plants and animals.
- Identify what living things need to survive, comparing and contrasting by comparing and contrasting the differences between living and non-living.
- Design an experiment demonstrating the fundamental needs of a plant or animal.
- Observe and journalize a plant or animal throughout a life cycle.
- Create a model of a life cycle
- Science experiments
- Trace, color and label countries using continent puzzle maps
- Trace continent puzzle map, use World Atlas (with guidance) to identify, color and label the biomes of the continent of study
- Create 3-D representation of a selected biome
- Through reflective journals, oral responses, and illustrations students will compare and contrast the differences of basic needs between humans and other life forms.
- Create a recycling and composting program for the classroom
- Create a miniature habitat
- Create a 3-D representation of a life cycle

Resources

Montessori Albums—Resources obtained through MACTE approved Montessori training courses
http://missbarbara.net/ - Web sites related to each area of the Montessori Great Lessons and the Delaware Content Standards.
http://www.thinkfinity.org/
http://education.nationalgeographic.com/education/
http://sciencenetlinks.com/
http://www.econedlink.org/
http://historyexplorer.americanhistory.si.edu/
www.nsta.org
http://www.loc.gov/index.html

PALS is an on-line, standards-based, continually updated resource bank of science performance assessment tasks indexed via the National Science Education Standards (NSES) and various other standards frameworks.

Sussex Montessori School
Interdisciplinary Science/Social Studies Curriculum
2nd-3rd Grade

The 2nd –3rd (Ages7-9) Cultural Curriculum (Social Studies/Science)

This document is the core of the curriculum plan for the 2nd –3rd (ages7-9) child. This document allows teachers to plan rich interdisciplinary units to ensure that the content standards are addressed, to determine where children are on the continuum of learning, to match instruction to learning goals, and to use assessment as a tool to monitor progress.

Social Studies and Science—2nd—3rd (Ages 7-9) **Transfer Knowledge** Transfer Skills in the Integrated Social Studies/ Science curriculum known as the Montessori Cultural curriculum are not based on the transfer of a specific body of knowledge but rather of several key conceptual understandings and the development of what Maria Montessori called the human potentials. These understandings and potentials transfer throughout the child's school and later life experiences.			
Montessori Great Lessons tied to what it means to live in the world.	**Human Potentials**	**Research Skills**	**Self-expression**
Unity of Human Beings Students understand the similarities and differences of cultures across the world; that people interact with the natural world in distinct ways that produce cultural uniqueness; that people, places, and environments are integrated; that life involves producing and consuming. **Unity of all Living Things**	**Students will:** Understand the role the human potentials play in both their school community and their everyday lives **Character** – Students are trustworthy, compassionate, and demonstrate integrity. **Leadership** – Students combine vision, ethics, and courage to empower others to make a difference in the community.	**Students will:** Understand what makes a question which leads to inquiry and investigation. Plan investigations to address a question or problem. Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results. Synthesize information from various resources and	**Students will:** Discover and express ideas, feelings, beliefs and values. Reflect on how these ideas effect the way they interact with the world. Acquire the skills necessary to successfully participate in groups, which includes defining the objective, dividing responsibilities, and working cooperatively.

on Earth Students will show respect for the beauty and wonder of nature. They develop an understanding of how, through science, we learn how nature works. They understand that all people use natural resources to meet a variety of human needs. This use of resources defines many cross cultural human interactions. **Unity of the Universe Itself** Students develop an understanding of their relationship and place in the development of the universe; how the earth has changed over time through physical, chemical, and geological processes.	**Thinking Skills** – Students develop flexibility, perseverance, curiosity, imagination, inventiveness, wonder, and reflections on process and product supporting lifelong and collaborative learning in order to address real life challenges. **Life Management** – Students develop self-awareness so that in the long run they make responsible, healthy and balanced life work choices. **Creative and Artistic** – Students discover and develop creative gifts so that in the long run they will be able to express themselves creatively and artistically, recognize and respect creativity in others, utilize the creativity of others, and preserve flexibility of thought and open-mindedness to look at and meet challenges. **Service and Responsibility** – Students learn the value of service and responsibility so that in the long run they will be able to demonstrate empathy, compassion, social responsibility,	experiences to develop inquiries about the world around them. Determine ways to gather data and use various tools (experiments, surveys, logs, journals, etc.). Understand what constitutes evidence. Understand when you have enough evidence. Interpret evidence and present logical inferences and conclusions to others from the evidence.	Demonstrate cooperation, assertion, responsibility, empathy and self-control when communicating with others. Utilize and explore their own creativity. Learn to appreciate the aesthetic. Use various technology tools to gather, organize, and communicate with others. Use various visual print and artistic mediums to communicate with others. Adapt presentation style and speech for the audience. Present claims and findings in a logically sequenced way, developing concepts to support a position.

	and appreciation for others and the world around them.		
Standards Embedded Across Both Years of the 2nd-3rd (Ages 7-9) Program			
Enduring Understanding Embedded in all three studies	**Essential Questions Embedded in all three studies**	**Standards Embedded in all three studies**	
Social Studies	**Social Studies**	**Social Studies**	
The questions a historian chooses to guide historical research that creates accurate chronologies will affect which events will go into the chronology and which will be left out. Many different types of sources exist to help us gather information about the past, such as artifacts and documents. Mental maps summarize differences and similarities about places. Mental maps change as the scale moves from local to global; we know more about our home area than more distant places; and these differences affect how we feel and behave towards places that are distant versus those that are close. Effective participation in groups leads to effective Democratic governments.	Why is *when* an event happens important? How can words, models, and graphics help us learn about the world? What does it mean to participate effectively in a group? Why does *where* matter? Why does *when* matter?	Students will use clocks, calendars, schedules, and written records to record or locate events in time **(H.1.K-3A).** Students will understand the nature and uses of maps, globes, and other geo-graphics. (**G.1.k-3a)** Students will use artifacts and documents to gather information about groups and their histories **(H. 2.k-3A)** Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively **(C.4.K-3a)**	
Science as Inquiry	**Science as Inquiry**	**Science and Inquiry**	

Scientific inquiry is a method by which humans seek to understand the natural world. Scientific inquiry involves asking scientifically-oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying the explanation. In a science investigation, a fair test is one in which all of the conditions are kept constant except the one condition being investigated. The purpose of accurate observations and data collection is to provide evidence. Scientists use tools to enhance their senses in order to obtain more evidence. Scientists use observations from investigations and knowledge that is already known to develop an explanation. The purpose of communicating with others is to share evidence and conclusions. Scientists communicate the results of their investigations to others. The use of mathematics, reading, writing, and technology are important in conducting scientific inquiries. The development of technology and advancement in science influence each other and drive each other forward.	What makes a question scientific? What constitutes evidence? When do you know you have enough evidence? Why is it necessary to justify and communicate an explanation?	Generate questions and predictions using observations and exploration about the natural world. **S1.1A (K-3)** Generate and follow simple plans using systematic observations to explore questions and predictions **S1.1B(K-3)** Collect data using observations, simple tools and equipment. Record data in tables, charts, and bar graphs. Compare data with others to examine and question results. **S1.1C (K-3)** Construct a simple explanation by analyzing observational data. Revise the explanation when given new evidence or information gained from other resources or from further investigation. **S1.1D (K-3)** Share simple plans, data, and explanations with an audience and justify the results using the evidence from the investigation. **S1.1E (K-3)** Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results. **S1.1F (K-3)** Tools are useful in science to help gather data for observations and measurements and provide a safe means of conducting an investigation. **S.1.2B(K-3)** People from all parts of the world practice science and make many important scientific contributions. **S.1.3A(K-3)**

Year One: What Does It Mean to Be Human? 2nd-3rd (Ages 7-9)
Continent Study of Europe & Antarctica

Children understand that humans think in various ways through their use of language, mathematics, scientific inquiry and research. Thinking like a scientist or a geographer, historian or social scientist, they use methods of scientific inquiry and research tools to learn about the natural and human world around them within the context of continent studies. Each program year is comprised of three time-periods or studies which spiral, building complexity throughout the subsequent grade levels. These studies are laid out across the curriculum by use of color coding for each study.

Study One - September, October, November

K-1st (Ages 5-7) Membership in Groups/ Diversity and Continuity of Living Things	2nd-3rd (Ages 7-9) Responsibility to Group Membership / Diversity and Continuity of Living Things	4th–6th (Ages 9-12) The Purpose of Governments and Scientific Advances
Children understand that everyone holds membership in a variety of groups, beginning with the family. They consider how groups shape our lives, how we, in turn, can shape groups, and they develop a sense of civic and social responsibility. Through this study, children will see themselves as holding membership in a variety of groups from their family, to the classroom, to the larger community. As children explore the diversity and continuity of all living things, they understand that all species belong to groups based on their characteristics; these characteristics are hereditary. All species, including humans, have a cycle of life.	Humans have established systems that structure their participation in groups. Children learn the various ways that governments are structured, develop an understanding of the principles of a representative democracy and the responsibilities they have a citizen holding both rights and responsibilities in society. They are challenged to be a good citizen in their school and beyond and to understand that group membership means having responsibilities, as well as rights. Building on the study of the 5-7 program, children continue to explore the diversity and continuity of living things and the relationship of humans to the natural world. They understand how humans as organisms are similar and different from other organisms	This study builds on the understandings of group functioning, rights and responsibilities from the K-1st (ages 5-7) and the 2nd-3rd (ages7-9) programs. The study focuses specifically on civic responsibility. Children learn the various ways that governments are structured, develop an understanding of the principles of a representative democracy and the responsibilities they have a citizen holding both rights and responsibilities in society. They are challenged to be a good citizen in their school and beyond and to understand that citizenship in groups and the U.S. means having responsibilities, as well as rights. Children explore various scientific advances, laws that have been instituted related to scientific knowledge, and how

	and that each has a place in the natural world.	government influences the uses of our natural resources.
Study Two – December, January, February, March		
K-1st (Ages 5-7) **Fundamental Needs** All species, including humans have basic fundamental needs. Children distinguish wants from needs and that due to scarcity, individuals, families, communities, and societies as a whole, must make choices in their activities and consumption of their goods and services. Science has provided ways that humans can better meet their needs. As humans use natural resources to meet their needs, they may have long term impacts on the environment and the future availability of resources. Children discover the importance of carefully using the precious resources of our earth, becoming responsible producers, consumers, and conservers.	**2nd-3rd (Ages 7-9)** **Economics of wants and fundamental needs** Children distinguish human wants from needs and that due to scarcity, individuals, families, communities, and societies as a whole, must make choices in their activities and consumption of their goods and services. People make decisions about production and consumption considering costs and benefits for various choices. Science has provided ways that humans can better meet their needs. As humans use natural resources to meet their needs, they may have long term impacts on the environment and the future availability of resources. Children discover the importance of carefully using the precious resources of our earth, becoming responsible producers, consumers, and conservers.	**4th–6th (Ages 9-12)** **Place in Time and Space -** **The Universe through the eyes of science and history** Building on the concept that humans seek to place themselves in time and space, children will develop an appreciation for the earth in relationship to the universe. Humans have always sought to explore and understand our place in the universe. Combining scientific thinking and the lens of the historian, children will develop an understanding of the solar system and track the history of human discovery related to space exploration beginning with the earliest scientist and moving to man's most recent explorations
Study Three – April, May, June		
K-1st (Ages 5-7) **Place in Time and Space**	**2nd-3rd (Ages 7-9)** **Place in Time and Space – Geological History, Human History**	**4th–6th (Ages 9-12)**

Humans have always had a capacity to place themselves in time and space. Students explore the intergenerational connections of the various groups they belong to. They learn about the history and traditions of their own cultures. They gain perspective about where they are located spatially on the planet and in the universe.	Humans have always had a capacity to place themselves in time and space. Students develop an understanding of the concept of regions, how regions and places are defined both by land forms and by human interactions and characteristics (cultures, linguistics, etc.). Students understand that they are part of a larger history of humanity and the geological history of the earth.	In the 4th – 6th (Ages 9-12) children are able to use their skills to delve more deeply into an academic study. As such, there are two focus studies in the course of a year not three.
Year One: What Does It Mean to Be Human? 2nd 3rd (Ages 7-9) Continent Study of Europe & Antarctica in September, October, November		
Study One: Responsibility to Group Membership/ Diversity and Continuity of Living Things Humans have established systems that structure their participation in groups. Children learn the various ways that governments are structured, develop an understanding of the principles of a representative democracy and the responsibilities they have a citizen holding both rights and responsibilities in society. They are challenged to be a good citizen in their school and beyond and to understand that group membership means having responsibilities, as well as rights. Building on the study of the 5-7 program, children continue to explore the diversity and continuity of living things and the relationship of humans to the natural world. They understand how humans as organisms are similar and different from other organisms and that each has a place in the natural world.		
Enduring Understanding for Study One	**Essential Questions for Study One**	**Standards Tied to Study One**
Social Studies	**Social Studies**	**Social Studies**
The principles and ideals underlying the American Democracy are designed to promote the freedom of the American people.	Why is authority needed? What are the obligations of authority? Why is respect for authority conditional? What is the nature of a privilege? What do you have to do to earn or lose a privilege?	Students will understand that respect for others, their opinions, and their property is a foundation of civil society in the United States. **C2A – K-3**

Effective citizens are committed to protecting rights for themselves, other citizens, and future generations, by upholding their civic responsibilities and are aware of the potential consequences of inaction.	What is the relationship between my rights and my responsibilities? Is working in a group better than working alone?	Students will understand that American citizens have distinct responsibilities (such as voting), rights (such as free speech and freedom of religion), and privileges (such as driving). **C3AK-3** Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively. **C4AK-3**
Science	**Science**	**Science**
Diversity and Continuity of Living Things Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring. The diversity and changing of life forms over many generations is the result of natural selection, in which organisms with advantageous traits survive, reproduce, and pass those traits to offspring. The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants.	**Diversity and Continuity of Living Things** Why do offspring resemble their parents? How are organisms of the same kind different from each other? How does this help them reproduce and survive? How does the understanding and manipulation of genetics, reproduction, development and evolution affect the quality of human life?	**Diversity and Continuity of Living Things** The offspring of some plants and animals resemble the parents (i.e., a tree seedling resembles a mature tree). **S7.1A (K-3)** The offspring of some plants and animals do not resemble the parents. Similarities between parents and their offspring become more apparent as their life cycle continues (i.e., caterpillars become butterflies). **S7.1B (K-3)**
Year One: What Does It Mean to Be Human? 2nd-3rd (Ages 7-9) Continent Study of Europe & Antarctica in September, October, November Study One: Responsibility to Group Membership/ Diversity and Continuity of Living Things		
Enduring Understanding for Study One	**Essential Questions for Study One**	**Standards Tied to Study 1**

Social Studies	Social Studies	Social Studies
The principles and ideals underlying the American Democracy are designed to promote the freedom of the American people. Effective citizens are committed to protecting rights for themselves, other citizens, and future generations, by upholding their civic responsibilities and are aware of the potential consequences of inaction. Distinctions between a citizen's rights, responsibilities, and privileges help to define the requirements and limits of personal freedom. Effective citizens can research issues, form reasoned opinions, support their positions, and engage in the political process.	Why is authority needed? What are the obligations of authority? Why is respect for authority conditional? What is the nature of a privilege? What do you have to do to earn or lose a privilege? What is the relationship between my rights and my responsibilities? Is working in a group better than working alone? How should an elected official represent the interests of the people? Should groups choose to make decisions democratically when it would be easier if one person made all the decisions and assignments? For whom should I vote? Why? What is most important to me when I make this decision?	Students will understand that respect for others, their opinions, and their property is a foundation of civil society in the United States. **C2A – K-3** Students will understand that American citizens have distinct responsibilities (such as voting), rights (such as free speech and freedom of religion), and privileges (such as driving). **C3AK-3** Students will understand leaders are sometimes chosen by election, and that elected officials are expected to represent the interests of the people who elected them **C.1.K-3a** Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively. **C4AK-3l**
Science	**Science**	**Science**
Diversity and Continuity of Living Things Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring. The diversity and changing of life forms over many generations is the result of natural selection, in which organisms with	**Diversity and Continuity of Living Things** Why do offspring resemble their parents? How are organisms of the same kind different from each other? How does this help them reproduce and survive? How does the understanding and manipulation of genetics, reproduction,	**Diversity and Continuity of Living Things** The Earth's present day species evolved from earlier, distinctly different species. **S7.2A (6-8) Introduced** Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival. Most of the species that

advantageous traits survive, reproduce, and pass those traits to offspring. The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants.	development and evolution affect the quality of human life?	have lived on Earth no longer exist. **S7.2D (6-8) Introduced** The offspring of some plants and animals resemble the parents (i.e., a tree seedling resembles a mature tree). **S7.1A (K-3)** The offspring of some plants and animals do not resemble the parents. Similarities between parents and their offspring become more apparent as their life cycle continues (i.e., caterpillars become butterflies). **S7.1B (K-3)** All plants and animals go through a life cycle of birth, growth, development, reproduction, and death. This cycle is predictable and describable, but differs from organism to organism. **S7.1C (K-3)** Many different kinds of plants and animals live throughout the world. These plants and animals can be grouped according to the characteristics they share. **S7.2A (K-3)**

Year One: What Does It Mean to Be Human? 2nd-3rd (Ages 7-9) Continent Study of Europe & Antarctica in December to March
Study Two: Economics of Wants and Fundamental Needs - Children distinguish human wants from needs and understand that due to scarcity, individuals, families, communities, and societies as a whole, must make choices in their activities and consumption of their goods and services. Science has provided ways that humans can better meet their needs. As humans use natural resources to meet their needs, they may have long term impacts on the environment and the future availability of resources. Children discover the importance of carefully using the precious resources of our earth, becoming responsible producers, consumers, and conservers.

Enduring Understanding in Study Two	Essential Questions in Study Two	Standards Tied to Study Two
Social Studies	**Social Studies**	**Social Studies**
Due to scarcity, individuals as producers and consumers, families, communities, and societies as a whole must make choices in their activities and consumption of goods and services. Because resources are scarce, societies must organize the production, distribution, and allocation of goods and services. Effective decision making requires comparing the additional costs of alternatives relative to the additional benefits received.	Why can't I have everything I want? How should people use what they have to get what they want? Why have different ways to produce and allocate goods and services developed?	Students will understand that communities and families with limited resources undertake a wide variety of activities to satisfy their wants. **E1A(k-3)** Students will apply the concept that economic choices require the balancing of costs incurred with benefits received to decisions about the use of natural resources. **E1B(K-3)** Students will identify human wants and the various resources and strategies which have been used to satisfy them over time. **E3A(K-3)** Students will understand the nature and uses of maps, globes, and other geo-graphics. **G1A(K-3)**
Science	**Science**	**Science**
Groups meet their fundamental needs in a variety of ways. The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants. As Humans Seek to meet their needs, they can alter the living and non-living factors	How do humans have an impact on the diversity and stability of ecosystems? What is a "responsible" use of energy? Are there alternative forms of energy that will serve our needs, or better ways of using traditional forms of energy? What is technology?	People use the variety of plants and animals found throughout the world for food, clothing, and shelter (e.g., silk for clothing, wood for building shelters). **S7.3A(K-3)** The ability of an organism (People) to meet its needs for survival is dependent upon its environment. Manipulation of the environment can positively or negatively

within an ecosystem, thereby creating changes to the overall system. People develop new materials as a response to the needs of society and pursuit of knowledge. This development may have risks and benefits to humans and the environment. People use a variety of resources to meet the basic and specific needs of life. Some of these resources cannot be replaced. Others can be replenished or exist in such vast quantities they are in no danger of becoming depleted. Humans use technology to solve problems and meet their needs.	How has technology helped people solve problems? How do humans have an impact on the diversity and stability of ecosystems as they seek to meet their needs? Why should people consider the risks and benefits before the production of new materials and/or the implementation of a new process? Are there alternative sources of energy to meet human needs? What can we do to benefit the health of humans and other organisms?	affect the well-being of various organisms that live there. **S6.4C (K-3)** Humans use devices and specialized equipment to ensure safety and to improve their quality of life (e.g., goggles, glasses, hearing aids, and wheelchairs). **S6.4B (K-3)** People have invented new technologies to solve problems. **S1.2A(K-3)** Technology has created new materials that can help people solve problems. **S.2.4B(K-3)** Many natural resources are limited. The amount available can be made to last longer by decreasing the use of some resources or by reusing or recycling certain materials. **S8.3A(K-3)** The properties of materials influence their use. Some materials are more suitable for making a particular product or device. **S2.4A (K-3)** Moving air, moving water, and sunlight contain energy that can be put to our use. **S3.4A (k-3)**

Year One: What Does It Mean to Be Human? 2nd-3rd (Ages 7-9) Continent Study of Europe & Antarctica in April to June		
Study Three: Place in Time and Space – Geological History, Human History - Humans have always had a capacity to place themselves in time and space. Students develop an understanding of the concept of regions and how regions and places are defined both by land forms and by human interactions and characteristics (cultures, linguistics, etc.). Students understand that they are part of a larger history of humanity and the geological history of the earth.		
Enduring Understanding for Study Three	**Essential Questions for Study Three**	**Standards Tied to Study Three**

Social Studies	Social Studies	Social Studies
Why are there different types of maps? How can they be "read" to discover the nature and contents of the real world? To what extent do differences between flat maps and globes affect understanding of places in the world and their relationship to each other? The human response to the characteristics of a physical environment comes with consequences for both the human culture and the physical environment. Places are unique associations of natural environments and human cultural modifications. Concepts of site and situation can explain the uniqueness of places. As site or situation change, so also does the character of a place. A region is a concept rather than a real object on the ground, used to simplify the diversity of places. Regions must have boundaries to exist, yet there are advantages and disadvantages associated with any real or abstract feature used to draw a boundary. History is often messy, yet a historian must logically organize events, recognize patterns and trends, explain cause and effect, make inferences, and draw conclusions from those sources which are available at the time. The questions a historian chooses to guide historical research that creates accurate	Why does *where* matter? To what extent do differences in climate and landforms across the earth affect how and where people live? To what extent are places different in culture and activity? How might connections between places affect their size and complexity? Why might places differ from regions? How can regions be used to simplify an understanding of place diversity? How might differences and similarities among regions result in connections between them? Why does *when* matter?	Students will understand the nature and uses of maps, globes, and other geo-graphics. **G1A (K-3)** Students will distinguish different types of climate and landforms and explain why they occur. **G2A(K-3)** Students will identify types of human settlement, connections between settlements, and the types of activities found in each. **G3A(K-3)** Students will use the concepts of place and region to explain simple patterns of connections between and among places across the country and the world. **G4A(K-3)** Students will develop an understanding of the similarities between families now and in the past, including: Daily life today and in other times Cultural origins of customs and beliefs around the world. **H4A(K-3)** Different kinds of communities in Delaware and the United States **H4B(K-3)** Students will develop an awareness of major events and people in United States and Delaware history. Who lives here and how did they get here? (immigrants, demographics, ethnic and religious groups) Important people in our past

chronologies will affect which events will go into the chronology and which will be left out. Competing chronologies can both be accurate, yet may not be equally relevant to the specific topic at hand.		
Science	**Science**	**Science**
The earth's regions are often defined by the dynamic systems that cause natural boundaries to form.	How have various geological and weather events changed face of the earth? How do these changes impact the community and the history of the region?	Water reshapes Earth's land surface by eroding rock and soil in some areas and depositing them in other areas. **S5.2B (4-5)** The surface of the earth changes constantly. Some of these changes happen slowly and are difficult to detect on a daily basis. Others changes happen quickly and result from events (i.e., major storms and volcanoes). **S5.2E (4-5)** The fit of continental coast lines, the similarity of rock types and fossilized remains provide evidence that today's continents were once a single land mass. The continents moved to their current positions on plates driven by energy from Earth's interior. **S5.2L (6-8)** Constructive processes that build up the land and the destructive processes of weathering and erosion shape and reshape the land surface. **5.4D(6-8)**

Instructional Strategies and Performance Projects/Assessments
Year One 2nd-3rd (Ages 7-9) - What Does It Mean to Be Human?

Montessori Great Lessons

The Montessori Great lessons are impressionistic lessons which provide a "whole" for the three studies of *What Does It Mean to Be Human*? These lessons are shared each year with various levels of detail according to the children's development. Particular emphasis should be given to the parts of the story that reinforce the content standards being developed in the K-1st (Ages 5-7) study of *What Does It Mean to Be Human.* The same lessons will be shared in the 2nd-3rd (Ages 7-9) program expanding on concepts introduced at the K-1st (Ages 5-7) level. (See page 5 for full details of Montessori Great Lessons)

First Great Lesson – Coming of the Universe and the Earth
The Second Great Lesson: Coming of Life
The Third Great Lesson: Coming of Human Beings
The Fourth Great Lesson: The Story of Language
The Fifth Great Lesson: The Story of Numbers

Continent studies

Montessori classrooms focus on a study of each continent and the various cultures and geography of those continents as children discover what it means to be human, how geography impacts the way cultures meet their human needs, and how the various cultures interact. While presented separately in this document, the concepts of what it means to be human and the Delaware Content Standards are closely interwoven throughout the year through the continent studies. These Integrated units developed through the **Understanding by Design (UbD) process** (see planning sheets page 57). Possible instructional materials and strategies teachers may use are listed below.

Montessori lessons and materials related to:

- Responsive Classroom lessons and activities to build community and teach social skills, responsibilities, rights and privileges
- Create fair classroom rules
- Timelines of Individual lives
- Set up the process to carry out a mock election within the classroom
- Working in Groups

- Fundamental needs of man and how various cultures meet these needs (food, clothing, shelter, water, communication, spirituality)
- Geography maps, globes, landform models
- Cultural traditions and celebrations
- Set up the process to carry out a mock election within the classroom
- Hands on materials developing concepts of time, quantity, linear measurement, volume, weight, and money
- Specific lessons on the earth, sun and moon:
    - Describe the shape of the Earth as being like a sphere and describe how a globe models this shape.
    - Name and identify objects that can be observed in the sky including the Sun, Moon, and stars and man-made objects such as airplanes.
    - Describe the repeating cyclic pattern of day and night and include in this description that we can see the Sun only during the daytime.
    - List objects that can be observed in the sky in the daytime and objects that can be observed in the sky at nighttime. Discuss which objects are on which lists (e.g., the Moon can be observed sometimes in the day and sometimes at night).
    - Safely observe the location of the Sun at the same time in the morning, noon, and afternoon over several days. Describe the Sun's movement across the sky over the course of the day.
    - Observe the Moon in the day sky over several months. Draw a sequence of pictures that shows the repeating cyclic pattern of the Moon.
    - Use simple models to demonstrate how Earth's rotation causes day and night.

Science Kits

As related to the UBD Units, teachers will utilize the following science kits to address the science standards across the two year cycle of the 7-9 program.

- Trees—Exploring how trees are alive and different from non-living things, their basic needs, and functions of structures.
- Five Senses—Using the five senses to observe and describe the world
- Wood and Paper-Examining the properties of wood and paper
- Weather and Me-Weather patterns and their influence on living things
- Solids and Liquids-Comparing/Testing the Properties of Solids and Liquids

- Organisms-Requirements for living things to survive in their habitats

Delaware Recommended Curriculum units that might be used in the studies.

Writing the Story of the Past
Scarcity and Wants
Respect in a Civil Society
Regions (K-3)
Resources and Production
Citzenopoly
Trading Partners
Using Maps and Globes
How Do We Know about Long Ago?
Places (K-3)
Economic Exchange

Classroom projects leading to the performance assessments as listed below:

- Using a world migration map, identify migration patterns around the world determining Americas roots, while tracking students' family migration path to the US or within the US
- Compare/contrast the migration paths of student's families to the migration patterns on the world map.
- Through a family interview, identify reasons ancestors migrated to the U.S. and traditions they brought with them to their new home/country.
- Photojournalism project – students will photograph people and places that represent cultural markers in our community.
- Create a dramatic enactment depicting the migratory path of a selected species
- Create a recycling and composting program for the classroom
- Create a structured market place wherein students will buy and sell chosen materials with all profits donated to a charity to be determined by the group's consensus

Resources

Montessori Albums—Resources obtained through MACTE approved Montessori training courses
http://missbarbara.net/ - Web sites related to each area of the Montessori Great Lessons and the Delaware Content Standards.
http://www.thinkfinity.org/
http://education.nationalgeographic.com/education/

http://sciencenetlinks.com/
http://www.econedlink.org/
http://historyexplorer.americanhistory.si.edu/
www.nsta.org
http://www.loc.gov/index.html

PALS is an on-line, standards-based, continually updated resource bank of science performance assessment tasks indexed via the National Science Education Standards (NSES) and various other standards frameworks.

Year Two: How Does the World Work? 2nd-3rd (Ages 7-9) Continent Study - Asia

Children understand that humans think in various ways through their use of language, mathematics, and scientific inquiry, and research. Thinking like a scientist or a geographer, historian, or social scientist, they use methods of scientific inquiry and research tools to learn about the natural and human world around them within the context of continent studies. Each program year is comprised of three time-periods, or studies which spiral, building complexity throughout the subsequent grade levels. These studies are laid out across the curriculum by use of color coding for each study.

Study One - September, October, November

K-1st (Ages 5-7) Man's Impact on Life Cycles and Systems	2nd-3rd (Ages 7-9) Life Cycles and Systems/ Historian's perspective	4th-6th (Ages 9-12) Energy exchanges and Systems / The Historical Perspective Science
The natural world works in a series of cycles and systems. Children understand that human life has a beginning, a time of growth, and an ending. They acquire a basic knowledge of the body's needs and its functions and adopt personal habits that promote wellness. Extending this concept, children learn that species within an ecosystem have unique structures that allow them to survive in that ecosystem. Children will see the cycle of life around them in nature. This understanding extends to an understanding that all organisms are all connected as a part of the larger ecosystem. Children develop an understanding that man's decisions can impact the balance of the larger ecosystems and the sustainability of resources. Beginning with their families and classrooms, children understand that people	The natural world works in a series of cycles and systems. This understanding extends to an understanding that we are all connected as a part of the larger ecosystem. This ecosystem depends on a system of consumers and producers. Species within an ecosystem have unique structures that allow them to survive in that ecosystem. As one part of the ecosystem changes, other parts will be affected. Children develop an understanding that man's decisions can impact the balance of the larger ecosystems and the sustainability of resources. The perspective of the historian can help us to understand how man has impacted the regions around them and how the resulting changes in ecosystems have impacted communities.	Children discover that the flow of energy drives processes of change and all biological, chemical, and physical systems. In this study children learn that energy stored in a variety of systems can be transformed into their energy forms, which influence many facets of daily life. People use a variety of resources to meet the basic energy needs of life. Some of these resources cannot be replaced and others exist in vast quantities. The structure of materials influences their physical properties, chemical reactivity, and use. The exchange of energy can change matter from one form to another making a material more suitable for a specific purpose. Many Scientists have contributed to our understanding of the biological, chemical and physical nature of energy. Historians

have a civic and global responsibility to use the earth's resources wisely.		contribute to our understanding of how these scientists worked, their culture, society's responses to their work, and the resources they had for their work.
Study Two—December, January, February, March		
K-1st (Ages 5-7) **Earth Systems and Human Interactions** **Weather/Soils** Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. These changes also impact human groups and their survival. Some of the changes can be measured on a human time scale, but others occur so slowly that they must be inferred from geological evidence.	**2nd-3rd (Ages 7-9)** **Producing and Consuming** All people engage in making and using things. Children recognize the value and dignity of work. They learn that human economic systems serve to provide a method for people to distribute goods and services to meet their wants and needs. They understand that due to scarcity, individuals, families, and communities and societies as a whole must make choices in their activities and consumption of their goods and services. Life for all of us involves producing and consuming. Knowledge of materials and their properties helps man to match materials to products for consumption.	**4th–6th (ages 9-12)** **Producing and Consuming** Production and consumption occurs as a human interaction among humans and as a natural interaction in ecosystems. All people engage in making and using things. Children learn the various ways that different cultures produce goods, what they value for production, how they structure economic systems that support production and consumption, and how cultures use the regional resources and trade globally to meet various needs of different societies. They understand that due to scarcity, communities and societies must make choices in their activities and consumption of goods and services. Various aspects of science contribute to decisions about production and consumption. The ecosystem is dependent on the concept of producers and consumers. When man utilizes the natural resources around him, he may impact the balance of the ecosystem impacting his long-term ability

		to meet man's needs. The production and consumption of energy impacts the ability of a society to produce goods and services to meet their needs. Knowledge of materials and their properties helps man to match materials to products.
Study Three — April, May, June		
K-1st (Ages 5-7) **The Flow of Energy and Human Needs** Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. In this study, children understand that energy takes many forms. People use energy to do work. There are various sources of energy that people can harness to use. Some are renewable sources and others will be depleted at some point. People also seek to understand materials and their properties. The transfer of energy can change materials into different forms (water, ice, steam). Different materials are best suited to various uses by man because of their properties.	**2nd-3rd (Ages 7-9)** **Earth's Energy and Geological Systems** Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. Some of the changes can be measured on a human time scale, but others occur so slowly that they must be inferred from geological evidence. These changes also impact human groups and the energy and mineral resources in various regions available to humans to meet their needs.	**4th–6th (Ages 9-12)** **Study Three** In the 4th – 6th (Ages 9-12) children are able to use their skills to delve more deeply into an academic study. As such, there are two focus studies in the course of a year not three.
Year Two: How Does the World Work? 2nd-3rd (Ages 7-9) Continent Study - Asia in September, October, November		

Study One – Life Cycles and Systems/ Historian's Perspective - The natural world works in a series of cycles and systems. This understanding extends to an understanding that we are all connected as a part of the larger ecosystem. This ecosystem depends on a system of consumers and producers. Species within an ecosystem have unique structures that allow them to survive in that ecosystem. As one part of the ecosystem changes, other parts will be affected. Children develop and understanding that man's decisions can impact the balance of the larger ecosystems and the sustainability of resources. The perspective of the historian can help us to understand how man has impacted the regions around them and how the resulting changes in ecosystems have impacted communities.		
Enduring Understanding in Study One	**Essential Questions in Study One**	**Standards Tied to Study One**
Social Studies	**Social Studies**	**Social Studies**
Many different types of sources exist to help us gather information about the past, such as artifacts and documents. Sources about the past need to be critically analyzed and categorized as they are used. Historians select important events from the past they consider worthy of being taught to the next generation. That selection process, deciding what to emphasize, and the questions that historians ask of the documents and other evidence contributes significantly to the conclusions drawn.	What can I learn about how ecosystems have impacted communities and regions shaping the history of an area from studying artifacts and documents? What can't I learn? How are artifacts and documents used to write the story of the past and the impact that man's decisions about the use of resources have today?	Students will use artifacts and documents to gather information about the past. **H2A(k-3)** Students will understand that historical accounts are constructed by drawing logical inferences from artifacts and documents. **H3A(k-3)**
Science	**Science**	**Science**
Life Processes Living systems demonstrate the complementary nature of structure and function.	**Life Processes** What do all living things need? How does structure relate to function in living systems from the cellular to the organismic level?	**Life Processes** Plants and animals are similar to and different from each other in observable structures and behavior. These characteristics distinguish them from each other and from nonliving things. **S6.1A (K-3)**

All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism. Organisms respond to internal and external cues, which allow them to survive. The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation. Living systems demonstrate the complementary nature of structure and function. All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism. Organisms respond to internal and external cues, which allow them to survive. The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation **Ecology** Organisms and their environments are interconnected. Changes in one part of the system will affect other parts of the system. Matter needed to sustain life is continually recycled among and between organisms and the environment. Energy from the sun flows	How is matter transferred and energy transferred/transformed in living systems? How do responses to internal and external cues aid in an organism's survival? What can we do to benefit the health of humans and other organisms? What do all living things need? How does structure relate to function in living systems from the cellular to the organismic level? How is matter transferred and energy transferred/transformed in living systems? How do responses to internal and external cues aid in an organism's survival? What can we do to benefit the health of humans and other organisms? **Ecology** How can change in one part of an ecosystem affect change in other parts of the ecosystem? How do matter and energy link organisms to each other and their environments? Why is sunlight essential to life on earth?	Each plant or animal has different structures that serve different functions in growth, survival and reproduction. **S6.1B(K-3)** In animals the skeletal-muscular system provides structure, support and enables movement. **S6.1C(K-3)** In addition to basic needs for survival, living things have needs specific to the organism such as temperature range and food requirements. **S6.2B (K-3)** The brain receives signals from parts of the body via the senses. In response, the brain sends signals to parts of the body to influence reactions. The ability of an organism to meet its needs for survival is dependent upon its environment. Manipulation of the environment can positively or negatively affect the well-being of various organisms that live there. **S6.4C (K-3)** Plants and animals are similar to and different from each other in observable structures and behavior. These characteristics distinguish them from each other and from nonliving things. **S6.1A (K-3)** Each plant or animal has different structures that serve different functions in growth, survival and reproduction. **S6.1B(K-3)** In animals, the skeletal-muscular system provides structure, support and enables movement. **S6.1C(K-3)** In addition to basic needs for survival, living things have needs specific to the organism such as

irreversibly through ecosystems and is conserved as organisms use and transform it.	How do humans have an impact on the diversity and stability of ecosystems?	temperature range and food requirements. **S6.2B (K-3)** The brain receives signals from parts of the body via the senses. In response, the brain sends signals to parts of the body to influence reactions. The ability of an organism to meet its needs for survival is dependent upon its environment. Manipulation of the environment can positively or negatively affect the well-being of various organisms that live there. **S6.4C (K-3)** **Ecology** An interconnectedness exists among the living and nonliving parts of an environment. This interconnectedness can be observed by the changes made by plants and animals in their environment. **S8.1A(K-3)** Plants and animals need enough space and resources to survive. Overcrowding leads to an increased need for resources. **S8.1B(K-3)** All animals depend on plants. Some animals eat plants for food. Other animals eat animals that have eaten plants. **S8.2A(K-3)** Plants need energy from the Sun, water and nutrients for growth and survival. **S8.2A(4-5)** Changes in an organism's environment may 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. **S8.1D(4-5)** Introduced

		Adaptations in organisms enable them 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. **S8.1C(4-5)** All living organisms interact with the living and nonliving parts of their surroundings to meet their needs for survival. These interactions lead to a constant exchange of matter. **S8.1B (4-5)** Introduced

Year Two: How Does the World Work? 2nd-3rd (Ages 7-9) Continent Study of Asia in December to March

Study 2 – Producing and Consuming - All people engage in making and using things. Children recognize the value and dignity of work. They learn that human economic systems serve to provide a method for people to distribute goods and services to meet their wants and needs. They understand that due to scarcity, individuals, families, and communities and societies as a whole, must make choices in their activities and consumption of their goods and services. Life for all of us involves producing and consuming. Knowledge of materials and their properties helps man to match materials to products for consumption.

Enduring Understanding	Essential Questions	Standards Tied to Study 2
Social Studies	**Social Studies**	**Social Studies**
Due to scarcity, individuals as producers and consumers, families, communities, and societies as a whole must make choices in their activities and consumption of goods and services. Goods, services, and resources in a market economy are allocated based on the choices of consumers and producers.	Why does trade create interdependence? Why can't I have everything I want? How might the use of money affect the economy? Why is what we use as money valuable?	Students will understand that individuals and families with limited resources undertake a wide variety of activities to satisfy their wants. **E1A(k-3)** Students will apply the concept that economic choices require the balancing of costs incurred with benefits received.**E1B(K-3)**

Effective decision making requires comparing the additional costs of alternatives to the additional benefits received. Individuals and nations trade when all parties expect to gain. Market economies are dependent on the creation and use of money and a monetary system to facilitate exchange. Mental maps summarize differences and similarities about places. These differences and similarities lead to conflict or cooperation and the exchange of goods and ideas between peoples.		Students will understand that the exchange of goods and services around the world creates economic interdependence between people in different places. **E4A (K-3)** Students will understand how barter, money, and other media are employed to facilitate the exchange of resources, goods, and services. **E2A(K-3)** Students will understand the nature and uses of maps, globes, and other geo-graphics. **G1A(K-3**
Science	**Science**	**Science**
Materials and Their Properties The structures of materials determine their properties. The properties of materials influence their use. Some materials are more suitable for making a particular product or device. People develop materials in response to the needs of society and the pursuit of knowledge. This development may have risks and benefits to humans and the environment.	**Materials and Their Properties** What determines if new materials need to be developed to meet group needs? How do the properties of materials determine their use? How should people use what they have to get what they want? Why should people consider the risks and benefits before the production of new materials and/or the implementation of a new process?	**Materials and Their Properties** Materials can be described and classified according to the following physical properties: size, shape, mass, texture, color, and material composition. Students can observe materials' physical properties by using tools that include rulers, balances, thermometers and hand lenses. **S.2 K-3A** Materials exist in one of three states – solid, liquid, or gas. Solids and liquids have easily observable properties and may change from one form to the other. **S.1 K-3B**

		Physical properties of materials can be changed by exposure to water, heat, light, or by cutting, mixing, and grinding. **S.2 K-3C** Many materials can be recycled and used again. **S2.3A (4-5)** The properties of materials influence their use. Some materials are more suitable for making a particular product or device. **S2.4A K-3**
Year Two: How Does the World Work? 2nd-3rd (Ages 7-9) Continent Study of Asia in April, May, June		
Study 3 - Earth's Energy and Geological Systems - Children discover that the flow of energy drives processes of change and all biological, chemical, physical and geological systems. Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. Some of the changes can be measured on a human time scale, but others occur so slowly that they must be inferred from geological evidence. These changes also impact human groups and the energy and mineral resources in various regions available to humans to meet their needs.		
Enduring Understanding in Study Three	**Essential Questions in Study Three**	**Standards Tied to Study Three**
Social Studies – as applied to the study of earth's systems and energy	**Social Studies**	**Social Studies**
Why are there different types of maps? How can they be "read" to discover the nature and contents of the real world? Places are unique associations of natural environments and human cultural modifications. The human response to the characteristics of a physical environment comes with	Why does *where* matter? How might differences and similarities among regions result in connections between them? To what extent do differences in the mineral and energy resources of a region affect how and where people live?	Students will understand the nature and uses of maps, globes, and other geo-graphics. **(G.1.k-3a)** Students will use the concepts of place and region to understand the natural mineral and energy resources available in a given place or region. Derived from **G4A(K-3)**

consequences for both the human culture and the physical environment.		
Science	**Science**	**Science**
Energy Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy). Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the transfer of the different forms of energy. Energy may transfer into or out of a system and it may change forms, but the total energy cannot change. **Earth Systems** Earth's systems can be broken down into individual components which have observable measurable properties. Technology enables us to better understand Earth's systems. It also allows us to analyze the impact of human activities on Earth's systems and the impact of Earth's systems on human activity.	**Energy** How do we know that things have energy? How can energy be transferred from one material to another? What happens to a material when energy is transferred to it? What happens to the energy in a system? Where does this energy come from, how is it changed within the system, and where does it ultimately go? How does the flow of energy affect the materials in the system? **Earth Systems** How does technology extend human senses and understanding? How does understanding the properties of Earth materials and the physical laws that govern their behavior lead to prediction of Earth events? Why is this important to people?	**Energy** Heat energy is a form of energy that makes things warmer. **S3.1C (K-3)** Electrical energy is a form of energy that is used to operate many of our tools and appliances. **S3.1D (K-3** The motion of an object describes how its position is changing. Pushing or pulling on an object can change its position or motion. **(S3.2A K-3)** The motion of an object describes how its position is changing. Pushing or pulling on an object can change its position or motion. **(S3.2A K-3)** The position of an object gives its location relative to where you are (e.g., above, below, in front, or behind). The motion of an object describes how its position is changing. Pushing or pulling on an object can change its position or motion. **S3.2A (K-3)** **Earth Systems** Components of **Earth's system** include minerals, rocks, soil, water and air. These materials can be observed, sorted and/or

		classified based on their physical properties. **S5.1A (K-3)** Water can exist as a solid, liquid or gas and in different forms such as rain, snow and ice. **S5.1B (K-3)** Sand, clay and humus have distinct physical properties and are components of soils. **S5.1C (K-3)** Soil type can be identified by testing for grain size and composition. **S5.1E (K-3)** Rocks are natural combinations of minerals. Minerals can be classified according to their physical properties (i.e., luster, color and hardness). **S5.1F (K-3)** Earth materials can be observed and described using simple tools (e.g., hand lens and balances). **S5.3A (K-3)** Soil types vary from environment to environment. **S5.1D (k-3)** Identify rocks and minerals as natural resources and list ways that humans use these resources to meet their needs and wants.

Instructional Strategies and Performance Projects/Assessments
2nd-3rd (Ages 7-9) Year Two – How does the World Work?

Montessori Great Lessons

The Montessori Great lessons are impressionistic lessons which provide a "whole" for the three studies of What Does It Mean to Be Human? These lessons are shared each year with various levels of detail according to the children's development. Particular emphasis should be given to the parts of the story that reinforce the content standards being developed in the 5-7 study of "what does it mean to be human?" The same lessons will be shared in the 7-9 program expanding on concepts introduced at the 5-7 level. (See page 5 for full details of Montessori Great Lessons)

First Great Lesson - Coming of the Universe and the Earth
The Second Great Lesson: Coming of Life
The Third Great Lesson: Coming of Human Beings
The Fourth Great Lesson: The Story of Language
The Fifth Great Lesson: The Story of Numbers

Continent studies

Montessori classrooms focus on a study of each continent and the various cultures and geography of those continents as children discover what it means to be human, how geography impacts how cultures meet their human needs, and how the various cultures interact. While presented separately in this document, the concepts of what it means to be human and the Delaware Content Standards are closely interwoven throughout the year through the continent studies. These Integrated units developed through the Understanding by Design (UbD) process (see planning sheet on p.57). Possible Instructional materials and strategies teachers may use are listed below.

Montessori Lessons and materials related to:

- States of Matter
- Maps and Globes
- The Basic Needs of Man
- Land and Water Forms materials
- Earth's Layers, plate tectonics, rocks and minerals
- Weather and water cycle

- Reduce, Reuse, Recycle
- Money
- Measurement
- Electricity, solar experiments
- Energy cycle specifically lessons focusing on:
    - Identifying that objects that move have energy because of their motion. Demonstrate that a hanging mobile has energy because of its motion and the mobile was given this energy by the push of moving air.
    - Identifying heat energy as the energy that makes things warmer.
    - Identifying electrical energy as a form of energy that is used to operate many of our machines and tools.
    - Investigate how to change an object's movement by giving it a push or pull.
    - Demonstrating that the greater the force, the greater the change in motion of the object.
    - Demonstrating that when the pushes and pulls acting on an object are balanced, the object will not move. Investigate the conditions necessary for objects to balance. Describing how the object was made to balance.
    - Determining the effect of adding heat energy (warming) or removing heat energy (cooling) on the properties of water as it changes state (gas to liquid to solid, and vice versa).
    - Investigating and describing what happens when an object at a higher temperature is placed in direct contact with an object at a lower temperature. Recording data and use the data to describe which way the heat energy is moving between the objects.
    - Demonstrating that energy of motion can be transferred from one object to another (e.g., moving air transfers energy to make a pinwheel spin).
    - Giving examples of energy transfer from one object to another.
    - Simulating how bones, muscles, and joints in the human body work to transfer energy to objects, making them move.
    - Investigating and describe how moving water and air can be used to make objects and machines, such as a waterwheel and windmill, move.

Science Kits –

As related to the UBD Units, teachers will utilize the following science kits to address the science standards across the two year cycle of the 7-9 program.

- Soils— Explaining how the properties of soils affect living things

- Balance & Weighing— Accounting for why objects move and balance
- Insects—The life cycle of living things
- Earth Materials—Exploring and understanding earth's materials
- Water—Acquiring evidence of how materials respond to change
- Human body—The human body - how form relates to function

Delaware Recommended Curriculum units that might be used in the studies.

Respect in Civil Society
Scarcity and Wants
Resources & Production (K-3)
Regions (K-3)
Economic Exchange (K-3)
Trading Partners
Places (K-3)
Using Maps and Globes

Classroom projects leading to the performance assessments as listed below.

- Host an Earth Fair – show and demonstrate how the Earth itself is always changing and how each aspect (plate tectonics, ring of fire, composition of the crust, rock cycle etc.) is part of a larger system working together and affected by the others.
- Observe the night sky and journal about what is observed and the changes that occur.
- Rock and mineral classification.
- Energy detectives - perform an energy evaluation at home and school
- Research project on alternative forms of energy, teaching other groups
- Measure size of trash, recycling of classroom waste, sort and classify the types of waste, plan and implement a system to reduce the amount of waste that is produced, measuring afterwards to determine the effects of the project.
- Map where common household and classroom items are made and where their resources come from, explaining Asia's role in the global economy.
- Using the classroom's field trip budget, determine what trips can be taken and if the financial "cost" is worth the educational "gain."
- Mini-Societies in which children set up a community economic system.

Other forms of informal assessments:

Art work	Cartoons	Designs and drawings	Documentary reports
Experiments	Foreign language activities	Games	Inventions
Journals	Maps	Model construction	Musical compositions
Newspapers	Notebooks	Oral reports	Original plays, stories, dances
Poetry recitations	Photos	Recipes	Story boards

Resources

Montessori Albums—Resources obtained through MACTE approved Montessori training courseshttp://missbarbara.net/ - Web sites related to each area of the Montessori Great Lessons and the Delaware Content Standards.
Montessori For Everyone Website: http://www.montessoriforeveryone.com/The-Five-Great-Lessons_ep_66-1.html
http://www.thinkfinity.org/
http://education.nationalgeographic.com/education/
http://sciencenetlinks.com/
http://www.econedlink.org/
http://historyexplorer.americanhistory.si.edu/
www.nsta.org
http://www.loc.gov/index.html
PALS is an on-line, standards-based, continually updated resource bank of science performance assessment tasks indexed via the National Science Education Standards (NSES) and various other standards frameworks.
Delaware Comprehensive Assessment System (DCAS) - Social studies in spring grade 4; science in spring grade 5

Sussex Montessori School
Interdisciplinary Science/Social Studies Curriculum
4th-6th Grade

The 4th—6th (Ages 9-12) Cultural Curriculum (Social Studies/Science)

This document is the core of the curriculum plan for the 4th—6th (Ages 9-12) child. This document allows teachers to plan rich interdisciplinary units to ensure that the content standards are addressed, to determine where children are on the continuum of learning, to match instruction to learning goals, and to use assessment as a tool to monitor progress.

Social Studies and Science—4th—6th (ages 9-12)
Transfer Knowledge

Transfer Skills in the Integrated Social Studies/ Science curriculum known as the Montessori Cultural curriculum are not based on the transfer of a specific body of knowledge but rather of several key conceptual understandings and the development of what Maria Montessori called the human potentials. These understandings and potentials transfer throughout the child's school and later life experiences.

Montessori Great Lessons tied to what it means to live in the world.	Human Potentials	Research Skills	Self-expression
Unity of Human Beings Students understand the similarities and differences of cultures across the world; that people interact with the natural world in distinct ways that produce cultural uniqueness; that people, places, and environments are integrated; that life involves producing and consuming. **Unity of all Living Things on Earth**	**Students will:** Understand the role the human potentials play in both their school community and their everyday lives. **Character** – Students are trustworthy, compassionate, and demonstrate integrity. **Leadership** – Students combine vision, ethics, and courage to empower others to make a difference in the community. **Thinking Skills** – Students develop flexibility, perseverance,	**Students will:** Understand what makes a question which leads to inquiry and investigation. Plan investigations to address a question or problem. Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results. Synthesize information from various resources and experiences to develop inquiries about the world around them.	**Students will:** Discover and express ideas, feelings, beliefs and values. Reflect on how these ideas effect the way they interact with the world. Acquire the skills necessary to successfully participate in groups, which includes defining the objective, dividing responsibilities, and working cooperatively. Demonstrate cooperation, assertion, responsibility, empathy

Students will show respect for the beauty and wonder of nature. They develop an understanding of how, through science, we learn how nature works. They understand that all people use natural resources to meet a variety of human needs. This use of resources defines many cross cultural human interactions. **Unity of the Universe Itself** Students develop an understanding of their relationship and place in the development of the universe; how the earth has changed over time through physical, chemical, and geological processes.	curiosity, imagination, inventiveness, wonder, and reflections on process and product supporting lifelong and collaborative learning in order to address real life challenges. **Life Management** – Students develop self-awareness so that in the long run they make responsible, healthy and balanced life work choices. **Creative and Artistic** – Students discover and develop creative gifts so that in the long run they will be able to express themselves creatively and artistically, recognize and respect creativity in others, utilize the creativity of others, and preserve flexibility of thought and open-mindedness to look at and meet challenges. **Service and Responsibility** – Students learn the value of service and responsibility so that in the long run they will be able to demonstrate empathy, compassion, social responsibility, and appreciation for others and the world around them.	Determine ways to gather data and use various tools (experiments, surveys, logs, journals, etc.). Understand what constitutes evidence. Understand when you have enough evidence.	and self-control when communicating with others. Utilize and explore their own creativity. Learn to appreciate the aesthetic. Use various technology tools to gather, organize, and communicate with others. Use various visual print and artistic mediums to communicate with others. Adapt presentation style and speech for the audience. Present claims and findings in a logically sequenced way, developing concepts to support a position.

Standards Embedded Across All Three Years of the 4th-6th (Ages 9-12) Program		
Enduring Understanding Embedded in all three studies	**Essential Questions Embedded in all three studies**	**Standards Embedded in all Three Studies**
Social Studies	**Social Studies**	**Social Studies**
Mental Maps summarize the difference and similarities about places. Because resources are scarce, societies must organize the production, distribution, and allocation of good and services. The way societies make economic decisions depends on cultural values, availability and quality of resources, and the type and use of technology. Many sources exist to help us learn about the past. These sources must be critically analyzed and categorized as they are used Participating in a group requires common goals, ways to interact successfully, responsibility to the group, and leadership.	Why is *when* an event happens important? How can words, models, and graphics help us learn about the world? Why does *where* matter? Why does *when* matter? How does getting what you want depend on where and when you live? How should people use what they have to get what they want? Which historical sources are best? What can I learn from artifacts and documents? What can't I learn? What does it mean to participate effectively in a group?	Students will demonstrate development of mental maps of local and world regions including the characteristics of major physical features, political divisions, and human settlements. **(G.1.4-5a/6-8a)** Students will understand that meeting human wants and needs is dependent on the local and global resources available to groups of people. **(E.3 4-5a/6-8a)** Students will use primary and secondary artifacts and documents to gather information about groups, individuals, and their histories. **(H. 2.4-5A/4-5b)** Students will acquire the skills necessary for participating in a group, including defining an objective, dividing responsibilities, and working cooperatively **(C.4.K-3a)** This is an ongoing developing skill for children from K-6th grade. Students will understand that respect for others, their opinions, and their property is a foundation of civil society **C2A – K-3**
Science and Inquiry	**Science and Inquiry**	**Science and Inquiry**

Scientific inquiry is a method by which humans seek to understand the natural world. Fair test design supports the validity of the investigation. Sometimes it is not possible to know everything that will have an effect on the investigation or control all conditions. The purpose of accurate data collection is to provide evidence to compare with the prediction. The body of scientific knowledge grows as scientists ask questions, conduct investigations, develop explanations and compares results with what is already known. The purpose of communicating is to share and justify results. Scientists communicate their results to others, including the details that allow others to replicate the results. The use of mathematics, reading, writing, and technology are important in conducting scientific inquiries.	What makes a question scientific? What constitutes evidence? When do you know you have enough evidence? Why is it necessary to justify and communicate an explanation?	Generate focused questions and informed predictions about the natural world. **S1.1A (4-5)** Design and conduct simple to multi-step investigations in order to test predictions. Keep constant all but the condition being tested. **S1.1B(4-5)** Accurately collect data using observations, simple tools and equipment. Display and organize data in tables, charts, diagrams, and bar graphs or plots over time. Compare and question results with and from others. **S1.1C (4-5)** Construct a reasonable explanation by analyzing evidence from the data. Revise the explanation after comparing results with other sources or after further investigation. **S1.1D (4-5)** Communicate procedures, data, and explanations to a variety of audiences. Justify the results by using evidence to form an argument. **S1.1E (4-5)** Use mathematics, reading, writing, and technology when conducting an investigation and communicating the results. **S1.1F (4-5)**

Year One: What Does It Mean to Be Human?
4th - 6th (Ages 9-12)

The Montessori curriculum provides the 5-9 year old with a foundational understanding of the connectedness of man to the environment and to each other. Through the continent studies, they explore the similarities and differences across cultures, discovering that all humans have fundamental needs that are met through the use of natural resources in their region and scientific advancement. Trade is another way that humans meet their needs for goods and services. Expanding on the concepts developed in the K-1st (ages 5-7) and the 2nd –3rd (ages7-9) programs, the 4th - 6th (Ages 9-12) child is able to use the tools of math, reading, writing, scientific inquiry and research to further expand their understanding of the world and develop inquiries of study on the ethics and social issues within and across cultures as man seeks to share the limited resources of the world community. They use their communication tools to frame view points, present evidence and share their understanding with others. Focusing on the concept of less is more and the desire of children this age to immerse themselves deeply in long-term studies, the program at this level focuses on two studies a year asking children to think like historians, economists, geographers, sociologists, anthropologists, chemists, geologists, biologists, and astronomers and physicists at various given points in their study.

Study One - The Purpose of Governments/ Scientific Advances
This study builds on the understandings of group functioning, rights and responsibilities from the 5-9 (K-3rd grade) program. The study focuses specifically on civic responsibility. Children learn the various ways that governments are structured and develop an understanding of the principles of a representative democracy and the responsibilities they have as a citizen holding both rights and responsibilities in society. They are challenged to be a good citizen in their school and beyond and to understand that citizenship in groups and the U.S. means having responsibilities as well as rights. Children explore various scientific advances, laws that have been instituted related to scientific knowledge, and how government influences the uses of our natural resources.

Study Two – Place in Time and Space - The Universe through the eyes of science and history
Building on the concept that humans seek to place themselves in time and space, children will develop an appreciation for the earth in relationship to the universe. Humans have always sought to explore and understand our place in the universe. Combining scientific thinking and the lens of the historian, children will develop an understanding of the solar system and track the history of human discovery related to space exploration beginning with the earliest scientist and moving to man's most recent explorations.

The following charts help teachers develop UBD unit plans connecting the Delaware Science and Social Studies Content Standards to these Studies so that they can be sure that each standard is focused on over the three-year cycle of the 9-12 program and that the relationship between the individual strands is developed. In some cases, concepts that are developed in the older grades are introduced in the Montessori program in the 9-12 years. This is a result of the Montessori program beginning with the whole and then studying the parts.

Study One Year One—The Purpose of Governments/ Scientific Advances	
Enduring Understanding for Study One	**Essential Questions for Study One**
Social Studies	**Social Studies**
Governments are structured to meet the basic needs of people in a society. There are various forms of governments. Constitutional Democracy attempts to balance individual freedoms and the needs of society as a whole. The principles and ideals underlying the American Democracy are designed to promote the freedom of the American people. Effective citizens are committed to protecting rights for themselves, other citizens, and future generations, by upholding their civic responsibilities and are aware of the potential consequences of inaction. Distinctions between a citizen's rights, responsibilities, and privileges help to define the requirements and limits of personal freedom. Effective citizens can research issues, form reasoned opinions, support their positions, and engage in the political process.	What does it take to be a good citizen in a Democracy? What makes a good citizen? How do I know if I am a good citizen? What happens if enough people are not good citizens? Should leaders be elected? How should an elected official represent the interests of the people? Why do different levels of government have different purposes? Why should the responsibilities and powers of government be divided? How am I protected from those with authority over me? Why are the rights in the Bill of Rights important to American citizens? To what extent are the rights of American citizens limited? In what ways is the Bill of Rights applied in everyday life? What is the nature of a privilege? What do you have to do to earn or lose a privilege? What is the relationship between my rights and my responsibilities? Is working in a group better than working alone? How should an elected official represent the interests of the people?

	For whom should I vote? Why? What is most important to me when I make this decision? How do I find out what a candidate thinks about a specific issue? Should groups choose to make decisions democratically when it would be easier if one person made all the decisions and assignments?
Social Studies Standards Tied to Study One Students will understand that governments have a variety of structures and exist for many purposes and that in America, these are explained in the United States and State constitutions **(C.1 4-5a)** Students will understand that the United States government is divided into executive, legislative, and judicial branches, each with specific responsibilities and powers. **(C.1. 4-5b)** Students will understand that governments have the power to make and enforce laws and regulations, levy taxes, conduct foreign policy, and make war. **(C1 6-8a)** Students will understand that the principle of "due process" means that the government must follow its own rules when taking actions against a citizen. **(C2.4-5a)** Students will understand that a society based on the ideal of individual liberty requires a commitment on the part of its citizens to the principles of civic responsibility and personal civility. **(C2.4-5b)** Students will identify the fundamental rights of all American citizens as enumerated in the Bill of Rights **(C.34-5a)** Students will apply the protections guaranteed in the Bill of Rights to an analysis of everyday situations **(C.34-5b)** Students will understand that in order to select effective leaders, citizens have to become informed about candidates' qualifications and the issues of the day. **(C.4.4-5a)** Students will identify and employ the formal and informal methods by which democratic groups function. **(C.4.4-5b)**	
Science	**Science**
Scientific Advances/Role of Government Government plays a role in the ways that scientific advances are implemented to meet the needs of society and individuals.	Scientific Advances/Role of Government What role do governments play in the following scientific issues? What determines if new materials need to be developed? Why should people consider the risks and benefits before the production of new materials and/or the implementation of a new process?

People develop new materials as a response to the needs of society and the pursuit of knowledge. This development may have risks and benefits to humans and the environment. The development of technology and advancement in science influence and drive each other forward. The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation. The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants. Humans can alter the living and non-living factors within an ecosystem, thereby creating changes to the overall system.	How do Science and Technology influence each other? How do people determine what advances are best for society? What can we do to benefit the health of humans and other organisms? How does the understanding and manipulation of genetics, reproduction, development and evolution affect the quality of human life? How do humans have an impact on the diversity and stability of ecosystems?

Science Standards Tied to Study One

Scientific Advances/Role of Government

The production of new materials has social, environmental, and other implications that require analyses of the risks and benefits. **S2.3B (6-8)**

Science and technology in society are driven by the following factors: economic, political, cultural, social, and environmental. Increased scientific knowledge and technology create changes that can be beneficial or detrimental to individuals or society through impact on human health and the environment. **(S1.2B 6-8)**

Science and technology are related. Technology provides the tools needed for science to investigate questions and may provide solutions to society's problems, wants, or needs. Not all technological solutions are effective, uniformly beneficial, or equally available to everyone. **(S1.2A 4-5)**

The development of safety devices and protective equipment has helped in the prevention of injuries. S6.4A (4-5)

The environment may contain dangerous levels of substances in the water and soil that are harmful to organisms. Careful monitoring of these is important for healthy life processes. **S6.4C (6-8)**

Short term and long term studies are used to determine the effects of environmental changes (natural and man-made) on the health of the organisms within that environment. **S6.4B (4-5)**

Technological advances in medicine and improvements in hygiene have helped in the prevention and treatment of illness. **S6.4A (6-8)**

Through the use of biotechnology, scientists engineer plants and manipulate growing conditions to meet human needs and wants (e.g., fruits without seeds, hydroponics). **S7.3A(4-5)**

Human activities may cause pollution of air, water and soil. **S8.3A(4-5)**
Different technologies are used to access resources to meet human wants and needs. In many cases the environment is affected and resources become limited. Some activities may include burning of fossil fuels, 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. **S8.3B(4-5)**
The introduction of competing species, removal of natural habitat, alteration of native landscapes due to urban, industrial and agricultural activities, over-harvesting of species, alteration of waterways and removal of natural predators, etc., are actions that have a lasting impact on ecosystems. **S8.3B(6-8)**
Individuals and policymakers make decisions regarding the use of resources based on estimated personal and societal benefits and risks. Impacts on environmental systems result from these decisions. **S8.3C(6-8)**
Advances in technology can expand the body of scientific knowledge. Technological tools allow people to observe objects and phenomena that otherwise would not be possible. Technology enhances the quality, accuracy, speed and analysis of data gathered. **S.1.3A(6-8)**

Study Two—Year One—Place in Time and Space – The Universe through the eyes of science and history	
Enduring Understanding for Study Two	**Essential Questions for Study Two**
Social Studies	**Social Studies**
History provides a venue for understanding scientific discovery and advancements. History is often messy, yet a historian must logically organize events, recognize patterns and trends, explain cause and effect, make inferences, and draw conclusions from those sources which are available at the time. The questions a historian chooses to guide historical research that creates accurate chronologies will affect which events will go into the chronology and which will be left out. Competing chronologies can both be accurate, yet may not be equally relevant to the specific topic at hand.	To what extent does one thing *always* lead to another? How should historical sources be used to look for change? How do artifacts and documents influence how history is written? Which historical source is best? How could there be different explanations of the same event in history?

Many different types of sources exist to help us gather information about the past, such as artifacts and documents. Sources about the past need to be critically analyzed and categorized as they are used. Critical investigation demands constant reassessment of one's research strategies. A historian must prove where the information can be found that is the basis for historical conclusions. What is written by a historian depends upon that historian's personal background and methods, the questions asked about the sources, and the sources used to find the answers to those questions. Historians select important events from the past they consider worthy of being taught to the next generation. That selection process, deciding what to emphasize and the questions that historians ask of the documents and other evidence, contributes significantly to the conclusions drawn. History is what the historian says it is. Different historians collect, use, and emphasize sources in ways that result in differing interpretations as they describe, compare, and interpret historical phenomena. Disagreement between historians about the causes and effects of historical events may result from these differences.	

Social Studies Standards Tied to Study Two

Students will study historical events and persons within a given time-frame in order to create a chronology and identify related cause-and-effect factors. **(H1.4-5a)**

Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect. **(H1.6-8a)**

Students will identify artifacts and documents as either primary or secondary sources of historical data from which historical accounts are constructed. **(H2.4-5A)**

Students will explain why historical accounts of the same event sometimes differ and will relate this explanation to the evidence presented or the point-of-view of the author. **(H2.4-5a)**

Science	Science
There are observable, predictable patterns of movement in the Sun, Earth, and Moon system that account for day/night. These patterns occur because of gravitational interaction and energy from the sun. Earth is part of a system that includes other planets. Most objects in the Solar System orbit the Sun and have distinctive physical characteristics and orderly motion. Technology expands our knowledge of the Earth, Moon, and Sun System.	What are the observable patterns that occur as a result of the interactions between the Earth, Moon, and Sun? What Causes these patterns? What is Earth's place in the Solar System? How does Earth's physical characteristics and motion compare to other bodies in the Solar System? How has technology expanded our understanding of the Solar System?

Science Standards Tied to Study Two

The apparent path of the Sun, as seen from Earth, is from east to west. Over the course of a day, half of the Earth is always illuminated by the Sun causing day, and the half not illuminated by the Sun experiences nighttime. **S4.1A (4-5)**

The cycle from day to night is caused by the Earth's rotation. Earth undergoes one complete rotation about every 24 hours. **S4.1B (4-5)**

The Moon orbits the Earth. The appearance of the Moon changes as it moves through its orbit. These changes are called phases. **S4.1C (4-5)**

The Sun is much larger than the Moon. Although the Moon is closer to Earth than the Sun, the two appear to be the same size when viewed from Earth. This is because objects appear smaller as the distance from the viewer increases. **S4.1D (4-5)**

The Sun is a star that gives off radiant energy that drives Earth systems and is essential for life. **S4.1A (6-8)**

Moon phases occur because the relative positions of Earth, Moon, and Sun change, thereby enabling us to see different amounts of the Moon's surface. **S4.1C (6-8)**

The Moon is a natural satellite of Earth and is different than the Earth in size, atmosphere, gravity, and surface features. **S4.1D (6-8)**

Tides are caused by the gravitational interactions of the Sun, Moon and Earth. The Moon has a greater impact on tides because of its proximity to Earth. **S4.1AE (6-8)**

Earth is one of the planets in our Solar System that orbits the Sun. The Sun we see during the day is our nearest star. Stars we see at night lie outside our Solar System. **S4.2A(4-5)**

The Sun is by far the most massive object in the Solar System, therefore gravitationally dominating all other members of the Solar System. **S4.2A(6-8)**

The Solar System consists of comets, asteroids, planets, and their respective satellites, most of which orbit the Sun on a plane called the ecliptic. The planets in our Solar System revolve in the same direction around the Sun in elliptical orbits that are very close to being in the same plane. Most planets rotate in the same direction with respect to the Sun. **S4.2B(6-8)**

Humanity's view of the Solar System has expanded enormously as a result of our exploration of outer space. The Hubble telescope gives us a better view of the many planets than the view we have from the Earth. Robot probes sent to planets send back close-up pictures of their surfaces. **S4.3A (4-5)**

Terrestrial telescopes allow people to observe objects in the sky from Earth. **S4.3B(4-5)**

Technology, including humans landing on the Moon robot landers and other space probes, satellites, and radio telescopes, allow scientists to investigate conditions on Earth and on other objects in the Solar System. **S4.3A (6-8)**

The technology used in space exploration expands our knowledge of the Universe and has many spin-offs related to everyday applications. **S4.3B (6-8)**

Instructional Strategies and Performance Projects/Assessments
Year One

Montessori Great Lessons

The Montessori Great lessons are impressionistic lessons which provide a "whole" for the three studies of *What Does It Mean to Be Human*? These lessons are shared each year with various levels of detail according to the children's development. (See page 5 for full details of Montessori Great Lessons)

First Great Lesson - Coming of the Universe and the Earth

The Second Great Lesson: Coming of Life

The Third Great Lesson: Coming of Human Beings

The Fourth Great Lesson: The Story of Writing

The Fifth Great Lesson: The Story of Numbers

Integrated units developed through the Understanding by Design (UbD) process (see planning sheet on p.87). Possible Instructional materials and strategies teachers may use are listed below.

Study 1 – The Purpose of Government/ Scientific Advances

Montessori lessons and materials related to:

- Montessori Fundamental Needs
- Governments and their structures
- Classroom projects leading to the performance assessments as listed below:
- Creating a country
- Establishing government: constitution, economy, hierarchy (if applicable)
- Scale maps of country including area and population distribution
- Compare and contrast governments/economies

Various lessons from the Delaware Recommended Curriculum leading to the development of the classroom government might include:

Democratic Methods
Liberty & Citizenship
Our Community: Profiles and Connections
Bill of Rights
Due Process

Mock Elections

Performance Projects and Assessments:

- Evaluate the issues in that a government might have related to scientific advancements with one of the following studies as determined by the children's prior experiences with the scientific thought involved:
- Evaluate the social, economic, and/or environmental consequences of the production of a particular new material to meet human wants and needs.
- · How do governments encourage people to purchase energy efficient appliances? Is this a role that government should play? Discuss which devices /appliances (i.e., washer, dryer, refrigerator, electric furnace) are manufactured to require less energy. Select one device/appliance, research different brand and their energy usage, determine which would be the better buy, and report on the findings.
- Search for ways that people use laws to regulate the natural resources used to supply energy needs for lighting, heating, and electricity. Report your results by making a poster, written report or oral presentation.
- Evaluate the quality of water in a nearby stream. What ways do human activities (e.g., building roads, fertilizing golf courses, etc.) on the quality of Delaware's waters. What laws have been made to control human impact on the environment? What laws do you think are needed? Why?
- Use knowledge of human body systems to synthesize research data and make informed decisions regarding personal and public health. How do governments use this data to encourage people to make wise health choices?
- Identify safety equipment (e.g., goggles, gloves) and procedures (e.g., washing hands, wafting, not eating) used in classroom science investigations. Explain how these promote healthy living and prevent injuries. How do governments regulate the use of safety equipment i.e., seatbelts, etc. When is using safety equipment a responsibility versus a right to choose?
- Identify natural (i.e., wildfire, flood, drought) and man-made changes (forest clear cutting, input of pollutants, filling in of marshland) to an ecosystem. Discuss how these changes affect the balance of an ecosystem. How do laws impact the ability of man to meet his needs and yet maintain the balance of the ecosystem?

Study 2 – Place in Time and Space - The Universe through the eyes of science and history

Montessori lessons and materials related to:

- Great lessons/Cosmic Task
- The Universe Story

- Science kits*
- Sky Watchers; Predictable patterns of interaction between the sun, moon and earth

Classroom projects leading to performance assessments as listed below:

- Use models to describe how the Earth's rotation on its axis causes one half of the Earth to always be illuminated by the Sun (day) and one half to not be illuminated by the Sun (night). Apply this model of the rotating Earth to explain why the Sun appears to move across the sky each day from east to west.
- Using newspapers, the internet, and actual sky observations when possible, charts the appearance of the Moon in the night sky over the course of at least two months. Identify the basic pattern of the Moon's appearance. Classify the Moon's appearance by using the terms new, first quarter, full, last (third) quarter.
- Observe the size of the Sun and Moon in the sky. Create models to illustrate the approximate size and distance relationship between the Sun and Moon. Explain why the Sun and Moon appear to be similar in size when observed in the sky.
- Research and develop a short report on one of the planets in the Solar System. Compare the information learned in the reports.
- Use photos gathered from terrestrial telescopes, robot probes, the Hubble telescope, and manned exploration of the Moon to create an historical time line of recent space exploration.
- Use various historical documentation and research to trace the history of space exploration as one of the basic inquiries of man over time. Demonstrate understanding by writing a journal from the point of view of one of the explorers, creating a play of the history of space exploration, or developing a series of news reports about early discoveries.

Various lessons from the Delaware Recommended Curriculum leading to the development historical investigation might include:

- Thinking Chronologically
- Interpreting the Past – Dueling Documents

Year Two —How Does the World Work?
4th – 6th (Ages 9-12) Extended Development of Concepts

Expanding on the concepts developed in the 5-7 (k/1st) and the 7-9 (2nd/3rd) programs, the 9-12 (45h, 5th, 6th) year old is able to use the tools of math, reading, writing, scientific inquiry and research to further expand their understanding of the world, develop inquiries of study, and to share their understanding with others. Focusing on the concept of less is more and the desire of children this age to immerse themselves deeply in long-term studies, the program at this level focuses on two studies a year asking children to think like historians, economists, geographers, sociologists, anthropologists, chemists, geologists, biologists, and astronomers at and physicists at various given points in their study.

Study One - Energy exchanges and Systems / The Historical Perspective Science - Children discover that the flow of energy drives processes of change and all biological, chemical, and physical systems. In this study children learn that energy stored in a variety of systems can be transformed into their energy forms, which influence many facets of daily life. People use a variety of resources to meet the basic energy needs of life. Some of these resources cannot be replaced and others exist in vast quantities. The structure of materials influences their physical properties, chemical reactivity, and use. The exchange of energy can change matter from one form to another making a material more suitable for a specific purpose. Many Scientists have contributed to our understanding the biological, chemical and physical nature of energy. Historians contribute to our understanding of how these scientists worked, their culture, society's responses to their work, and the resources they had for their work.

Study Two – Producing and Consuming - Production and consumption occurs as a human interaction among humans and as a natural interaction in ecosystems. All people engage in making and using things. Children learn the various ways that different cultures produce goods, what they value for production, how they structure economic systems that support production and consumption, and how cultures use the regional resources and trade globally to meet various needs of different societies. They understand that due to scarcity, communities and societies must make choices in their activities and consumption of goods and services. Various aspects of science contribute to decisions about production and consumption. The ecosystem is dependent on the concept of producers and consumers. When man utilizes the natural resources around him, he may impact the balance of the ecosystem impacting his long-term ability to meet man's needs. The production and consumption of energy impacts the ability of a society to produce goods and services to meet their needs. Knowledge of materials and their properties helps man to match materials to products.

The following charts help teachers develop UBD unit plans connecting the Delaware Science and Social Studies Content Standards to these Studies so that they can be sure that each standard is focused on over the three-year cycle of the 9-12 program and that the relationship between the individual strands is developed. In some cases, concepts that are developed in the older grades are introduced in the Montessori program in the 9-12 years. This is a result of the Montessori program beginning with the whole and then studying the parts.

Study One - Year Two - Energy exchanges and Systems / The Historical Perspective Science	
Enduring Understanding in Study One - Social Studies	**Essential Questions in Study One - Social Studies**
History provides a venue for understanding scientific discovery and advancements. History is often messy, yet a historian must logically organize events, recognize patterns and tends, explain cause and effect, make inferences, and draw conclusions from those sources which are available at the time. The questions a historian chooses to guide historical research that creates accurate chronologies will affect which events will go into the chronology and which will be left out. Competing chronologies can both be accurate, yet may not be equally relevant to the specific topic at hand. Many different types of sources exist to help us gather information about the past, such as artifacts and documents. Sources about the past need to be critically analyzed and categorized as they are used. Critical investigation demands constant reassessment of one's research strategies. A historian must prove where the information can be found which is the basis for their historical conclusions.	To what extent does one thing always lead to another? How should historical sources be used to look for change? How do artifacts and documents influence how history is written? Which historical source is best? How could there be different explanations of the same event in history? How have past scientific contributions influenced current scientific understanding of the world? What do we mean in science when we say that we stand on the shoulders of giants?

What is written by a historian depends upon the historian's personal background and methods, the questions asked about the sources, and the sources used to find the answer to those questions. Historian select important events from the past they consider worthy of being taught to the next generation. That selection process, deciding what to emphasize and the questions that historians ask of the documents and other evidence, contributes significantly to the conclusions drawn. History is what the historian says it is. Different historians collect, use and emphasize sources in ways that result in differing interpretations as they describe, compare, and interpret historical phenomena. Disagreement between historians about the causes and effects of historical events may result from these differences. Understanding past processes and contributions is essential in building scientific knowledge.	
Social Studies Standards Tied to Study One Students will study historical events and persons within a given time frame in order to create a chronology and identify related cause-and-effect factors. **(H1.4-5a**) Students will examine historical materials relating to particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect. **(H1.6-8a)** Students will identify artifacts and documents as either primary or secondary sources of historical data from which historical accounts are constructed. **(H2.4-5A)** Students will explain why historical accounts of the same events sometimes differ and will related this explanation to the evidence presented or the point-of-view of the author. **(H2.4-5a)** Contributions by individuals have been essential in advancing the body of scientific knowledge. **S1.3A(4-5)** Cover the course of human history, contributions to science have been made by different people from different cultures. Studying some of these contributions and how they came about provides insight into the expansion of scientific knowledge. **S1.3A(6-8)**	
Science	**Science**

Energy	**Energy**
Energy takes many forms. These forms can be grouped into types of energy that are associated with the motions of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy). Changes take place because of the transfer of energy Energy is transferred to matter through that action of forces. Different forces are responsible for the transfer of the different forms of energy. Energy may transfer into or out of a system and it may change forms, but the total energy cannot change.	How do we know that things have energy? How can energy be transferred from one material to another? What happens to a material when energy is transferred to it? What happens to the energy in a system - where does this energy come from, how is it changed within the system, and where does it ultimately go? How does the flow of energy affect the materials in the system?

Science Standard Tied to Study One

Energy

Energy from the sun includes visible light, which consists of a combination of different colored light, and components that are not visible, which include infrared and ultraviolet light waves. **S3.1A (4-6)**

The energy of a moving object depends on it speed. Faster moving objects have more energy than slower moving objects. **S3.1B (4-6)**

Energy can be stored in an elastic material when it is stretched. **S3.1C(4-6)**

Sound is a form of energy that is produced by vibrating objects, and can be described by its pitch and its loudness (volume). Sound travels faster through some substances than others. **S3.1D (4-5)**

Heat energy raises the object's temperature or changes the state of the object (i.e., solid to liquid, liquid to gas). **S3.1E(4-5)**

The energy obtained from electrical outlets is electrical energy that was produced at an electrical power plant. Electrical energy can be generated and then transmitted over great distances. Batteries are portable sources of electrical energy. **S3.1F (4-5)**

Electrical energy is a form of energy that can be transferred by moving charges through a complete circuit. **S3.1E (6-8)**

Force is any push or pull entered by one object on another. Some forces (e.g., magnetic forces and gravity) can make things move without touching them. **S3.2A (4-5)**

When the forces acting on an object are balances, its motion will not change. Unbalanced forces will cause the object's motion to change. Changes in motion depend upon the size and direction of the toral unbalanced force exerted on the object. **S3.2A(6-8)**

The speeds of two or more objects can be compared (i.e., faster, slower) by measuring the distance traveled in a given unit of time, or by measuring the time needed to travel a fixed distance. **S3.2B (4-5)**

A force must be applied to change the speed of a moving object or change its direction of motion. Larger forces will create greater changes in an object's speed in a given unit of time. **S2.3C (4-5)**

Forces can be used to transfer energy from one object to another. Simple machines are used to transfer energy in order to simplify difficult tasks. **S3.2C(6-8)**
Pushing and pulling forces can be used to transfer energy from one object to another. **S3.2D (4-5)**
The transfer of heat energy may produce changes in the state of a substance. **S3.2E (4-5)**
The energy of electricity is transferred to electrical devices through simple closed circuits (simple series or simple parallel circuits). **S3.2F (4-5)**
Some materials allow electricity to flow freely (conductors), while other materials inhibit the flow of electricity (insulators). **S3.2G(4-5)**
Electrical systems can be designed to perform a variety of tasks. Series or parallel circuits can be used to transfer electrical energy to devices.
Electrical circuits require a complete loop through which the electrical charges can pass. **S3.2H (6-8)**
Some materials are magnetic and can be pushed or pulled by other magnets. **S3.2H (4-5)**
Moving electric charges produce magnetic fields. **S3.2I(6-8)**
Gravity is a force that acts between masses over very large distances. Near the Earth's surface, gravity pulls objects and substances vertically downward. **3.2B (6-8)**

Study One - Year Two - Energy exchanges and Systems / The Historical Perspective Science	
Enduring Understanding for Study One	**Essential Questions for Study One**
Science	**Science**
Materials and Properties The structures of materials determine their properties. The properties of a mixture are based on the properties of its components.	**Materials and Properties** How do the properties of materials determine their use? How do the components determine the properties of mixtures? How can the properties of the components of a mixture be used to separate the mixture?

Science Standards Tied to Study One
Materials and Properties

Observable physical properties can be used to classify materials. These physical properties may include solubility, mass, magnetism and electrical conductivity. Tools such as graduated cylinders, balances, rulers, magnifiers, simple circuits, and magnets are used to study the physical properties. **S2.1A (4-5)**

Heating and cooling of materials may produce changes in the state of solids, liquids and gases. **S2.1B(K-3)**
All matter consists of particles too small to be seen with the naked eye. The arrangement, motion, and interaction of these particles determine the three states of matter (solid, liquid and gas). Particles in all three states are in constant motion In the solid state, tightly packed particles have a limited range of motion. In the liquid state, particles are loosely packed and move past each other. In the gaseous state, particles are free to move. **S2.1A (6-8)**
Most materials are physical mixtures. Physical mixtures can be composed of different kinds of materials, each having distinct physical properties. There physical property differences can be used to separate, sort and group the materials of the mixture. **S2.2A (4-5)**
Mixtures can consist of different combinations of solids and/or liquids. The characteristics of these resulting mixtures depend on the relative amounts and properties of the components. **S2.2B (4-5)**
Physical properties can be used to separate mixtures through techniques such as filtration and evaporation. **S2.2C (4-5)**
When a solid is dissolved in a liquid, a solution is formed that can be separated through the process of evaporation. **S2.2D (4-5)**

Study Two - Year Two - Producing and Consuming	
Enduring Understanding	**Essential Questions**
Social Studies	**Social Studies**
Due to scarcity, individuals as producers and consumers, families, communities and societies as a whole must make choices in their activities and consumption of goods and services. Goods, services, and resources in a market economy are allocated based on the choices of consumers and producers. Effective decision making requires comparing the additional costs of alternatives to the additional benefits received. Individuals and nations trade when all parties expect to gain. Market economies are depended on the creation and use of money and monetary system to facilitate exchange. Because resources are scarce, societies must organize the production, distribution and allocation of goods and services.	Why might prices change? Who decides? How do I know what and when to buy or sell? Does price always matter? To what extent should government become involved in markets? How does getting what you want within an economic system depend on where and when you live? In what ways do economic systems differ and why? Under what conditions does international trade occur? How does international trade increase standards of living? What will happen to the earth because people live on it? What will happen to people as a result of what happens to the earth?

The way societies make economic decisions depends on cultural values, availability and quality of resources, and the type and use of technology. Nations with different economic systems often specialize and become interdependent as a result of international trade. Government actions that promote competition and free trade among people and nations increase the health of an economy and the welfare of nations. Students will develop a knowledge of the ways humans modify and respond to the natural environment. The relationship between human needs and he natural environment is fundamental to life. Humans modify the environment in culturally distinctive ways as they respond to the resource opportunities and risks present in the physical worlds.	

Social Studies Standards Tied to Study Two

Students will understand that prices in a market economy are determined by the interaction of supply and demand, with governments intervening to deal with market failures. **(E1.4-5a)**

Students will understand that consumers and producers make economic choices based on supply, demand, access to markets, and the actions to the government. **(E1.4-5b)**

Students will understand the role of banks and other financial institutions in the economy. **(E2.4-5a)**

Students will demonstrate the ways in which the means of production, distribution and exchange in different economic systems have a relationship to cultural values, resources, and technologies. **(E3.6-8a)**

Students will identify different means of production, distribution, and exchange used within economic systems in different times and places. **(E3.4-5a)**

Students will demonstrate how international trade links countries around the world and can improve the economic welfare of nations. **(E4.4-5a)**

Students will apply a knowledge or topography, climate, soils and vegetation of Delaware and the United States to understand how human society alters, and is affected by, the physical environment. **(G2.4-5a)**

Students will apply a knowledge of the major processes shaping natural environments to understand how different peoples have changed and

been affected by, physical environments in the world's sub-regions. **(G2.6-8a)**

Study Two - Year Two - Producing and Consuming	
Enduring Understanding	**Essential Questions**
Science	**Science**
Ecology - Systems of Production and Consumption in Nature Organisms and their environments are interconnected. Changes in one part of the system will affect other parts of the system.	**Ecology - Systems of Production and Consumption in Nature** How can change in one part of an ecosystem affect change in other parts of the econ-system?

Science Standards Tied to Study 2

Ecology - Systems of Production and Consumption in Nature

People depend on living and nonliving resources to satisfy their need for food, shelter and fuel. **S8.1A(4-5)**

All living organisms interact with the living and nonliving parts of their surroundings to meet their needs for survival. These interactions lead to a constant exchange of matter. **S8.1B(4-5)**

Adaptations in organisms enable them to live and reproduce in certain environments. Those organisms that are best suited for particular environments have adaptations that allow them to compete for available resources and cope with the physical conditions of their immediate surroundings. **S8.1C(4-5)**

Changes in an organism's environment may 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. **S8.1D(4-5)**

In order to survive, populations within an ecosystem require a balance or resources. **S8.1E(4-5)**

The Delaware Estuary is a semi-enclosed tidal body of water with a free connection to the ocean. This richly productive system, including the associated marshes, provides a variety of habitats for diverse species. This system is biologically and economically important. **S8.1C(6-8)**

In all environments organisms with similar needs may compete with one another for resources including food, water, air, space and shelter. This competition results in natural population fluctuations. **S8.1F(6-8)**

Overpopulation can lead to depletion of resources and potential extinction of species. **S8.1G(6-8)**

Plants need energy from the Sun, water and nutrients for growth and survival. **S8.2A(4-5)**

Animals eat plants or other animals that have eaten plants. Animals obtain energy and materials for body repair and growth from fast food.

S8.2B(4-5)
Dead plants and animals are broken down by decomposers. **S8.2C(4-5)**
All organism, including humans, are part of and depend on food webs. Food webs recycle matter continuously as organisms are decomposed after death to return food materials to the environment where it re-enters a food web. **S8.2C(6-8)**
Human activities may cause pollution of air, water and soil. **S8.3A(4-5)**
Different technologies are used to access resources to meet human wants and needs. In many cases the environment is affected and resources become limited. Some activities may include burning of fossil fuels, 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 arming. **S83B(4-5)**
The introduction of competing species, removal of natural habitat, alteration of native landscapes due to urban, industrial and agricultural activities over-harvesting of species, alteration of waterways and removal of natural predators, etc., are actions that have a lasting impact on ecosystems. **S8.3B(6-8)**
Individuals and policymakers make decisions regarding the use of resources based on estimated personal and societal benefits and risks, Impacts on environmental systems result from these decisions. **S8.3C(6-8)**

Study Two - Year Two - Producing and Consuming	
Enduring Understanding	**Essential Question**
Science	**Science**
Energy Production and Consumption People utilize a variety of resources to meet the basic and specific needs of life. Some of these resources cannot be replaced. Other resources can be replenished or exist in such vast quantities they are not in danger of becoming depleted. Often the energy stored in resources must be transformed into more useful forms and transported over great distances before it can be helpful to us. **Materials and Their Properties** The structure of materials determine their properties. The properties of materials influence their use. Some materials are	**Energy Production and Consumption** What is a “responsible” use of energy? Are there alternative forms of energy that will serve our needs or better ways of using traditional forms of energy? **Materials and Their Properties** How do you know which material is best for a particular product or need? Why should people consider the risks and benefits before the production of new materials and/or the implementations of a new process?

more suitable for making a particular product or device. People develop materials in response to the needs of society and the pursuit of knowledge. This development may have risks and benefits to humans and the environment.	

Science Standards Tied to Study Two
Energy Production and Consumption

The production of most of the energy that we use in our daily lives comes from energy stored in natural resources. The quantity of these resources is limited, so it is important to conserve our natural resources by using them wisely. **S3.4A (4-5)**

Energy sources can be renewable or finite. 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. Renewable energy sources vary in their availability and ease of use. **S3.4A (6-8)**

Technological advances throughout history have led to the discovery and use of different forms of energy and to more efficient use of all forms of energy. These technological advances have let to increase demand for energy and have had both beneficial and detrimental effects of society. **S3.4B (6-8)**

Responsible use of energy requires consideration of energy availability, efficiency of its use, the environmental impact and possible alternate sources. **S3.4C (6-8)**

Materials and Their Properties

Many materials can be recycled and used again (sometimes in different forms). **S2.3A (4-5)**

Synthetic materials and/or modified natural materials are produced to make products use in everyday life. **S2.3A (6-8)**

The production of new materials has social, environmental and other implications that require analyses o the risks and benefits. **S2.3B (6-8)**

Instructional Strategies and Performance Projects/Assessments
Year Two - How does the world work?

Study One - Energy exchange and systems / The Historical Perspective of Science

Montessori lessons and material related to:

- Great lessons/Cosmic Task
- The Universe Story
- Fundamental Needs of man
- Biographical sketches of people throughout history
- Timelines of humans on the earth
- Functional Geography

Science kits for possible use with this study:

- Magnetism and Electricity - Using electricity in everyday life
- Mixtures and Solutions - Combining and separating substances
- Motions and Design - Physics of motion and technique in design

Various lessons from the Delaware Recommended Curriculum leading to an understanding of cultures past and present might include:

- Thinking Chronologically
- Interpreting the Past - Dueling Documents
- Historical Research

Classroom projects leading to the performance assessments as listed below:

- Focusing on one scientist who contributed to the world's understanding of energy, materials and their properties, or forces and motion, students will develop a chronology of the scientist's life, relate that chronology to the time period he lived in and reflect on how his work was accepted or not accepted according to his place in time, culture, and place. Demonstrate understanding by writing a journal from the point of view of one of the scientists, creating a play about history related to one of these areas, or developing a series of news reports about early discoveries.
- Evaluate the electrical use of the school or your home. What are the sources of this energy? What are ways that you recommend to conserve energy? Provide mathematical evidence to support your recommendations? What natural resources are used to provide electrical energy in your home or school? What are the costs implications to your family or the school?

Why should they or should they not choose those sources for energy? What alternatives are there (wind, solar, water, etc.)? What are the economic costs of these sources of energy?

- Design a device that relies on the directional and/or mechanical advantage of a simple machine to perform a task (e.g., lift a weight, move a heavy object). Identify the forces and motions involved, the source of the energy used to complete the task, and how the energy is used by the simple machine,
- Identify different forms of alternative energy (i.e., solar, wind, ocean waves tidal and hydroelectric systems). Research and report on the use of this alternative form of energy. Discuss and compare finding to describe the advantages and disadvantages of different kinds of alternative energy.
- Write an opinion editorial for the newspaper on the social, economic, and/or environmental consequences of the production of new materials to meet human wants and needs.
-

Study Two - Producing and Consuming

Montessori lessons and materials related to:

- Timeline of humans on the earth
- Study of Early Humans Fundamental Needs
- Ecosystems
- The biomes
- Landforms
- Science kits for possible use with this study
- Ecosystems - Interactions between living things and their environment

Various lessons from the Delaware Recommended Curriculum leading to an understanding of cultures past and present might include:

- Reasons for Banks
- Thinking Economically
- Economic Systems

Possible classroom projects leading to the performance assessment as listed below:

- Classroom mini-society in which students run a city with businesses and services. Junior Achievement's JA Biz Town would be a resource for this hands-on project and assessments.

- Presentations at demonstrate an understanding of various ways that people around the world produce goods and meet energy needs using the resources available to them in their ecosystem. Arque the impact of the consumption of those resources on the ecosystem and the decisions that the community cases as a result.
- Analyze ways in which human activity (e.g. producing food, transporting materials, generating energy, disposing of waste, obtaining fresh water, or extracting natural resources) can affect ecosystems and the organisms within.
- Examine and describe how the exponential growth of the human population has affected the consumption of renewable and non-renewable resources.
- Evaluate decisions about the use of resources in one country and how these decisions can impact the diversity and stability of ecosystems globally.
- Teachers will develop rubrics based on content standards as evaluation of progress.

Assessment Tools for Both Studies

PALS is an on-line, standards-based, continually updated resource bank of science performance assessment tasks indexed via the National Science Education Standards (NSES) and various other standards frameworks.
Delaware Comprehensive Assessment System (DCAS) - Social studies in spring grade 4; science in spring grade 5

Other forms of informal assessment:

Art work	Cartoons	Designs and drawings	Documentary reports
Experiments	Foreign language activities	Games	Inventions
Journals	Maps	Model construction	Musical compositions
Newspapers	Notebooks	Oral reports	Original plays, stories, dances
Poetry recitations	Photos	Recipes	
Story illustrations	Story boards		

Year Three - What is Culture?
4th-6th (Ages 9-12)

Expanding on the concepts developed in the K-1st (Ages 5-7) and the 2nd-3rd (Ages 7-9) programs, the 4th-6th (Ages 9-12) child is able to use the tools of math, reading, writing, scientific inquiry and research to further expand their understanding of the world, develop inquires of study, and to share their understanding with others. Focusing on the concept of less is more and the desire of children this age to immerse themselves deeply in long-term studies, the program at this level focuses on two studies a year asking children to think like historians, economists, geographers, sociologists, anthropologists, chemists, geologist, biologists, astronomers and physicists at various given points in their study.

Study One - The diversity of life and life processes/cycles in nature and in studies of human cultures - The natural living world is composed of a diverse group of organisms and species. Man seeks to understand the similarities and differences between them including structure of species, life cycles, and the interdependency between them. Some scientists view some animal groups as having cultures or norms, e.g. jane Goodall and her study of chimpanzees. Man uses this knowledge to improve his own life experiences. Like the organisms in the natural world around us, people of various cultures have a life cycle and traditions that go with various stages of their life cycles. Children come to appreciate the diversity across cultures, understanding that cultures address childhood, adolescence, adulthood and aging in similar and different ways.

Study Two - Earth's Dynamic System/Earth Regions/and the Impact on Culture - Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere and organisms. Interactions and changes in these spheres have resulted in ongoing changes to the system. Some of the changes can be measured on a human time scale, but others occur so slowly that they must be inferred from Geological evidence. These changes also impact human groups, their resources, the cultures that develop and inter-actions and exchanges between cultures. Groups may choose to settle in particular areas because of the varus geological aspects of the region providing for such things as good trade routes, protection from others, and ease of communication. The history of a region helps us to understand the development of cultural uniqueness and the impact of natural events on the people living in a region.

Study One - The diversity of life and life processes/cycles in nature and in studies of human cultures	
Enduring Understanding in Study One	**Essential Questions in Study One**
Social Studies	**Social Studies**
Students will develop an understanding of the diversity of human culture and the unique nature of places. Like the organisms in the natural world around us, people of various cultures have a life cycle and traditions that go with various stages of their life cycle. Culture is the collective traditions and beliefs that distinguish one category or people from another. Culture includes learned and shared patterns or behaviors of living day to day, year to year, and life cycle to life cycle. Cultures have symbols, artifacts and structures that define them. Places are unique associations of natural environments human cultural modifications. Cultural differences produce patterns of diversity in language, religion, economic activity, social custom, and political organization across the Earth's surface. Places reflect the culture of the inhabitants as well as the ways that culture has changed over time. The human response to the characteristics of a physical environment comes with consequences for both human culture and the physical environment.	What are the various traditions that various cultures adhere to at the different stages of human life? What are the collective beliefs and traditions within a culture? What are the shared patterns and routine behaviors of a specific culture? What are the important symbols and artifacts for a culture? How does the natural environment influence cultural norms? To what extent are paces different in culture and activity? What makes a place culturally unique? Under what conditions do cultures spread?
Social Studies Standard Tied to Study One Students will identify and explain the major cultural patterns of human activity in the world's sub-regions. **(G3.6-8a)** Students will develop and understanding of selected themes in United States history and cultures, including:	

Who are the American people? (demographics, immigration, culture)
How have advances in technology changed our lives?
Important people in American history. H4 (4-5b)

Students will apply a knowledge of topography, climate, soils and vegetation of Delaware and the United States to understand how human society alters, and is affected by, the physical environment (G2.6-8a) This is applied to understanding human culture in particular.

Enduring Science Understanding in Study One	Essential Science Questions in Study One
Life Processes Living systems, from the organismic to the cellular level, demonstrate the complementary nature of structure and functions. All organisms transfer matter and convert energy from one form to another. Both matter and energy and energy are necessary to build and maintain structures within the organism. Organisms respond to internal and external cues, which allow them to survive. The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation. All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism. The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation. **Diversity and Continuity of Living Things** The diversity and changing of life forms over many generations is the result of natural selection, in which organism with advantageous traits survive, reproduce and pass those traits to offspring.	**Life Process** What do all living things need? How does structure relate to function in living systems from the cellular to the organismic level? How do responses to internal and external cues aid in an organism's survival? What can we do to benefit the health of humans and other organisms? How is matter transferred and energy transferred/transformed in living systems? **Diversity and continuity of Living Things** How are organisms of the same kind different from each other? How does this help them reproduce and survive?
Science Standards Tied to Study One	

Life Processes

Structures that function for similar purposes in living things may have different appearances. **S6.1A (4-5)**

The digestive system has major structures that function to break down food for use in the body. The major parts of the digestive system include the mouth, esophagus, stomach, small intestine and large intestine. **S6.1B (4-5)**

Organisms can be grouped based on similarities and differences in their structures and functions. These may include characteristics such as appendages, roots and leaves of plants, or the presence or lack of a backbone. **S6.1C(4-5)**

Living organisms share common characteristics that distinguish them from non-living, dead and dormant things. **S6.1A(6-8)**

All organisms require energy. A general distinction among organisms is that plants use solar energy to make their own food (sugar) and animals acquire energy directly or indirectly from plants. **S6.2A(6-8)**

The human body has systems that perform functions necessary for life. Major systems of the human body include the digestive, respiratory, reproductive, and circulatory system. **S6.1F(6-8)**

Diversity and Continuity of Living Things

Plants need the Sun's energy to grow and survive. **S6.2A(4-5)**

Animals need food to provide materials and energy for life which they derive directly or indirectly from plants. **S6.2B (4-5)**

Plants use the energy from sunlight, carbon dioxide, and water to produce sugars (photosynthesis). Plants can use the food (sugar) immediately or store it for later use. **S6.2B (6-8)**

An organism displays behaviors in response to internal cues, such as hunger, and external cues, such as light, temperature, or interaction with other living things. **S6.3A (4-5)**

There are similarities and differences in how organisms respond to internal and external cues. **S6.3B (4-5)**

Physical characteristics are passed on from parent to offspring. Organisms with two parents inherit characteristics of both. **S7.1A (4-6)**

An organism's physical appearance can change without the change being passed on to its offspring (e.g., dyed hair, loss of claw). **S7.1B (4-6)**

Most plants go through a life cycle of germination, growth development, reproduction and death. **S7.1C (4-6)**

Organisms of the same type vary in appearance. These variations may provide an advantage in reproduction and survival. **S7.2A (4-6)**

The Earth's present day species evolved from earlier, distinctly different species. Many thousands of layers of sedimentary rock provide evidence for the long history of the Earth and for the long history of changing life forms whose remains are found in the rocks. More recently deposited rock layers are more likely to contain fossils resembling existing species. **S7.2A (6-8)**

Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival . Most of the species that have lived on Earth no longer exist. **S7.2D (6-8)**

There is a wide diversity of organisms on Earth. Organisms may be classified in a number of ways one classification system places organisms into five kingdoms. **S7.E2 (6-8)**

The great variety of body forms and structures found in different species enable organism to survive in diverse environments. **S7.2F (6-8)**

Study Two - Earth's Dynamic Systems / Earth Regions / and the Impact on Culture	
Enduring Understanding for Study Two	**Essential Questions for Study Two**
Social Studies	**Social Studies**
Mental maps summarize differences and similarities about places. These differences and similarities lead to conflict or cooperation and the exchange of goods and ideas between people. Mental maps change as the scale moves from local to global; we know more about our home area than more distant places; and these differences affect how we feel and behave towards places that are distant versus those that are close. The ways mapped patterns are analyzed and used help solve societal problems. A region is a concept rather than a real object on the ground, used to simplify the diversity of places. Regions must have boundaries to exist, yet there advantages and disadvantages associated with any real or abstract feature use to draw a boundary. Places are unique associations of natural environments and human cultural modifications. Concepts of site and situation can explain the uniqueness of places. As site or situation change, so also does the character of a place. The human response to the characteristics of a physical environment comes with consequences for both the human culture and the physical environment.	How can thinking like a geographer help us to understand the concept of place & the relation between place & people? Why does where matter? To what extent are mental maps of different scales linked? How might connections between places affect their size and complexity? How might differences and similarities among regions result in connections between them? How might this place be like other in a larger region? Why is a place founded where it is? Why might those reasons change? What will happen to the earth because people live on it? What will happen to people as a result of what happens to the earth?
Social Studies Standards Tied to Study Two Students will demonstrate development of mental maps of Delaware and of the United States which include the relative location and characteristics of major physical features, political divisions, and human settlements. **(G1. 4-5a)**	

Students will demonstrate mental maps of the world and its sub-regions which include the relative location and characteristics of major physical features, political division, and human settlement. **(G1.6-8a)**
Students will apply geographic skills to develop a profile of the local community by placing it in the context of physical, cultural and other types of regions. **(G4.4-5a)**
Students will understand that the location of people's settlements impacts the economic activities in different world regions. **(G4.6-8a)**
Students will understand the reasons for the locations of human activities and settlements and the routes connecting them in Delaware and in the United States. **(G3.4-5a)**
Students will identify and explain the major cultural patterns of human activity in the word's sub-regions **(G3.6-8a)**
Students will apply a knowledge of topography, climate, soils and vegetation of Delaware and the United States to understand how human society alters, and is affected by, the physical environment. **(G2.4-5a)**
Students will apply a knowledge of the major processes shaping natural environments to understand how different peoples have changed and been affected by physical environments in the world's sub-regions. **(G2.6-8a)**

Science	**Science**
The earth's regions are often defined by the dynamic systems that cause natural boundaries to form. Earth's components from systems. These systems continually interact at different rates of time, affecting the Earth locally and globally. Technology enables us to better understand Earth's systems. It also allows us to analyze the impact of human activities on Earth's Systems and the impact of earth's systems on human activity.	How does understanding the properties of Earth materials and the physical laws that govern their behavior lead to prediction of Earth events? How do changes in one part of the Earth system affect other parts of the system? How do these changes impact the community and the history of the region? How does technology extend human senses and understanding of earth stems and their impact on a region?

Science Standards Tied to Study Two

Water exists in three states (solid, liquid, and gas) that are dependent upon the surrounding temperature. **S5.1A (4-5)**
Rocks and minerals are broken down over time to clay and sand sized particles. These particles combine with plant remains to form soil. **S5.1B (4-5)**
The ability of water to pass through soil depends on the relative amounts of clay and sand in the soil. **S5.1C (4-5)**
Water exists on the Earth in reservoirs (on or within the Earth's surface and atmosphere). The total amount of water in these reservoirs does

not change, however the ratio of water in solid, liquid, or gaseous form varies over time and location. **S5.1A (6-8)**
The movement of water among the geosphere, hydrosphere and atmosphere affects such things as weather systems, ocean currents and global climate. **S5.1B (6-8)**
The formation of sediment and soil requires a long period of time as rocks are weathered, eroded and deposited. **S5.1C (6-8)**
Earth is a dynamic system resulting from interactions among the geosphere, hydrosphere, atmosphere and biosphere. **S5.2A (4-5)**
Water reshapes Earth's land surface by eroding rock and oil in some areas and depositing them in other areas. **S5.2B (4-5)**
The flow of water can be affected by human activities, ground cover and the slope of the land affected. **S5.2C (4-5)**
Water in rivers and streams transports materials. As a general rule, when a stream enters a larger body of water, less massive materials in suspension will travel farther than more massive materials before settling. **S5.2D (4-5)**
The surface of the earth changes constantly. Some of these changes happen slowly and are difficult to detect on a daily basis. Others changes happen quickly and result from events (i.e., major storms and volcanoes). **S5.2E (4-5)**
Weather changes daily and seasonally. Weather in Delaware may change little from day to day, but an vary greatly when storm systems move into the area. **S5.2F (4-5)**
Some weather events, such as snowstorms, hurricanes, thunderstorms or tornadoes are more likely to occur at different times of the year. **S5.2G (4-5)**
Local weather at any point in time varies at different locations around the world. **S5.2H (4-5)**
The fit of continental coastlines, the similarity or rock types are fossilized remains proved evidence that today's continents were once a single landmass. The continents moved to their current positions on plates driven by energy from Earth's interior. **S5.2L (6-8)**
Heat energy stored in the oceans and transferred by currents influence climate. A disruption of the circulation and temperature of the world's oceans would foster climate change and have environmental and economic consequences. **S5.2M (6-8)**
Constructive processes that build up the land and the destructive processes of weathering and erosion shape and reshape the land surface. **5.4D (6-8)**
Some Earth events such as El Nino, volcanism and global warming can affect the entire Earth system and are likely the result of complex interactions among Earth spheres. **5.4E (6-8)**
Heat energy stored in the oceans and transferred by currents influence climate. A disruption of the circulation and temperature of the world foster climate change and have environmental and economic consequences. **S5.2M (6-8)**
Constructive processes that build up the land and he destructive processes of weathering and erosion shape and reshape the land surface. **5.4D (6-8)**
Some satellites allow scientists to observe, over time, large-scale changes in the geosphere as well as the development of short term weather events. **S5.3A (4-5)**
Global weather data from ground measurements, satellites and radar are recorded on maps, analyzed, and used to predict local weather.

S5.3A (6-8)
Water from some natural sources is unfit to drink and requires the use of specialized technology to analyze and purify it. **S5.3B (6-8)**

Instructional Strategies and Performance Projects / Assessment Year Three - What is Culture?

Montessori Great Lessons

The Montessori Great lessons are impressionistic lessons which provide a "whole" for the three studies of What Does It Mean to Be Human? These lessons are shared each year with various levels of detail according to the children's development. Particular emphasis should be given to the parts of the story that reinforce the content standards being developed in the K-1st (Ages 5-7) study of What Does It Mean to Be Human. The same lessons will be shred in the 2nd - 3rd (Ages 7-9) program expanding on concepts introduced at the K-1st (Ages 5-7) level. (See page 5 for full details of Montessori Great Lessons)

First Great lesson - Coming of the Universe and the Earth
The Second Great Lesson: Coming of Life
The Third Great Lesson: Coming of Human Beings
The Fourth Great Lesson: The Story of Language
The Fifth Great Lesson: The Story of Numbers

Study 1 - The diversity of life and life processes / cycles in nature and in studies of human culture

Montessori lessons and materials related to:

- Great lessons/Cosmic Task
- The Universe Story
- Biographical sketches of people throughout history
- Timelines of humans on the earth
- Study of Early Humans
- Science kits for possible use with the study
- Structure of Life - Relating the Structure of living things to their function.

Various lessons from the Delaware Recommended Curriculum leading to an understanding of cultures past and present might include:

- Thinking Chronologically
- Interpreting the Past - Dueling Documents
- Culture & Civilization

Classroom projects leading performance assessments as listed below:

- All cultures have heroes. Students will demonstrate and understanding of the role that heroes play in a culture creating a Living Museum of historical figures through history, writing Biographies of a personal hero, or creating Poetry Collections about an historical figure.
- Create a culture including traditions, passages and rituals as people move through the various stages of life, and artistic and musical aspects to the culture.
- Trace the physical characteristics of a cultural group explaining how those attributes are passed from one generation to the next genetically and demonstrating and understanding that physical characteristics have created boundaries for people's interactions across cultures.
- Recognize that there are variations among organisms of the same kind. Observe organisms of the same kind and describe how their physical appearances differ.
- Compare the similarities and difference of offspring to the parents (e.g. crayfish, bean sprouts). Know that offspring receive characteristics from both parents.
- Sketches comparing similarities and differences between various species of animals.
- Recognize that some characteristics acquired by the parents are not inherited by the offspring
- Research about animals: kingdom, phylum, genus, species. Sort and group plants and animals according to similarities in structures or functions or structures. Explain why the plants and animals have been grouped in this manner.
- Describe how similar structures found on different organisms (e.g., eyes, ears, mouths) have similar functions and enable those organisms to survive and reproduce in different environments (e.g., eyes of owls versus eyes of crustaceans).
- Research the life cycle of various other organisms. Diagram the life cycle of the organism and describe how the organism changes over time. Compare the life cycle of this organism to the life cycle of various other organisms including humans. Recognize that all organism go through a life cycle. Identify factors in the ecosystem that are beneficial or harmful to the organisms at various stages in their life cycles.

Study 2 - Earth's Dynamic System / Earth Regions / and the impact on Culture

Montessori lessons and materials related to:

- Great lessons/Cosmic Task
- The Universe Story
- Biographical sketches of people throughout history
- Timelines of humans on the earth
- Study of Early Humans Fundamental Needs

- Work of Water
- Landforms
- Earth models
- Water Cycle
- Functional Geography (Hydrosphere)
- Science kits for possible use with the study
- Land & Water Examining the rate at which forces change the earth

Various lessons from the Delaware Recommended Curriculum leading to an understanding of cultures past and present might include:

- Thinking Chronologically
- Interpreting the Past - Dueling Documents
- Culture & Civilization
- Our Community: Profiles and connections
- Conflict & Cooperation

Classroom projects leading to the performance assessments as listed below:

- Models of the Earth showing the Earth's layers
- Natural Resources Presentation, their locations and distribution throughout the world
- Recycling Process Presentations
- Water Fair showcasing:
    - water's impact on the world
    - science experiments and the water cycle demonstrations
    - magazine with poetry, articles etc. about water and its uses, distribution, etc.
- Scale models of various architectural structures from various cultures demonstrating how the design and materials used in the structure are related to the region, the impact of weather and other earth systems, and the resources available to a culture. This project has several sub-studies that might include:
    - Neighborhood /local architecture (notice, compare, contrast)
    - Study of Frank Lloyd Wright and other architects and their work
    - Scale models of the school, student's bedrooms, homes
    - Architecture through time - presentation on various types of architecture in the world from Ancient Greece to present