

Constructing New Scientific Knowledge (C) I.1

All students will ask questions that help them learn about the world:

UNIT TITLE	CORE TOPICS (Key Concepts & Real World Contexts)	UNIT BENCHMARKS	SUGGESTED ASSESSMENT	POSSIBLE RESOURCES
WHAT IS SCIENCE?	<p>KC: Questions often build on existing knowledge.</p> <p>RWC: Any in the sections on Using Scientific Knowledge.</p>	<p>I.1.HS.1: Ask questions that can be investigated empirically.</p>		

All students will design and conduct investigations using appropriate methodology and technology:

	<p>KC: Types of scientific knowledge—hypothesis, theory, observation, conclusion, law, data, generalization. Aspects of field research—hypothesis, design, observations, samples, analysis, conclusion. Aspects of experimental research—hypothesis, design, variable, experimental group, control group, prediction, analysis, conclusion. Investigations are based on questions about the world (see C h-1).</p> <p>RWC: Any suggested in Using Scientific Knowledge benchmarks for which students would design and/or conduct investigations.</p> <p>KC: Uncertainty, error, range, tolerances, accuracy, precision.</p> <p>RWC: Designing an experiment that uses quantitative data.</p>	<p>I.1.HS.2: Design and conduct scientific investigations.</p> <p>I.1.HS.3: Recognize and explain the limitations of measuring devices.</p>		<p>Balance, thermometer, measuring tape, ruler, graduated cylinder, measuring devices.</p>
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All students will learn from books and other sources of information:

WHAT IS SCIENCE?	<p>KC: Scientific journals, text- and computer-based reference materials.</p> <p>RWC: Libraries, technical reference books, Internet, computer software.</p>	<p>I.1.HS.4: Gather and synthesize information from books and other sources of information.</p>		
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All students will communicate findings of investigations, using appropriate technology:

	<p>KC: Logical argument, summary, clarification, elaboration, alternative perspectives.</p> <p>RWC: Newspaper or magazine articles discussing a topic of social concern.</p>	<p>I.1.HS.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.</p>		
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Reflecting on Scientific Knowledge (R)

All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge:

UNIT TITLE	CORE TOPICS (Key Concepts & Real World Contexts)	UNIT BENCHMARKS	SUGGESTED ASSESSMENT	POSSIBLE RESOURCES
WHAT IS SCIENCE?	<p>KC: Aspects of logical argument, including evidence, fact, opinion, assumptions, claims, conclusions, observations. RWC: Any in the sections on Using Scientific Knowledge.</p> <p>KC: Understanding of the general limits of science and scientific knowledge as constantly developing human enterprises; recognizing that arguments can have emotive, economic, and political dimensions as well as scientific. RWC: Any in the sections on Using Scientific Knowledge.</p>	<p>II.1.HS.1: Justify plans or explanations on a theoretical or empirical basis.</p> <p>II.1.HS.2: Describe some general limitations of scientific knowledge.</p>		
All students will show how science is related to other ways of knowing:				
	<p>Thematic ideas: Systems-subsystems, feedback models, mathematical constancy, scale, conservation, structure, function, adaptation. RWC: Any in the sections on Using Scientific Knowledge.</p> <p>KC: Historical, political, social, and economic factors influencing the development of science. See <i>Benchmarks for Science Literacy</i>, AAAS, Chapter 10. RWC: Historical development of key scientific theories.</p>	<p>II.1.HS.3: Show how common themes of science, mathematics, and technology apply in real-world contexts.</p> <p>II.1.HS.4: Discuss the historical development of key scientific concepts and principles.</p>		
All students will show how science and technology affect our society:				
WHAT IS SCIENCE?	<p>KC: Cost-benefit analysis; See LO h-5 (health technology), PME h-1 (household and agricultural materials), EG h-4 (resource use), LEC h-6 (effects of urban development and agriculture on ecosystems), EAW h-4 (air pollution), EH h-2 (water pollution). RWC: Issues related to new technologies, including ones in health-care, transportation, communications, manufacturing, information and media.</p>	<p>II.1.HS.5: Explain the social and economic advantages and risks of new technology.</p>		

Science

High School

UNIT TITLE	CORE TOPICS (Key Concepts & Real World Contexts)	UNIT BENCHMARKS	SUGGESTED ASSESSMENT	POSSIBLE RESOURCES
	<p>KC: Appreciation of the balance of nature and the effects organisms have on each other, including the effects humans have on the natural world.</p> <p>RWC: Any in the sections on Using Scientific Knowledge appropriate to high school.</p>	<p>II.1.HS.6: Develop an awareness of and sensitivity to the natural world.</p>		
<p>All students will show how people of diverse cultures have contributed to and influenced developments in science:</p>				
	<p>KC: Historical, political, social, and economic factors influencing the development of science.</p> <p>RWC: The development of the sun-centered model of the solar system and political pressures on Galileo; the development of Darwin's theory of evolution by natural selection.</p>	<p>II.1.HS.7: Describe the historical, political, and social factors affecting developments in science.</p>		