

Prentice Hall Conceptual Physics (Hewitt) © 2006
 Correlated to:
 Michigan Curriculum Framework Science Benchmarks
 (Grade 9-12)

MICHIGAN CURRICULUM FRAMEWORK SCIENCE BENCHMARKS	PAGE(S) WHERE TAUGHT (If submission is not a text, cite appropriate resource(s))
CONSTRUCTING NEW SCIENTIFIC KNOWLEDGE (C) I.1	
All students will ask questions that help them learn about the world:	
1. Ask questions that can be investigated empirically.	SE: 16, 38, 50, 57, 71, 84-85, 121, 125, 141, 157, 312, 330, 413, 435, 441, 471, 521, 536, 551, 564
	TE: T11-14
	TR: LM: 3, 8, 19; Probe ware LM: 3, 4, 6
	TECH: CD: IJ, www.phschool.com
All students will design and conduct investigations using appropriate methodology and technology:	
2. Design and conduct scientific investigations.	SE: 2-5, 110, 167, 200-201, 260-262, 471-473
	TE: T13-14
	TR: LM: 14, 22, 45, 46, 54, 66, 71, 75, 82, 89; Probe ware LM: 1, 5, 10, 13; Problem-Solving Exercises in Physics: 13-3
	TECH: CD: IJ, www.phschool.com
3. Recognize and explain the limitations of measuring devices.	SE: 167, 217, 294, 296, 310, 317, 393-394, 405-407, 492, 518, 645
	TR: LM: 4,5, 11, 17, 34, 37, 41, 42, 44, 46, 69; Probe ware LM: 1, 3, 12, 13
	TECH: CD: IJ; www.phschool.com
All students will learn from books and other sources of information:	
4. Gather and synthesize information from books and other sources of information.	SE: 393, 462, 471, 479, 480, 487, 493, 514
	TR: LM: 29, 34, 37, 45, 53; Concept-Development Practice Book in Physics: 2-1, 3-1, 5-3, 5-4, 9-3, 12-3
	TECH: CD: IJ, www.phschool.com
All students will communicate findings of investigations, using appropriate technology.	
5. Discuss topics in groups by making clear presentations, restating or summarizing what others have said, asking for clarification or elaboration, taking alternative perspectives, and defending a position.	SE: All Think and Explain questions, 55, 57, 80, 173, 177, 250, 281, 384, 473, 511, 537, 601, 602, 605, 606

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	TR: LM: 1, 12, 14, 27, 50, 85; Probe ware LM: 2, 3, 13
	TECH: CD: IJ, www.phschool.com
REFLECTING ON SCIENTIFIC KNOWLEDGE (R) II.1	
All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge:	
1. Justify plans or explanations on a theoretical or empirical basis.	SE: 84, 85, 395, 396, 404, 405, 421, 422
	TR: LM: 45, 57, 62, 76, 77, 84; Probe ware LM: 2, 10; Concept-Development Practice Book: 4-1,5-5,6-1, 11-1; Problem-Solving Exercises in Physics:4-1, 6-3, 9-1
	TECH: CD: IJ; www.phschool.com
2. Describe some general limitations of scientific knowledge.	SE: 212-214, 216-217, 219, 228-229, 236- 237, 244-245, 247-249, 364, 366, 391, 405, 597, 605-606
	TR: LM: 40; Probe ware LM: 3; Problem Solving Exercises in Physics: 1-2
	TECH: CD: IJ, www.phschool.com
All students will show how science is related to other ways of knowing:	
3. Show how common themes of science, mathematics, and technology apply in real-world contexts.	SE: 5, 22, 29-31, 37, 54, 136-139, 150, 168, 208, 432-434, 439, 455-457, 548-549, 637
	TR: LM: 4; Concept-Development Exercises in Physics: 1-1, 3-1, 5-1, 20-2
	TECH: CD: IJ, www.phschool.com
4. Discuss the historical development of key scientific concepts and principles	SE: 2, 43-48, 55, 168-179, 212, 236, 248, 300, 356, 361-363, 373, 404-407, 421, 480, 487-490, 598-606
	TECH: www.phschool.com
All students will show how science and technology affect our society:	
5. Explain the social and economic advantages and risks of new technology.	SE: 5-7, 39, 103, 118, 131-132, 192, 240, 335, 367, 393-394, 400, 495-406, 503, 569, 633
	TR: LM: 55, 56
	TECH: www.phschool.com

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6. Develop an awareness of and sensitivity to the natural world.	TECH: www.phschool.com
7. Describe the historical, political, and social factors affecting developments in science	SE: 2, 5, 43, 44, 55, 91-92, 118. 168-169, 170-174, 178-179, 192, 212, 236, 487, 490, 577, 590, 624-625
	TECH: www.phschool.com
USING LIFE SCIENCE KNOWLEDGE (III)	
CELLS (LC) III.1	
All students will apply an understanding of cells to the functioning of multicellular organisms, including how cells grow, develop and reproduce:	
1. Explain how multicellular organisms grow, based on how cells grow and reproduce.	NA
2. Compare and contrast ways in which selected cells are specialized to carry out particular life functions.	NA
ORGANIZATION OF LIVING THINGS (LO) III.2	
All students will use classification systems to describe groups of living things:	
1. Classify major groups of organisms to the kingdom level.	NA
All students will compare and contrast differences in the life cycles of living things:	
2. Describe the life cycle of an organism associated with human disease.	NA
All students will investigate and explain how living things obtain and use energy:	
3. Explain the process of food storage and food use in organisms.	NA
All students will analyze how parts of living things are adapted to carry out specific functions:	
4. Explain how living things maintain a stable internal environment.	NA
5. Describe technology used in the prevention, diagnosis, and treatment of diseases and explain its function in terms of human body processes.	NA

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HEREDITY (LH) III.3	
All students will investigate and explain how characteristics of living things are passed on through generations:	
1. Explain how characteristics of living things are passed on from generation to generation	NA
All students will explain why organisms within a species are different from one another:	
2. Describe how genetic material is passed from parent to young during sexual and asexual reproduction.	NA
All students will explain how new traits can be established by changing or manipulating genes:	
3. Explain how new traits may arise in individuals through changes in genetic material (DNA).	NA
EVOLUTION (LE) III.4	
All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species:	
1. Describe what biologists consider to be evidence for human evolutionary relationships among present and past life forms.	NA
All students will compare ways that living organisms are adapted (suited) to survive and reproduce in their environments and explain how species change through time:	
2. Explain how a new species or variety may originate through the evolutionary process of natural selection.	NA
ECOSYSTEMS (LEC) III.5	
All students will explain how parts of an ecosystem are related and how they interact:	
1. Describe common ecological relationships between and among species and their environments.	NA
All students will explain how energy is distributed to living things in an ecosystem:	
2. Explain how energy flows through familiar ecosystems.	NA

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All students will investigate and explain how communities of living things change over a period of time:	
3. Describe general factors regulating population size in ecosystems.	NA
4. Describe responses of an ecosystem to events that cause it to change.	NA
All students will describe how materials cycle through an ecosystem and get reused in the environment:	
5. Describe how carbon and soil nutrients cycle through selected ecosystems.	NA
6. Explain the effects of agriculture and urban development on selected ecosystems.	NA
USING PHYSICAL SCIENCE KNOWLEDGE (IV)	
Matter and Energy (PME) IV.1	
All students will measure and describe the things around us:	
1. Analyze properties of common household and agricultural materials in terms of risk/benefit balance.	NA
2. Identify properties of common families of elements.	SE: 244-245, 254
	TECH: www.phschool.com
All students will explain what the world around us is made of:	
3. Explain how elements differ, in terms of the structural parts and electrical charges of atoms.	SE: 244-245, 250-253
	TR: Concept-Development Practice Book: 17-1, 39-2, 40-1
	TECH: www.phschool.com
All students will explain how electricity (and magnetism; see PMO) interact with matter:	
4. Explain how current is controlled in simple series and parallel circuits.	SE: 531-544, 548-558

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	TR: LM: 87, 89, 90, 91, 92; Probe ware LM: 15; Concept-Development Practice Book: 35-1, 35-2; Problem Solving Exercises in Physics: 16-4
	TECH: CD: IJ –Circuits, www.phschool.com
5. Describe how electric currents can be produced by interacting wires and magnets, and explain applications of this principle.	SE: 562, 564-565, 568-569, 571, 577-582, 589-591
	TR: LM: 92, 93, 94, 95; Concept-Development Practice Book: 36-1, 37-1; Problem Solving Exercises in Physics: 17-1, 17-2
	TECH: CD: IJ-Electricity and Magnetism, www.phschool.com
Changes in Matter (PCM) IV.2	
All students will explain how visible changes in matter are related to atoms and molecules:	
1. Explain chemical changes in terms of the breaking of bonds and the rearrangement of atoms to form new substances.	NA
2. Explain why mass is conserved in physical and chemical changes.	NA
3. Contrast nuclear fission, nuclear fusion, and natural radioactivity.	SE: 235-237, 609-611, 615-622, 629-642
	TR: LM: 98, 99; Concept-Development Practice Book: 39-1, 39-2, 40-1; Problem Solving Exercises in Physics: 18-4
	TECH: www.phschool.com
All students will explain how changes in matter are related to changes in energy and how living things and human technology change matter and transform energy.	
4. Describe energy transformations involved in physical, chemical and nuclear changes, and contrast their relative magnitudes.	SE: 193-195, 236-237, 617-619, 636-639
	TECH: www.phschool.com

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5. Explain changes in matter and energy involving heat transfer.	SE: 307, 309, 315-317, 320-321, 325-334, 335-336
	TR: LM: 49, 50, 51, 53; Probe ware LM: 10, 11, 12; Concept Development Practice Book: 21-1, 21-2, 22-2, 23-1, 23-2
	TECH: CD: IJ-Thermodynamics, www.phschool.com
Motion of Objects (PMO) IV.3	
All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects:	
1. Analyze patterns of force and motion in the operation of complex machines.	SE: 11-24, 33-39, 111-117, 123-132, 199-206
	TR: LM 2, 3, 4, 5, 6, 7, 21; Probe ware LM: 1, 2, 3, 6, 9, 13 Concept-Development Practice Book: 8-1
	TECH: CD: IJ-Mechanics, www.phschool.com
All students will relate motion to energy and energy conversions:	
2. Explain energy conversions in moving objects and machines.	SE: 103-118, 347-350, 355-357, 358, 360, 363
	TR: LM: 25, 25; Probe ware LM: 8; Concept Development Practice Book: 8-2: Problem Solving Exercises in Physics: 5-2, 5-3
	TECH: CD: IJ-Energy, www.phschool.com
Waves and Vibrations (PWV) IV.4	
All students will describe sounds and sound waves:	
1. Relate characteristics of sounds that we hear to properties of sound waves.	SE: 372-377, 382-386, 390-400
	TR: LM: 66, 67, 74,75, 76, 77, 84, 85; Concept Development Practice Book: 25-2, 26-1
	TECH: CD: IJ-Vibrations and Waves, www.phschool.com
All students will explain shadows, color, and other light phenomena:	
2. Explain how we see colors of objects	SE: 408-409, 412-413, 421-438

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	TR: LM: 73, 85; Concept Development Practice Book: 28-1
	TECH: CD: IJ-Light & Optics, www.phschool.com
All students will measure and describe vibrations and waves:	
3. Describe waves in terms of their properties.	SE: 373-386, 391-398, 405-407, 443-444, 447-454
	TR: LM: 66, 67; Concept-Development Practice Book: 25-1, 27-1; Problem Solving Exercises in Physics: 12-1, 12-3
	TECH: CD: IJ-Light and Optics, www.phschool.com
4. Describe different types of waves and their technological applications.	SE: 374, 378, 393, 414-417, 471-473
	TR: LM: 72, 74, 77, 79
	TECH: CD: IJ-Vibrations and Waves, www.phschool.com
Using Earth Science Knowledge (V)	
Geosphere (EG) V.1	
All students will describe and explain how the earth's features change over time:	
1. Explain the surface features of the Great Lakes region using Ice Age theory.	NA
2. Use the plate tectonics theory to explain features of the earth's surface and geological phenomena and describe evidence for the plate tectonics theory.	NA
All students will analyze effects of technology on the earth's surface and resources:	
3. Explain how common objects are made from earth materials and why earth materials are conserved and recycled.	NA
4. Evaluate alternative long range plans for resource use and by-product disposal in terms of environmental and economic impact.	NA

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Hydrosphere (EH) V.2	
All students will describe how water moves:	
1. Identify and describe regional watersheds.	NA
All students will analyze the interaction of human activities with the hydrosphere:	
2. Describe how human activities affect the quality of water in the hydrosphere.	NA
Atmosphere and Weather (EAW) V.3	
All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time:	
1. Explain how interactions of the atmosphere, hydrosphere and geosphere create climates and how climates change over time.	NA
All students will explain what causes different kinds of weather:	
2. Describe patterns of air movement in the atmosphere and how they affect weather conditions.	NA
3. Explain and predict general weather patterns and storms.	NA
All students will analyze the relationships between human activities and the atmosphere:	
4. Explain the impact of human activities on the atmosphere and explain ways that individuals and society can reduce pollution.	NA
Solar System, Galaxy and Universe (ES) V.4	
All students will compare and contrast our planet and sun to other planets and star systems.	
1. Compare our sun to other stars.	SE: 193-195
All students will describe and explain how objects in the solar system move.	
2. Describe the position and motion of our solar system in our galaxy and the overall scale, structure and age of the universe.	SE: 177-179, 207-209
	TECH: www.phschool.com

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All students will explain scientific theories as to the origin of the solar system.	
3. Explain how stars and planetary systems form and how stars produce energy.	NA
All students will explain how we learn about the universe.	
4. Explain how technology and scientific inquiry have helped us learn about the universe.	SE: 209
	TECH: www.phschool.com