

HPS Scope & Sequence  
K-8 Grade Level Essential Skills  
DRAFT  
August 2009

Grade Level: 7  
Subject: Science

Howell Public Schools (HPS), like many of our fellow Michigan districts, has studied the work of Dr. Robert Marzano and other educational consultants. In his book *What Works in Schools: Translating Research into Action*, Marzano points to the necessity of school districts having a “guaranteed and viable curriculum.” Marzano stresses the importance of everyone in the school community understanding what skills will be taught for mastery at each grade level, and then guaranteeing that happens. Using this research, our district is undertaking the task of creating an aligned curriculum that prepares students to successfully meet the academic rigors of Michigan’s Grade Level Content Expectations (GLCEs).






During the 2008-09 school year, small groups of teachers worked under the guidance of curriculum consultants and HPS administrators to study the core content curriculums of English, math, science and social studies. Through professional development efforts, these groups learned to identify subsets of fundamental, non-negotiable content expectations that require a higher degree of mastery than the other expectations within the content area. HPS has chosen to call these fundamental, non-negotiable content expectations for each grade level subject “Essential Skills”. Teacher groups then assigned a recommended number of lessons, per quarter, needed to successfully teach each GLCE, thus securing the curriculum as viable. Vocabulary, a researched component to uniform student achievement, was identified by quarter (nine-week sessions). Examples of formative assessments were provided for each expectation, with the creation of uniform summative assessments to follow the final approval of this document. Upon completion of draft essential skills for each subject, the teacher groups used supporting MDE documents to align their chosen skills horizontally for grades kindergarten through eight.

The essential skills found within this document will be piloted in the 2009-2010 school year. Our teaching staff will provide on-going feedback on the document during this pilot. At the conclusion of each semester the original teacher groups will re-assemble under the guidance of educational consultants and HPS administration to review the edit suggestions. These steps will culminate in revisions for a final document.

It should be noted that as a subset of Michigan’s Grade Level Content Expectations, the overall number of expectations identified as essential skills is smaller than the total articulated within the State’s course expectation documents. This is the intentional result of a process that asked teacher leaders to identify fundamental content expectations that require a higher degree of mastery than others included within the discipline. Expectations that were not considered fundamental to the success of all students are not included in this document, but may be found on the MDE web site at [http://www.michigan.gov/mde/0,1607,7-140-28753\\_33232---,00.html](http://www.michigan.gov/mde/0,1607,7-140-28753_33232---,00.html)






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## Quarter 1

Quarter 1						
Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . . .			42		
						
<b>Science Processes: Inquiry Process</b>					Through inquiry activities students will identify physical and chemical properties of substances. Students will also identify chemical changes. Students will construct written responses including a scientific claim, scientific evidence and reasoning to show their understanding of key concepts. Students will draw or make a model of a chemical reaction.	Scientific Claim Scientific Reasoning Scientific Evidence Scientific Principle Observation Scientific skepticism Scientific interpretation Atom Atomic arrangement compound physical change chemical change conservation of energy chemical properties of substances closed system chemical reaction molecules products reactants density boiling point conductivity periodic table of elements open system
S.IP.07.11	Generate scientific questions based on observations, investigations, and research.		Y			
S.IP.07.12	Design and conduct scientific investigations.		Y			
S.IP.07.13	Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, models, sieves, microscopes, hot plates, pH meters) appropriate to scientific investigations.		Y			
S.IP.07.14	Use metric measurement devices in an investigation.		Y			
S.IP.07.15	Construct charts and graphs from data and observations.		Y			
S.IP.07.16	Identify patterns in data.		Y			
<b>Science Processes: Inquiry Analysis and Communication</b>						
S.IA.07.11	Analyze information from data tables and graphs to answer scientific questions.		Y			
S.IA.07.12	Evaluate data, claims, and personal knowledge through collaborative science discourse.		Y			
S.IA.07.13	Communicate and defend findings of observations and investigations.		Y			
S.IA.07.14	Draw conclusions from sets of data from multiple trials of a scientific investigation to draw conclusions.		Y			
S.IA.07.15	Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.		Y			






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Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . . .			42		
						
<b>Science Processes: Reflection and Social Implications</b>						
S.RS.07.11	Evaluate the strengths and weaknesses of claims, arguments, and data.		Y			
S.RS.07.12	Describe limitations in personal and scientific knowledge.		Y			
S.RS.07.13	Identify the need for evidence in making scientific decisions.		Y			
S.RS.07.14	Evaluate scientific explanations based on current evidence and scientific principles.		Y			
S.RS.07.15	Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.		Y			
S.RS.07.16	Design solutions to problems using technology.		Y			
S.RS.07.17	Describe the effect humans and other organisms have on the balance of the natural world.		Y			
S.RS.07.18	Describe what science and technology can and cannot reasonably contribute to society.		Y			
S.RS.07.19	Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.		Y			






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Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . . .			42		
						
<b>Physical Science: Changes in Matter</b>						
P.PM.07.11	Classify substances by their chemical properties (flammability, pH, acid-base indicators, reactivity).	<ul style="list-style-type: none"> <li>Matter is made up of atoms and molecules that are represented through models</li> <li>Elements are chemical substances that make up all other substances</li> <li>Elements are composed of one kind of atom</li> <li>Elements are organized on the periodic table</li> <li>Physical and chemical properties identify substances and determine when a chemical change has occurred</li> <li>Compounds are composed of two or more elements</li> <li>Chemical changes occur when two elements and or compounds react and produce new substances</li> <li>Mass is conserved during chemical changes</li> </ul>	1	5		
P.PM.07.21	Identify the smallest component that makes up an element.		1	10		
P.PM.07.22	Describe how the elements within the Periodic Table are organized by similar properties into families (highly reactive metals, less reactive metals, highly reactive nonmetals, and some almost completely non-reactive gases).		1	6		






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Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . . .			42		
						
P.PM.07.24	List examples of physical and chemical properties of elements and compounds (boiling point, density, color, conductivity, reactivity).		1			
P.CM.07.21	Identify evidence of chemical change through color, gas formation, solid formation, and temperature change.		1	6		
P.CM.07.22	Compare and contrast the chemical properties of a new substance with the original after a chemical change.		1	8		
P.CM.07.23	Describe the physical properties and chemical properties of the products and reactants in a chemical change.		1	7		






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## Quarter 2

Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . .			45		
						
<b>Science Processes: Reflection and Social Implications</b>					Through inquiry activities students will grow and observe plants in order to draw conclusions about the life processes of plants. Students will use microscopes and other technology to identify cells and their organization and structure. Other assessments may include journals, quizzes, tests, and or labs.	Wavelength Seismic wave Wave Light energy Energy Vibration Matter Energy transfer Transform waves Transverse Waves Crest Trough Amplitude Frequency Medium Scientific claim Sound Wave Scientific evidence Pendulum Scientific reasoning cell cell growth tissue organ system cell division specialized cell organ photosynthesis asexual reproduction sexual reproduction unicellular organism
P.EN.07.31	Identify examples of waves, including sound waves, seismic waves, and waves on water.	<ul style="list-style-type: none"> <li>Waves have energy</li> <li>Waves transfer energy when they interact with matter</li> <li>Waves are produced through vibration</li> </ul>	2	5		
P.EN.07.32	Describe how waves are produced by vibrations in matter.		2	5		
P.EN.07.33	Demonstrate how waves transfer energy when they interact with matter (for example: tuning fork in water, waves hitting a beach, earthquake knocking over buildings).		2	5		
<b>Life Science: Organization of Living Things</b>						
L.OL.07.21	Recognize that all organisms are composed of cells (single cell organisms, multicellular organisms).	<ul style="list-style-type: none"> <li>All living things are composed of one or more cells</li> <li>Specialized cells within multicellular organisms form different kinds of tissues and organs and organ systems that function together</li> <li>Photosynthesis transfers light energy to chemical energy</li> <li>Photosynthesis builds key chemical blocks of living organisms</li> <li>All organisms must reproduce to continue the species</li> <li>Reproduction may be asexual or sexual</li> </ul>	2	4		
L.OL.07.22	Explain how cells make up different body tissues, organs, and organ systems.		2	4		
L.OL.07.23	Describe how cells in all multicellular organisms are specialized to take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or organism needs.		2	3		
L.OL.07.24	Recognize that cells function in a similar way in all organisms.		2	3		
L.OL.07.61	Recognize the need for light to provide energy for the production of carbohydrates, proteins and fats.		2	3		
L.OL.07.63	Describe evidence that plants make, use and store food.		2	3		






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	Students will . . . .			45				
								
P.EN.07.43	Explain how light energy is transferred to chemical energy through the process of photosynthesis.		2	3		multicellular organism carbon dioxide water carbohydrate protein fat food gene species species diversity egg cell sperm cell		
<b>Life Science: Heredity</b>								
L.HE.07.21	Compare how characteristics of living things are passed on through generations, both asexually and sexually.		2	4				
L.HE.07.22	Compare and contrast the advantages and disadvantages of sexual vs. asexual reproduction.		2	3				

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## Quarter 3

Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary	
	Students will . . . .			45			
							
<b>Life Science: Organization of Living Things</b>					Through inquiry activities students will grow and observe plants in order to draw conclusions about the life processes of plants. Students will use microscopes and other technology to identify cells and their organization and structure. Other assessments may include journals, quizzes, tests, and or labs.	cell cell growth tissue organ system cell division specialized cell organ photosynthesis asexual reproduction sexual reproduction unicellular organism multicellular organism carbon dioxide water carbohydrate protein fat food gene species species diversity egg cell sperm cell	
L.OL.07.21	Recognize that all organisms are composed of cells (single cell organisms, multicellular organisms).	<ul style="list-style-type: none"> <li>All living things are composed of one or more cells</li> <li>Specialized cells within multicellular organisms form different kinds of tissues and organs and organ systems that function together</li> <li>Photosynthesis transfers light energy to chemical energy</li> <li>Photosynthesis builds key chemical blocks of living organisms</li> <li>All organisms must reproduce to continue the species</li> <li>Reproduction may be asexual or sexual</li> </ul>	3	6			
L.OL.07.22	Explain how cells make up different body tissues, organs, and organ systems.		3	6			
L.OL.07.23	Describe how cells in all multicellular organisms are specialized to take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or organism needs.		3	3			
L.OL.07.24	Recognize that cells function in a similar way in all organisms.		3	3			
L.OL.07.61	Recognize the need for light to provide energy for the production of carbohydrates, proteins and fats.		3	6			
L.OL.07.63	Describe evidence that plants make, use and store food.		3	6			
P.EN.07.43	Explain how light energy is transferred to chemical energy through the process of photosynthesis.		3	6			
<b>Life Science: Heredity</b>							
L.HE.07.21	Compare how characteristics of living things are passed on through generations, both asexually and sexually.			3			4
L.HE.07.22	Compare and contrast the advantages and disadvantages of sexual vs. asexual reproduction.			3	5		








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## Quarter 4

Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . .			45		
						
<b>Earth Science: Earth Systems</b>					<p>Through inquiry activities students will draw and label the water cycle. Students will create a model showing how the sun warms the soil and water. They will design and conduct experiments demonstrating the sun's role in weather and climate. Students may also keep a journal, construct written explanations or take a written exam.</p>	<p>water cycle            atmospheric layers            water vapor            clouds            ocean currents            weather            frontal boundaries            warm front            transpiration            surface runoff            infiltration            water shed            air pressure            atmosphere            evaporation condensation            convection            wind            climate            cold front            air mass            precipitation            ground water            absorption            deforestation            barometric pressure            radiation            conduction            energy</p>
E.ES.07.11	Demonstrate, using a model or drawing, the relationship between the warming by the sun of the Earth and the water cycle as it applies to the atmosphere (evaporation, water vapor, warm air rising, cooling, condensation, clouds).	<ul style="list-style-type: none"> <li>The sun is the major source of energy for phenomenon on Earth</li> <li>The sun's warming relates to weather, climate, and the water cycle</li> <li>Human interaction and the use of natural resources affects the environment</li> <li>The Earth's atmosphere is a mixture of gasses and water vapor</li> </ul>	4	4		
E.ES.07.12	Describe the relationship between the warming of the atmosphere of the Earth by the sun and convection within the atmosphere and oceans.		4	5		
E.ES.07.13	Describe how the warming of the Earth by the sun produces winds and ocean currents.		4	5		
E.ES.07.41	Explain how human activities (surface mining, deforestation, overpopulation, construction and urban development, farming, dams, landfills, and restoring natural areas) change the surface of the Earth and affect the survival of organisms.		4	4		
E.ES.07.42	Describe the origins of pollution in the atmosphere, geosphere, and hydrosphere, (car exhaust, industrial emissions, acid rain, and natural sources), and how pollution impacts habitats, climatic change, threatens or endangers species.		4	4		
E.ES.07.72	Describe how different weather occurs due to the constant motion of the atmosphere from the energy of the sun reaching the surface of the Earth.		4	4		
E.ES.07.73	Explain how the temperature of the oceans affects the different climates on Earth because water in the oceans holds a large amount of heat.		4	5		

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## Quarter 4

Standard or GLCE #	Standard or GLCE Language	What this means:	Q	Lessons or Days	Examples of Formative Assessments	Vocabulary
	Students will . . . .			45		
						
E.ES.07.81	Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.		4	5		
E.ES.07.82	Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater.		4	4		
<b>Earth Science: Fluid Earth</b>						
E.FE.07.11	Describe the atmosphere as a mixture of gases.		4	4		