HUDSONVILLE PUBLIC SCHOOLS ELEMENTARY COURSE FRAMEWORK

COURSE/SUBJECT **Fourth Grade Science**

ENDURING UNDERSTANDINGS - INQUIRY STANDARDS (Kindergarten - 7th Grade Standards)	
Inquiry Process	**K-7 Standard S.IP: Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.**
	S.IP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.
Inquiry Analysis & Communications	**K-7 Standard S.IA: Develop an understanding that scientific inquiry and investigations require analysis and communication of findings, using appropriate technology.**
	S.IA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.
Reflection & Social Implications	**K-7 Standard S.RS: Develop an understanding that claims and evidence for their scientific merit should be analyzed. Understand how scientists decide what constitutes scientific knowledge. Develop an understanding of the importance of reflection on scientific knowledge and its application to new situations to better understand the role of science in society and technology.**
	S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

SCIENCE UNIT	STANDARD Which Michigan state standards does the unit address?	KEY VOCABULARY	ASSESSMENTS
Unit 1: Heat, Electricity, and Magnetism	**INQUIRY STANDARDS** **Process** • S.IP.04.11 Make purposeful observations of heat, electricity and magnetism. • S.IP.04.12 Generate questions based on observation of heat, electricity and magnetism. • S.IP.04.13 Plan and conduct simple and fair investigations to compare and contrast heat, electricity and magnetism. • S.IP.04.14 Manipulate simple tools (for example, thermometer, stop watch/timer) to measure temperature. • S.IP.04.15 Make accurate measurements with appropriate units (degrees, Celsius, Fahrenheit, minutes, seconds) in. • S.IP.04.16 Construct simple charts and graphs from data information collected about fuel types. **Analysis & Communication** • S.IA.04.11 Summarize information from charts and graphs to answer questions about kinds of fuel that are used to heat buildings. • S.IA.04.12 Share ideas about heat, electricity and magnetism through purposeful conversation in collaborative groups. • S.IA.04.13 Communicate and present findings of investigations that describe the strength of magnets and their uses. • S.IA.04.14 Develop research strategies and skills for information gathering and problem solving about heat energy, electricity sources, global climate changes and uses of electromagnets. • S.IA.04.15 Compare and contrast sets of data from multiple trials of an investigation on magnets and their strengths to explain reasons for differences. **Reflection & Social Implications** • S.RS.04.11 Demonstrate similarities and differences in uses of heat, electricity and magnetism through various illustrations, performances or activities. • S.RS.04.14 Use data/samples as evidence to separate fact from opinion about electricity and magnetism. • S.RS.04.15 Use evidence when communicating, comparing and contrasting the types of heat uses of electricity and uses of magnetism. • S.RS.04.16 Identify technology used in everyday life to measure temperatures. • S.RS.04.17 Identify current problems about heat and electricity sources that may be solved through the use of technology. • S.RS.04.19 Describe how people such as Michael Faraday, Thomas Edison, and Enrico Fermi have contributed to science throughout history and across cultures. **CONTENT STANDARDS** • P.EN.04.12 Identify heat and electricity as forms of energy. • P.EN.04.41 Demonstrate how temperature can be increased in a substance by adding energy. • P.EN.04.42 Describe heat as the energy produced when substances burn, certain kinds of materials rub against each other, and when electricity flows through wire. • P.EN.04.43 Describe how heat is produced through electricity, rubbing and burning. • P.EN.04.51 Demonstrate how electrical energy is transferred and changed through the use of a simple circuit. • P.EN.04.52 Demonstrate magnetic effects in a simple electric circuit. • P.PM.04.53 Identify objects that are good conductors or poor conductors of heat and electricity. • P.PM.04.33 Demonstrate magnetic field by observing the patterns formed with iron filings using a variety of magnets. • P.PM.04.34 Demonstrate that magnetic objects are affected by the strength of the magnet and the distance from the magnet.	heat electricity energy evident temperature thermometer Celsius Fahrenheit increase decrease substance electric current friction simple circuit open circuit closed circuit battery wire bulb power source energy transfer conductor compass magnet magnetic field magnetic poles lines of force iron filings attract repel generator device appliance	District Assessment Science Fair

Unit 2: Properties and Changes of Matter	**INQUIRY STANDARDS** **Process** • S.IP.04.11 Make purposeful observations concerning properties and changes in matter. • S.IP.04.12 Generate questions based on observations to understand properties and changes in matter. • S.IP.04.13 Plan and conduct simple and fair investigations of properties and changes in matter. • S.IP.04.14 Use metric measurement devices in an investigation of properties and changes in matter. • S.IP.04.15 Make accurate measurements with appropriate units for the measurement tool. • S.IP.04.16 Construct charts and graphs from data and observations dealing with properties and changes in matter. **Analysis & Communication** • S.IA.04.11 Summarize information from data tables and graphs to answer scientific questions on properties and changes in matter. • S.IA.04.12 Share ideas through discussion in collaborative groups about properties and changes in matter. • S.IA.04.13 Communicate and present findings of observations and investigations about properties and changes in matter using evidence. **Reflection & Social Implications** • S.RS.04.11 Use data/samples as evidence to separate fact from opinion regarding properties and changes in matter. • S.RS.04.12 Use evidence in making scientific decisions about properties and changes in matter. • S.RS.04.13 Demonstrate scientific concepts concerning properties and changes in matter through various illustrations, performances, models, exhibits, and activities. • S.RS.04.14 Identify technology associated with properties and changes in matter . • S.RS.04.15 Use evidence when communicating about the properties and changes in matter. • S.RS.04.16 Design solutions to problems on energy and changes in matter using technology. • S.RS.04.17 Describe how people have contributed to society through the discovery and research into properties and changes in matter. **CONTENT STANDARDS** • P.PM.04.16 Measure the weight (spring scale) and mass (balances) in grams or kilograms of objects. • P.PM.04.17 Measure the volume of liquids in milliliters and liters. • P.PM.04.23 Compare and contrast the states (solid, liquid, and gas) of matter . • P.CM.04.11 Explain how matter can change from one state (solid, liquid, and gas) to another by heating and cooling.	weight spring scale grams kilograms balance volume liter (L) milliliter (mL) matter states of matter solid liquid gas definite (as related to shape) compare contrast mass	Unit Assessments Science Fair Presentations

Unit 3: Relationships and Requirements of Living Things (Ecosystems)	**INQUIRY STANDARDS** **Process** • S.IP.04.11 Make purposeful observations of plant and animal requirements and relationships. • S.IP.04.12 Generate questions based on observations of living things, their requirements and relationships. • S.IP.04.13 Plan and conduct simple and fair investigations to compare and contrast the needs of plant and animal requirements and their relationships. • S.IP.04.14 Manipulate simple tools (for example ruler, meter stick, balance scales) to determine the growth and change of living things. • S.IP.04.15 Make accurate measurements with appropriate units (centimeters, meters, grams, kilograms) of the growth and change of living things. • S.IP.04.16 Construct simple charts and graphs from data and observations of living things. **Analysis & Communication** • S.IA.04.11 Summarize information from charts and graphs to answer questions about plants and animal requirements and their relationships. • S.IA.04.12 Share ideas about plants and animals and their relationships through purposeful conversation in collaborative groups. • S.IA.04.13 Communicate and present findings of investigations that describe plants and animal requirements and their relationships. • S.IA.04.14 Develop research strategies and skills for information gathering and problem solving about plants and animal requirements and their relationships. • S.IA.04.15 Compare and contrast sets of data from multiple trials of an investigation about plants and animal requirements and their relationships to explain reasons for differences. **Reflection & Social Implications** • S.RS.04.11 Demonstrate similarities and differences of plants and animal requirements and their relationships through various illustrations, performances or activities. • S.RS.04.14 Use data/samples as evidence to separate fact from opinion about plants and animal requirements and their relationships. • S.RS.04.15 Use evidence when communicating, comparing and contrasting plants and animal requirements and their relationships. • S.RS.04.16 Identify technology used in everyday life to help plant and animal requirements and their relationships. • S.RS.04.17 Identify current problems about changes in plant and animal requirements and their relationships that may be solved through the use of technology. • S.RS.04.19 Describe how people such as Charles Darwin, Rachel Carson, Luther Burbank, George Washington Carver, Ibn Al-Baitar, Charles Turner and others have contributed to science throughout history and across cultures. **CONTENT STANDARDS** • L.OL.04.15 Determine that plants require air, water, light, and a source of energy and building material for growth and repair. • L.OL.04.16 Determine that animals require air, water and a source of energy and building material for growth and repair. • L.EV.04.21 Identify individual differences (color, leg length, size, wing size, leaf shape) in organisms of the same kind. • L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction. • L.EC.04.11 Identify organisms as part of a food chain or food web. • L.EC.04.21 Explain how environmental changes can produce a change in the food web. • E.ST.04.31 Explain how fossils provide evidence of Earth's past. • E.ST.04.32 Compare and contrast life forms found in fossils and organisms that exist today.	plants animals source of energy building material requirements for life repair individual differences organisms observable features enable obtain coloring similarities and differences in organisms camouflage predator prey litter food chain food web producers consumers decomposers populations environment affect survival reproduce fossil evidence variations physical characteristics survival reproduction advantage location compare contrast	District Assessments Science Fair or Diorama

Unit 4: Sun, Moon, and Earth	**INQUIRY STANDARDS** **Process** • S.IP.04.11 Make purposeful observations of the sun and the moon using the appropriate senses. • S.IP.04.12 Generate questions based on observations of the sun and the moon. • S.IP.04.14 Manipulate simple tools that aid observation and data collection (ruler, thermometer). • S.IP.04.15 Make accurate measurements with appropriate units (centimeters, Celsius). • S.IP.04.16 Construct simple charts and graphs from data and observations of the movements of the sun and the moon. **Analysis & Communication** • S.IA.04.11 Summarize information from charts of the Earth, sun, and moon. • S.IA.04.12 Share ideas about the Earth, sun, and moon through purposeful conversation in collaborative groups. • S.IA.04.13 Communicate and present findings of observations and investigations. • S.IA.04.14 Develop research strategies and skills for information gathering about the sun and the moon. **Reflection & Social Implications** • S.RS.04.11 Demonstrate understanding of the relationship of the Earth, sun, and moon through illustrations and models. • S.RS.04.14 Use samples as evidence to separate fact from opinion when classifying the Earth, sun, and moon. • S.RS.04.15 Use evidence when communicating about the Earth, sun, and moon. • S.RS.04.16 Identify technology used in everyday life when taking shadow readings of the sun's movement in the sky. • S.RS.04.18 Describe the effect the sun has on the balance of the natural world. • S.RS.04.19 Describe how people such as Ptolemy, Copernicus, Galileo, Hubble, and Hawking have contributed to science throughout history and across cultures. **CONTENT STANDARDS** • E.ST.04.11 Identify the sun and moon as common objects in the sky. • E.ST.04.12 Compare and contrast the characteristics of the sun, moon, and Earth, including relative distances and abilities to support life. • E.ST.04.21 Describe the orbit of the Earth around the sun as it defines a year. • E.ST.04.22 Explain that the spin of the Earth creates day and night. • E.ST.04.23 Describe the motion of the moon around the Earth. • E.ST.04.24 Explain how the visible shape of the moon follows a predictable cycle, which takes approximately a month. • E.ST.04.25 Describe the apparent movement of the sun and moon across the sky through day/night and the seasons.	Earth sun moon star observe reflect ability to support life produce light breathable atmosphere revolution orbit rotation Earth's axis phases of the moon day night cycle seasons year natural satellite relative distance capable visible shape predictable cycle apparent movement	District Assessment