

Map: **Science Grade 7** Grade Level: **7**District: **Island Trees**Created: **03/15/2007** Last Updated: **03/15/2007**

	Essential Questions	Content	Skills	Standards/PIs
Unit 1	<p>Scientific Method</p> <p>-Why is the scientific method important to scientific investigations? -Why do we need controls in an experiment? -How do controls affect variables? -How can an observation become a theory? -How does a theory become a law?</p> <p>Graphing</p> <p>-How are graphs useful to show trends in data? -How do you determine what factor is the independent or dependent variable?</p> <p>Metric Measurements</p> <p>-Why is it important to learn to use scientific tools effectively?</p>	<p>The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.</p> <p>Introduction to Science</p> <p>Scientific Method</p> <p>Graphing</p> <p>Metric Measurements</p> <p>Vocabulary</p> <p>Scientific Method - Control, Variable, Observation, Inference</p> <p>Graphing - Independent Variable, Dependent Variable, Line Graph, Bar Graph, Data Tables</p> <p>Metric Measurements - Mass, Triple Beam Balance,</p>	<p>-Seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists.</p> <p>-Design charts, tables, graphs and other representations of observations in conventional and creative ways to help them address their research question or hypothesis.</p> <p>-Use mathematical analysis, scientific inquiry, and engineering design, as appropriate to pose questions, seek answers and develop solutions.</p> <p>-Interpret the organized data to answer the research question or hypothesis and to gain insight into the problem.</p> <p>-Distinguish between the dependent and independent variable.</p>	<p>MST1-K6-2B</p> <p>MST1-K6-2C</p> <p>MST1-K4-2D</p> <p>MST1-K4-2A</p> <p>MST1-K6-2A</p> <p>MST1-K4-2B</p> <p>MST1-K4-2C</p> <p>MST1-K5-2A</p> <p>MST1-K5-2B</p> <p>MST1-K5-2C</p>

Gram, Volume,
Overflow Can,
Graduated
Cylinder, Liter,
Length,
Ruler, Meter,
Density

-Use independent and dependent variables to create a title.

-Modify their personal understanding of phenomena based on evaluation of their hypothesis.

-Measure the distance between objects in metric units using a ruler/meter stick.

-Measure the mass of a given object in grams using a triple beam balance.

-Measure the volume of liquids or solids using a graduated cylinder or metric ruler.

-Record the volume of a meniscus using a graduated cylinder.

-Determine the volume of a regular shaped object using a metric ruler and the volume of an irregular shaped object using an overflow tank/graduated cylinder.

-Construct explanations independently for natural phenomena, especially by proposing preliminary visual

models of phenomena.

-Represent, present and defend their proposed explanations of everyday observations so they can be understood and assessed by others.

-Use conventional techniques and those of their own design to make further observations and refine explanations, guided by a need for more information.

-Develop, present and defend formal research proposals for testing their own explanations of common phenomena, including ways of obtaining needed observations and ways of conducting simple controlled experiments.

-Carry out their research proposals, **recording observations and measurements** to help assess the explanation.

Unit 2	<p>Features and Origins of Life -How can you determine if something is a living organism? -How did life evolve from non-living factors?</p>	<p>Living things are both similar to and different from each other and non-living things.</p> <p>Features and Origins of Life</p> <p>Features of Life</p> <p>Where does life come from?</p> <p>Vocabulary</p> <p>Features of Life - organism, cells, stimulus, response, homeostasis, development, adaptation, life span, reproduce, growth, energy,</p> <p>Where does life come from? - spontaneous generation, biogenesis</p>	<p>-Explain how a mouse trap, an engine and a crystal each shows features of life, yet are not considered a living organism.</p> <p>- Demonstrate Spallanzani's experiment using an erlenmeyer flask, rubber stopper and hot plate.</p> <p>- Demonstrate Redi's Experiment using cheesecloth, paper cups and bananas.</p>		MST4-K6-6A	
	<p>Cells -What is the relationship between technology and the development of the cell theory? -How are plant, animal and bacteria cells different? -How does the structure of a cell reflect the role it performs? -How do cells in a multicellular organism differ from unicellular organisms?</p>	<p>Living things are both similar to and different from each other and from non-living things.</p> <p>Cells</p>	<p>-Compare and contrast the parts of plants, animals and one-celled organisms.</p> <p>-Identify parts and function of each microscope</p>		MST4-K6-6A	

Unit 3		<p>Cell Theory</p> <p>Microscope</p> <p>Cell Organelles and Organization (Plants)</p> <p>Vocabulary</p> <p>Microscope - Ocular Lens, Eye Piece, Body Tube, Revolving Nosepiece, Objective Lens, Stage, Stage Clips, Base, Arm, Diaphragm, Light Source/Mirror</p> <p>Cell Organelles - Cell Wall, Cell Membrane, Mitochondria, Nucleus, Nucleolus, Golgi Apparatus, Endoplasmic Reticulum, Chloroplast, Lysosome, Ribosome, Vacuole</p>	<p>part.</p> <p>-Distinguish between plant, animal and bacterial cells.</p> <p>-Explain how a prokaryotic cell continues to survive.</p> <p>-List levels of organization with examples.</p>			
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	Essential Questions	Content	Skills	Standards/PIs
Unit 4	<p>Chemistry -Why it is significant to live on a planet that is composed primarily of oxygen, hydrogen and carbon?</p> <p>Cell Processes -How were you able to observe that the cell membrane is selectively permeable?</p> <p>Photosynthesis/ Respiration/ Fermentation -Why do chloroplasts move? -How does each process occur in the human body? -Why is it important to breathe during an athletic event?</p>	<p>-Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p>-Organisms maintain a dynamic equilibrium that sustains life.</p> <p>-Plants and animals depend on each other and their physical environment.</p> <p>Cell Processes Chemistry of Living Things Cell Transport: Osmosis and Diffusion Photosynthesis, Respiration and Fermentation (Ch 3 & Ch 12)</p> <p>Vocabulary Chemistry of Living Things - carbohydrate, lipids, proteins, enzymes, nucleic acid, atom, element, chemical formula, solution, suspension, compound, molecule, mixtures Cell Transport - passive transport, active transport, diffusion, equilibrium, osmosis, endocytosis, exocytosis, plasmolysis, equilibrium Photosynthesis, Respiration and Fermentation - metabolism, producers, photosynthesis,</p>	<p>-Develop mental models to explain common chemical reactions and changes in states of matter.</p> <p>-Compare atoms and elements to compounds and molecules.</p> <p>-Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms.</p> <p>-Provide evidence that green plants make food and explain the significance of this process to other organisms.</p>	<p>MST4-K3-3C MST4-K10-10A MST4-K10-10B MST4-K11-11B MST4-K6-6B</p>

		consumers, respiration, fermentation, transpiration			
Unit 5	<p>Mitosis/ Meiosis -How are traits passed on from generation to generation? -Why are offspring produced sexually not identical to their parents?</p> <p>DNA -What is the importance of DNA?</p> <p>Heredity -How are some traits inherited by factors other than dominance and recessiveness?</p>	<p>-Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.</p> <p>-The continuity of life is sustained through reproduction and development.</p> <p>Cell Reproduction Mitosis/Meiosis DNA Heredity</p> <p>Vocabulary Mitosis/Meiosis - mitosis, interphase, prophase, metaphase, anaphase, telophase, chromosomes, centromere, asexual reproduction, sexual reproduction, gametes, sperm, egg, meiosis, diploid, haploid, fertilization, DNA - DNA, phosphate, deoxyribose sugar, cytosine, guanine, thymine, adenine, replication, gene, mRNA, tRNA, mutation, plasmid, transgenic organism Heredity - Mendel,</p>	<p>-Describe sexual and asexual mechanisms for passing genetic materials</p> <p>-Describe simple mechanisms related to the inheritance of some physical traits in offspring.</p> <p>-Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction.</p> <p>-Explain the role of sperm and egg in sexual reproduction.</p> <p>- Explain why sexual reproduction is the dominant method in most higher life forms.</p> <p>- Discuss Mendel's scientific methods and explain why the pea plant was a useful specimen.</p>	<p>MST4-K9-9A MST4-K9-9B MST4-K9-9C MST4-K9-9D MST4-K7-7A MST4-K7-7B</p>	

		heredity, alleles, genetics, purebred, dominant, recessive, probability, Punnett Square, genotype, homozygous, heterozygous, phenotype, incomplete dominance, multiple alleles, polygenic inheritance, sex-linked gene, pedigree, genetic engineering, genome			
Unit 6	<p>Evolution</p> <p>-What impact does the environment have on evolution?</p> <p>-How can humans affect the evolution of other species?</p> <p>-How does competition among various species impact its evolution?</p> <p>-How do structures, fossils, and embryology provide evidence of evolution?</p>	<p>Individual organisms and species change over time.</p> <p>Vocabulary</p> <p>Evolution</p> <p>Evolution</p> <p>Mechanisms of Evolution</p> <p>Evidence for Evolution</p> <p>Radio active vs. Relative Dating</p> <p>Human Evolution</p> <p>Ancestor</p> <p>Mechanisms for Evolution -species, evolution, natural selection, variation, population, gradualism, punctuated equilibrium, Charles Darwin</p> <p>Evidence for Evolution - fossils, sedimentary rock, relative dating, radioactive elements, homologous structure, vestigial structure, embryology</p>	<p>-Describe sources of variation in organisms and their structures and relate the variations to survival.</p> <p>-Describe factors responsible for competition within a species and the significance of that competition.</p> <p>- Infer how scientists were able to determine that the fossils of Australopithecus were of human origin.</p> <p>- Identify the factors responsible for certain adaptations of various organisms.</p> <p>-Compare and Contrast the Theory of Evolution that was proposed by Lamarck and Darwin.</p>		<p>MST4-K8-8A</p> <p>MST4-K8-8B</p>

		Human Evolution - primates, hominids, <i>Homo sapien</i>					
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	Essential Questions	Content	Skills		Standards/PIs	
Unit 7	<p>Classification</p> <p>-Why is a classification system important to scientists?</p> <p>-How is the scientific name of an organism determined?</p> <p>-How does an organism's classification relate to its ancestry?</p>	<p>Identifying patterns of change is necessary for making predictions about future behavior and conditions.</p> <p>Classification</p> <p>Classification (Aristotle)</p> <p>Modern Classification (KPCOFGS)</p> <p>Vocabulary</p> <p>classify, taxonomy, kingdom, binomial nomenclature, species, genus, phylogeny, prokaryotes, eukaryotes, phylum, division, classes, orders, families, dichotomous keys</p> <p>Key Idea: Organisms are organized in a scientific manner.</p>	<p>-Observe and describe developmental patterns in selected plants and animals.</p> <p>-List 5/6 kingdoms and identify one organism for every category.</p> <p>-Classify an organism based on its physical characteristics.</p> <p>-Identify ancestors and closely related species in an ancestral map (family tree/cladogram)</p>		MST4-K9-9C	
Unit 8	<p>Human Body Systems</p> <p>-How do human body systems work together to maintain balance?</p> <p>Skeletal/Muscular System</p> <p>-Explain how the structure of an umbrella is similar to the importance of human bones in the body.</p> <p>-Explain how the skeletal and muscular systems work together.</p> <p>Nutrition</p> <p>-If we are what we</p>	<p>Organisms maintain a dynamic equilibrium that sustains life.</p> <p>Human Body Systems</p> <p>Bones</p> <p>Muscles</p> <p>Skin</p> <p>Digestion</p> <p>Nutrients</p> <p>Circulatory</p>	<p>-Explain the functioning of the major human organ systems and their interactions.</p> <p>-Demonstrate that muscle speed decreases as temperature decreases.</p> <p>-Compare the way a variety of living specimens carry out basic life functions and maintain dynamic</p>		MST4-K6-6B MST4-K10-10B	

	<p>eat, why has the school adopted a wellness policy? Digestive System -How does the breakdown of food encourage molecules to be absorbed and transported to cells?</p>	<p>Vocabulary Skeletal System - Periosteum, Marrow, Cartilage, Fracture (simple and compound), Joint (movable, immovable), Ligament, Tendon The Muscular System - Muscle (smooth, cardiac, skeletal), Voluntary Muscle, Involuntary Muscle, Tendons Skin - Epidermis, Melanin, Dermis Nutrition - Nutrients, carbohydrate, protein, amino acids, fats, vitamins, minerals Digestion - Digestion (mechanical, chemical), Saliva, Peristalsis, Chyme, Villi, Tongue, Salivary Glands, Esophagus, Gall Bladder, Liver, Stomach, Pancreas, Large Intestine, Small Intestine, Rectum, Anus</p>	<p>equilibrium. -Describe the importance of major nutrients, vitamins and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms.</p>			
<p>Unit 9</p>	<p>Human Body Systems Circulatory/Immune System -How do tissues, organs and organ systems help to provide cells with nutrients, oxygen and waste removal? -How does the circulatory system move substances to and from cells, where</p>	<p>Each system is composed of organs and tissues which perform specific functions and interact with each other. Human Body Systems Circulatory Respiration Excretion Body Regulation (Endocrine and Nervous System)</p>	<p>-Explain the functioning of the major human organ systems and their interactions. -Compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium.</p>		<p>MST4-K6-6B MST4-K10-10B</p>	

<p>they are needed or produced, responding to changing demands? -How do specialized cells protect our body from disease?</p> <p>Respiratory System -How is energy obtained due to the metabolism of oxygen? -Why is the structure of the alveoli in the lungs important to gas exchange?</p> <p>Excretory System -Why is it important for living organisms to eliminate their waste products?</p> <p>Endocrine and Nervous System -How do the nervous and endocrine system interact to control and coordinate the body's responses to changes in the environment, regulate growth, development and reproduction? -Why are hormones important?</p>	<p>Vocabulary</p> <p>Circulatory System - Heart, Atria, Ventricles, Circulation (Pulmonary, Systemic, Coronary), Veins, Arteries, Capillaries, Blood Pressure, Blood (Red Blood Cells, White Blood Cells, Platelets), Plasma, Hemoglobin, Lymphatic System, Lymph Nodes, Lymphocytes</p> <p>Respiratory System - Pharynx, Larynx, Trachea, Epiglottis, Bronchi, Alveoli, Diaphragm, Lungs</p> <p>Excretory Systems - Urinary System - Kidneys, Urine, Ureter, Bladder, Urethra, Nephrons, Others – Skin (Sweat), Lungs (Carbon Dioxide)</p> <p>Nervous System - Neuron, Dendrites, Axon, Neurons, Interneurons, Motor Neurons, Synapse, Central Nervous System (brain, spinal cord), Peripheral Nervous System (somatic, autonomic), Cerebrum, Cerebellum, Brainstem, Reflex</p> <p>Endocrine System - Hormones, Target tissues, Feedback</p>	<p>-Describe the importance of major nutrients, vitamins and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms</p> <p>-Explain the path of blood and air as it travels through the human body.</p> <p>-Demonstrate how wastes are expelled from the human body.</p> <p>-Identify various hormonal disorders.</p>			
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	Essential Questions	Content	Skills	Standards/PIs
Unit ID	<p>Ecology</p> <p>-How do food webs identify feeding relationships among producers, consumers and decomposers in an ecosystem?</p> <p>-How can the interaction between other species be competitive, harmful or beneficial?</p> <p>-How does an increase or decrease in species affect vegetation and the advancement of a species?</p>	<p>Plants and animals depend on each other and their physical environment.</p> <p>Ecology</p> <p>Organisms and their Environment</p> <p>Vocabulary</p> <p>Biosphere, Ecology, Biotic Factors, Abiotic Factors, Food chain, Energy Pyramid</p> <p>Community, Population, Ecosystem, Niche, Habitat, Competition, Camouflage, Symbiotic Relationships</p>	<p>-Describe the flow of energy and matter through food chains and food webs.</p> <p>-Describe how environmental changes affect humans and other populations.</p> <p>-Describe how living things, including humans, depend upon the living and non-living environment for their survival.</p> <p>- Examine how a food web is used to identify feeding relationships among producers, consumers, and decomposers in an ecosystem.</p>	<p>MST4-K11-11A</p> <p>MST4-K12-12A</p> <p>MST4-K12-12B</p>

Key to Standards used in this Map

MST1-K4-2A [1 occurrence] - MST Standard 1 - Key Idea 4 [Scientific Inquiry i] - Performance Indicator 2A - formulate questions independently with the aid of references appropriate for guiding the search for explanations of everyday observations. [Intermediate]

MST1-K4-2B [1 occurrence] - MST Standard 1 - Key Idea 4 [Scientific Inquiry i] - Performance Indicator 2B - construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena. [Intermediate]

MST1-K4-2C [1 occurrence] - MST Standard 1 - Key Idea 4 [Scientific Inquiry i] - Performance Indicator 2C - represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others. [Intermediate]

MST1-K4-2D [1 occurrence] - MST Standard 1 - Key Idea 4 [Scientific Inquiry i] - Performance Indicator 2D - seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists. [Intermediate]

MST1-K5-2A [1 occurrence] - MST Standard 1 - Key Idea 5 [Scientific Inquiry ii] - Performance Indicator 2A - use conventional techniques and those of their own design to make further observations and refine their explanations, guided by a need for more information. [Intermediate]

MST1-K5-2B [1 occurrence] - MST Standard 1 - Key Idea 5 [Scientific Inquiry ii] - Performance Indicator 2B - develop, present, and defend formal research proposals for testing their own explanations of common phenomena, including ways of obtaining needed observations and ways of conducting simple controlled experiments. [Intermediate]

MST1-K5-2C [1 occurrence] - MST Standard 1 - Key Idea 5 [Scientific Inquiry ii] - Performance Indicator 2C - carry out their research proposals, recording observations and measurements (e.g., lab notes, audio tape, computer disk, video tape) to help assess the explanation. [Intermediate]

MST1-K6-2A [1 occurrence] - MST Standard 1 - Key Idea 6 [Scientific Inquiry iii] - Performance Indicator 2A - design charts, tables, graphs and other representations of observations in conventional and creative ways to help them address their research question or hypothesis. [Intermediate]

MST1-K6-2B [1 occurrence] - MST Standard 1 - Key Idea 6 [Scientific Inquiry iii] - Performance Indicator 2B - interpret the organized data to answer the research question or hypothesis and to gain insight into the problem. [Intermediate]

MST1-K6-2C [1 occurrence] - MST Standard 1 - Key Idea 6 [Scientific Inquiry iii] - Performance Indicator 2C - modify their personal understanding of phenomena based on evaluation of their hypothesis. [Intermediate]

MST4-K3-3C [1 occurrence] - MST Standard 4 - Key Idea 3 [Physical Setting iii] - Performance Indicator 3C - develop their own mental models to explain common chemical reactions and changes in states of matter. [Intermediate]

MST4-K6-6A [2 occurrences] - MST Standard 4 - Key Idea 6 [The Living Environment i] - Performance Indicator 6A - compare and contrast the parts of plants, animals, and

one-celled organisms. [Intermediate]

MST4-K6-6B [3 occurrences] - MST Standard 4 - Key Idea 6 [The Living Environment i] - Performance Indicator 6B - explain the functioning of the major human organ systems and their interactions. [Intermediate]

MST4-K7-7A [1 occurrence] - MST Standard 4 - Key Idea 7 [The Living Environment ii] - Performance Indicator 7A - describe sexual and asexual mechanisms for passing genetic materials from generation to generation. [Intermediate]

MST4-K7-7B [1 occurrence] - MST Standard 4 - Key Idea 7 [The Living Environment ii] - Performance Indicator 7B - describe simple mechanisms related to the inheritance of some physical traits in offspring. [Intermediate]

MST4-K8-8A [1 occurrence] - MST Standard 4 - Key Idea 8 [The Living Environment iii] - Performance Indicator 8A - describe sources of variation in organisms and their structures and relate the variations to survival. [Intermediate]

MST4-K8-8B [1 occurrence] - MST Standard 4 - Key Idea 8 [The Living Environment iii] - Performance Indicator 8B - describe factors responsible for competition within species and the significance of that competition. [Intermediate]

MST4-K9-9A [1 occurrence] - MST Standard 4 - Key Idea 9 [The Living Environment iv] - Performance Indicator 9A - observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction. [Intermediate]

MST4-K9-9B [1 occurrence] - MST Standard 4 - Key Idea 9 [The Living Environment iv] - Performance Indicator 9B - explain the role of sperm and egg cells in sexual reproduction. [Intermediate]

MST4-K9-9C [2 occurrences] - MST Standard 4 - Key Idea 9 [The Living Environment iv] - Performance Indicator 9C - observe and describe developmental patterns in selected plants and animals (e.g., insects, frogs, humans, seed-bearing plants). [Intermediate]

MST4-K9-9D [1 occurrence] - MST Standard 4 - Key Idea 9 [The Living Environment iv] - Performance Indicator 9D - observe and describe cell division at the microscopic level and its macroscopic effects. [Intermediate]

MST4-K10-10A [1 occurrence] - MST Standard 4 - Key Idea 10 [The Living Environment v] - Performance Indicator 10A - compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium. [Intermediate]

MST4-K10-10B [3 occurrences] - MST Standard 4 - Key Idea 10 [The Living Environment v] - Performance Indicator 10B - describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth and explain the need for a constant input of energy for living organisms. [Intermediate]

MST4-K11-11A [1 occurrence] - MST Standard 4 - Key Idea 11 [The Living Environment vi] - Performance Indicator 11A - describe the flow of energy and matter through food chains and food webs. [Intermediate]

MST4-K11-11B [1 occurrence] - MST Standard 4 - Key Idea 11 [The Living Environment vi] - Performance Indicator 11B - provide evidence that green plants make food and explain the significance of this process to other organisms. [Intermediate]

MST4-K12-12A [1 occurrence] - MST Standard 4 - Key Idea 12 [The Living Environment vii] - Performance Indicator 12A - describe how living things, including humans, depend upon the living and nonliving environment for their survival. [Intermediate]

MST4-K12-12B [1 occurrence] - MST Standard 4 - Key Idea 12 [The Living Environment vii] - Performance Indicator 12B - describe the effects of environmental changes on humans and other populations. [Intermediate]