

HUDSONVILLE PUBLIC SCHOOLS ELEMENTARY COURSE FRAMEWORK



COURSE/SUBJECT

Fifth 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 CONCEPTS/ VOCABULARY	ASSESSMENTS
<p>Unit 1: Measuring Changes in Motion (Force)</p>	<p>INQUIRY STANDARDS</p> <p>Process</p> <ul style="list-style-type: none"> • S.IP.05.11 Generate scientific questions about motion based on observations, investigations, and research. • S.IP.05.12 Design and conduct scientific investigations on motion and changes in motion. • S.IP.05.13 Use tools and equipment (stop watches, meter sticks and tapes, models, balances) appropriate to scientific investigation of motion. • S.IP.05.14 Use metric measurement devices in the investigation of motion. • S.IP.05.15 Construct charts and graphs from data and observations dealing with motion and changes in motion. • S.IP.05.16 Identify patterns in data regarding motion. <p>Analysis & Communication</p> <ul style="list-style-type: none"> • S.IA.05.11 Analyze information from data tables and graphs to answer scientific questions on motion. • S.IA.05.12 Evaluate data, claims, and personal knowledge through collaborative science discourse about motion. • S.IA.05.13 Communicate and defend findings of observations and investigations about motion using evidence. • S.IA.05.14 Draw conclusions from sets of data from multiple trials of a scientific investigation on motion and changes in motion. • S.IA.05.15 Use multiple sources of information on motion and changes in motion to evaluate strengths and weaknesses of claims, arguments, or data. <p>Reflection & Social Implication</p> <ul style="list-style-type: none"> • S.RS.05.11 Evaluate the strengths and weaknesses of claims, arguments, and data regarding motion and changes in motion. • S.RS.05.12 Describe limitations in personal and scientific knowledge regarding motion and changes in motion. • S.RS.05.13 Identify the need for evidence in making scientific decisions about motion. • S.RS.05.15 Demonstrate scientific concepts about motion through various illustrations, performances, models, exhibits, and activities. • S.RS.05.16 Design solutions to problems concerning the motion of objects using technology. • S.RS.05.17 Describe the effect humans and other organisms have on the balance in the natural world when force is applied to an object. • S.RS.05.19 Describe how the science and technology of motion have advanced because of the contribution of many people throughout history and across cultures. <p>CONTENT STANDARDS</p> <ul style="list-style-type: none"> • P.FM.05.21 Distinguish between contact forces and non-contact forces. • P.FM.05.22 Demonstrate contact and non-contact forces to change the motion of an object. • P.FM.05.31 Describe what happens when two forces act on an object in the same or opposing directions. • P.FM.05.32 Describe how constant motion is the result of balanced (zero net) forces. • P.FM.05.33 Describe how changes in the motion of objects are caused by a non-zero net (unbalanced) force. • P.FM.05.34 Relate the size of change in motion to the strength of unbalanced forces and the mass of the object. • P.FM.05.41 Explain the motion of an object relative to a point of reference. • P.FM.05.42 Describe the motion of an object in terms of distance, time and direction, as the object moves, and in relationship to other objects. • P.FM.05.43 Demonstrate how motion can be measured and represented on a graph. 	<p>force balanced force change of direction change of motion change of speed force strength friction graph magnetic attraction magnetic repulsion mass relative position constant speed direction of motion gravitational force speed unbalanced force zero net force non-zero net force</p>	<p>Unit Assessment</p>

<p>Unit 2: Animal Systems (Body Systems)</p>	<p>INQUIRY STANDARDS</p> <p>Process</p> <ul style="list-style-type: none"> • S.IP.05.11 Generate scientific questions about animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory and reproductive) based on observations, investigations, and research. • S.IP.05.12 Design and conduct scientific investigations that demonstrate how selected systems work together (for example: how changes in muscular activity cause changes in circulatory and respiratory activity). • S.IP.05.13 Use tools and equipment appropriate to scientific investigations of systems working together (stop watches, meter sticks). • S.IP.05.14 Use metric measuring devices in investigations of how animal systems work together. • S.IP.05.15 Construct charts and graphs comparing changes in muscular activity with changes in pulse rate and breathing rate. • S.IP.05.16 Identify patterns in data from investigations of changes in muscular activity, pulse rate and breathing rate. <p>Analysis & Communication</p> <ul style="list-style-type: none"> • S.IA.05.11 Analyze information from data tables and graphs comparing changes in muscular activity with changes in pulse rate and breathing rate to answer scientific questions. • S.IA.05.12 Evaluate data, claims, and personal knowledge through collaborative discourse about animal systems working together. • S.IA.05.13 Communicate and defend findings of observations and investigations using evidence about muscular activity, heart rate and breathing rate. • S.IA.05.14 Draw conclusions from sets of data from multiple trials (data from all student groups) of a scientific investigation. • S.IA.05.15 Use multiple sources of information to evaluate strengths and weaknesses about the claims, arguments, or data regarding the relationship between muscular activity and breathing rate and pulse rate. <p>Reflection & Social Implication</p> <ul style="list-style-type: none"> • S.RS.05.21 Evaluate the strengths and weaknesses of claims, arguments, and data about the work performed by selected animal systems. • S.RS.05.22 Describe limitations in personal and scientific knowledge about the ways in which animal systems work together. • S.RS.05.24 Demonstrate scientific concepts through various illustrations, performances, models, exhibits or activities of how animal systems work together. • S.RS.05.27 Describe how science and technology related to animal systems have advanced because of the contributions of Ibn Nafis, Daniel Hale Williams and other people throughout history and across cultures. <p>CONTENT STANDARDS</p> <ul style="list-style-type: none"> • L.OL.05.41 Identify the general purpose of selected animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive). • L.OL.05.42 Explain how animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive) work together to perform selected activities. 	<p>energy movement & support breathe digestion absorption elimination transport stimulus response urine feces mouth esophagus stomach small intestine large intestine (colon) liver pancreas heart arteries veins skeletal: (bones, tendons, ligaments, skull, ribs, sternum) muscles tendons brain spinal cord sensory nerves motor nerves kidneys urinary bladder urethra</p>	<p>Unit Assessment</p>
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<p>Unit 3: Adaptations and Traits of Organisms (Taught in conjunction with Unit 2: Body Systems)</p>	<p>INQUIRY STANDARDS</p> <p>Process</p> <ul style="list-style-type: none"> • S.IP.05.11 Generate scientific questions about heredity, traits that allow organisms to survive and evolution based on observations, investigations, and research. • S.IP.05.12 Design and conduct scientific investigations showing traits/characteristics and how they are influenced by the environment and genetics. • S.IP.05.13 Use tools and equipment appropriate to scientific investigations of environmental influence on characteristics and traits and characteristics improving survival rate (research materials, plants, soil of varying nutrient levels). • S.IP.05.14 Use metric measurement devices in an investigation of environmental factors on plant growth (height in centimeters, volume of water in milliliters, etc.). • S.IP.05.15 Construct charts and graphs from data and observations found while investigating heredity and factors affecting populations and traits. • S.IP.05.16 Identify patterns in data from investigations of behavioral, physical and environmental factors affecting traits and changes in populations. <p>Analysis & Communication</p> <ul style="list-style-type: none"> • S.IA.05.11 Analyze information on behavioral and physical characteristics and environmental influences on traits from data tables and graphs to answer scientific questions. • S.IA.05.12 Evaluate data, claims, and personal knowledge of traits, changes in traits/ characteristics over time and degree of organism similarity through collaborative science discourse. • S.IA.05.13 Communicate and defend findings of observations and investigations using evidence of students traits and factors influencing traits. • S.IA.05.14 Draw conclusions from sets of data from multiple trials of a scientific investigation on environmental influence on traits. • S.IA.05.15 Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments or data while conducting research on environmental factors causing change in species/organisms over time. <p>Reflection & Social Implication</p> <ul style="list-style-type: none"> • S.RS.05.11 Evaluate the strengths and weaknesses of claims, arguments, and data recorded investigating influences on traits. • S.RS.05.12 Describe limitations in personal and scientific knowledge on heredity and traits as well as how the environment influences these traits. • S.RS.05.13 Identify the need for evidence in making scientific decisions while investigating factors influencing traits. • S.RS.05.15 Demonstrate scientific concepts of heredity, traits and characteristics through various illustrations, performances, models, exhibits, and activities. <p>CONTENT STANDARDS</p> <ul style="list-style-type: none"> • L.HE.05.11 Explain that both the environment and the genetics of the individual influence the traits of an individual. • L.HE.05.12 Distinguish between inherited and acquired traits. • L.EV.05.11 Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment. • L.EV.05.12 Describe the physical characteristics (traits) of organisms that help them survive in their environment. • L.EV.05.13 Describe how fossils provide evidence about how living things and environmental conditions have changed. • L.EV.05.14 Analyze the relationship of environmental change and catastrophic events (for example: volcanic eruption, floods, asteroid impact, tsunami) to species extinction. • L.EV.05.21 Relate degree of similarity in anatomical features to the classification of contemporary organisms. 	<p>anatomical features genetic relatedness adaptation inherited traits acquired traits learned behavior nocturnal heredity environmental factors fossil catastrophic events (volcanic eruptions, tsunamis, asteroid impacts, floods) natural selection instinct habit behavioral characteristics physical characteristics (traits) survival</p>	<p>Unit Assessment</p>
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<p>Unit 4: Positions and Motion of Objects in the Sky (Season and Solar System)</p>	<p>INQUIRY STANDARDS</p> <p>Process</p> <ul style="list-style-type: none"> • S.IP.05.11 Generate scientific questions based on observations, investigations, and research concerning the position and motion of objects in the sky. • S.IP.05.13 Use tools and equipment (models) appropriate to scientific investigations for the position and motion of objects in the sky. • S.IP.05.15 Construct charts and graphs from data and observations dealing with the position and motion of objects in the sky. • S.IP.05.16 Identify patterns in data dealing with the position and motion of objects in the sky. <p>Analysis & Communication</p> <ul style="list-style-type: none"> • S.IA.05.12 Evaluate data, claims, and personal knowledge through collaborative science discourse about the position and motion of objects in the sky. • S.IA.05.13 Communicate and defend findings of observations and investigations about the position and motion of objects in the sky using evidence. • S.IA.05.15 Use multiple sources of information on the position and motion of objects in the sky to evaluate strengths and weaknesses of claims, arguments, or data. <p>Reflection & Social Implication</p> <ul style="list-style-type: none"> • S.RS.05.11 Evaluate the strengths and weaknesses of claims, arguments, and data regarding the reasons for the position and motion of objects in the sky. • S.RS.05.13 Identify the need for evidence in making scientific decisions about the position and motion of objects in the sky. • S.RS.05.15 Demonstrate scientific concepts concerning the position and motion of objects in the sky through various illustrations, performances, models, exhibits, and activities. <p>CONTENT STANDARDS</p> <ul style="list-style-type: none"> • E.ES.05.61 Demonstrate and explain seasons using a model. • E.ES.05.62 Explain how the revolution of the Earth around the sun defines a year. • E.ST.05.11 Design a model of the solar system that shows the relative distances and positions of the planets, dwarf planets, comets and asteroids to the sun. • E.ST.05.21 Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity. • E.ST.05.22 Explain the phases of the moon. • E.ST.05.23 Explain the apparent motion of the stars (constellations) and the sun across the sky. • E.ST.05.24 Explain lunar and solar eclipses. • E.ST.05.25 Explain the tides of the oceans as they relate to the gravitational pull and orbit of the moon. 	<p>seasons tilt axis revolution rotation solar system planet dwarf planet asteroids comets gravity gravitational pull phases stars constellations lunar solar eclipse tides</p>	<p>Unit Assessment</p>
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