APPENDIX I

Issues, Evidence and You and the National Science Education Standards

GRADES 5–8

As a complete course, *Issues, Evidence and You (IEY)* provides approximately one school year of science instruction. To help you evaluate course content, *IEY* activities have been correlated to the *National Science Education Standards* produced by the National Research Council in 1996.

The *National Science Education Standards* are divided into three levels: K–4, 5–8, and 9–12. The 5–8 standards are intended to cover the middle-level course of study. Because *IEY* provides one year of early secondary science instruction and not four, it addresses some, but not all, of the standards. You can use other instructional materials, including additional materials from SEPUP, to address the 5–8 standards in their entirety.

As a set, the National Science Education Standards for grades 5–8 include individual standards for:

- Science as Inquiry
- Physical Science
- Science and Technology in Society
- Science in Personal and Social Perspectives
- History and Nature of Science
- Life Science

IEY activities support the content of all of these standards except for Life Science. To see how SEPUP materials support the Life Science standard, please consult the Teacher's Guide for *Science and Life Issues (SALI),* the SEPUP middle-level Life Science program, Appendix I.

Because of the spiral nature of the *IEY* curriculum, a specific activity may not address all aspects of a standard. However, all of the activities correlated to a particular standard work together to develop student understanding and mastery of the identified content. For more information on the content of a specific activity, consult the Megamodule Overviews in the introduction to this Teacher's Guide. To see how *IEY* activities correlate to selected state science frameworks, visit www.sepup.com.

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A. SCIENCE AS INQUIRY

Abilities Necessary to Do Scientific Inquiry		
	Identify questions that can be answered through scientific investigation	All activities
	Design and conduct a scientific investigation	A1–2, A6–9, A11–A12, A18, B1–2, B7, B10, B16, C1–2, C9–10, D4, D6
	Use appropriate tools and techniques to gather, analyze and interpret data	A1–2, A6–9, A11, A12, A18, B1–2, B7, B10, B16, C1–2, C9–10, D4, D6
	Develop descriptions, explanations, predictions, and models using evidence	A8, A13, A17, A21, B8, C4, D1, D6
	Find relationships	A1–2, A6–9, A11, A12, A18, B1–2, B7, B10, B16, C1–2, C9–10, D4, D6
	Communicate scientific procedures and explanations	A6, A7, A21, B6, B18, C11, D6
	Use mathematics in all aspects of scientific inquiry	A3, A10, A17, A19, B11, C6, D4
Understandings about Scientific Inquiry		
	Different kinds of questions require different kinds of scientific investigations	A1, A5, A13, B2, C5, C9
	Different scientific domains have different approaches to scientific study	A5, A13, B2, C5, C9
	Mathematics is important to scientific inquiry	A3, A9, A17, A18, A3, B10, C3, C7, C11
	Technology can be used to gather data more accurately and to analyze and quantify results	B2, B17, B18, C9, C10, C11, D4, D6
	Scientific explanations emphasize evidence and are accepted until displaced by better ones	A4, A5, A7, A13, B4, B14, C2, C3, C4
	Science advances through skepticism and debate	A4, A5, A7, A13, B4, B14, C2, C3, C4
	Scientific investigations may lead to new ideas or investigations	A4, A5, A7, A13, B4, B14, C2, C3, C4

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B. PHYSICAL SCIENCE

Properties and Changes of Properties in Matter		
	Substances have characteristic properties which are independent of the amount of the sample	A3, A8, A10, B3, B4, B5, B7, B8–9, B15–16
	Substances react chemically in characteristic ways with other substances to form new substances	A8–11, B3, B7, B15–16
	Chemical elements do not break down down during normal laboratory reactions	A8–11, B15–16
Motion and Forces		
	The motion of an object can be described by its position, direction of motion, and speed	N/C
	An object not subjected to a force will continue to move at a constant speed	N/C
	If more than one force acts on an object object along a straight line, then the forces will reinforce or cancel one another	N/C
Transfer of Energy		
	Energy is a property of many substances	C1, C2, C3, C4, C7
	Heat moves in predictable ways	C2, C3
	Light interacts with matter by transmission, absorption, or scattering	C10
	Electric circuits provide a means of transferring electrical energy	C5, C7
	In most chemical and nuclear reactions, energy is transferred into or out of a system	C8
	The sun is a major source of energy for changes on the earth's surface	C9, C10

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C. SCIENCE AND TECHNOLOGY

Abilities of Technological Design		
	Identify appropriate problems for technological design	A4–5, A7, A18
	Design a solution or product	A7, A19, A21, B10, B18, C11, D6
	Implement a proposed design	A7, A19, A21, B10, B18, C11, D6
	Evaluate completed technological designs or products	A5, A7, A13, A21, B6, B10, B12, B14, B16, C4, C6, C7, C11, D6
	Communicate the process of technological design	A6, A7, A21, B6, B18, C11, D6
Understandings about Science and Technology		
	Scientific inquiry and technological design have similarities and differences	A4–5, A18, A21, B3–5, B13–14, B18, C4, C7, C9, C10, D3–4, D6
	Different people in different cultures have made and continue to make contributions to science and technology	N/C
	Science and technology are reciprocal	A4–5, A18, A21, B3–5, B13–14, B18, C4, C7, C9, C10, D3–4, D6
	All technological solutions have associated trade-offs and risks	A13, A20, B5, B6, B10, B14, C5, C6, C8, C11, D6
	Technological designs have constraints	A13, A20, B5, B6, B10, B14, C5, C6, C8, C11, D6

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D. SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

Personal Health		
	Regular exercise is important to the maintenance and improvement of health	N/C (See SALI)
	Injury prevention can reduce the potential for accidents	N/C (See SALI)
	The use of tobacco increases the risk of illness	N/C (See SALI)
	Alcohol and other drugs are often-abused substances that can change how the body functions	N/C (See SALI)
	Food provides energy and nutrients for growth and development	N/C (See SALI)
	Sex, a natural human function, can be a means of transmitting disease	N/C (See SALI)
	Natural environments may contain substances that are harmful to humans	A4, A5, A7
Populations, Resources, and Environments		
	When an area becomes overpopulated, the environment will become degraded due to increased use of resources	D7
	Causes of environmental degradation and resource depletion vary	A21, C9, D6, D7
Natural Hazards		
	Natural hazards can change or destroy habitats, damage property, and harm or kill humans	A16, A17
	Human activities can also induce hazards or accelerate the speed of natural changes	A17
	Addressing natural hazards presents personal and societal challenges	A20

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D. SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES, *continued*

Risks and Benefits		
	Risk analysis can be used to determine the options for reducing or eliminating risk	A6, A7, A14, A20, B10, B16, B17, D6
	Risks may be associated with natural, chemical, biological, social, or personal hazards	A6, A7, A14, A20, B10, B16, B17, D6
	Individuals can use a systematic approach to analyzing risks and benefits	A6, A7, A14, A20, B10, B16, B17, D6
	Important personal and social decisions are made based on perceptions of benefits and risks	A6, A7, A14, A20, B10, B16, B17, D6
Science and Technology in Society		
	Science influences how society thinks about itself and the environment	A20, B10, B18, C11
	Societal challenges often inspire scientific research and influence funding decisions	A5, A7, A20, B5, B18, D1
	Technology influences society through its products and processes	B6, B7, C9, C10
	Science and technology have advanced through contributions of many different people	B13, B15, B18, D1
	Scientists and engineers work in many different settings	A5, A14, B2, B10, C11
	Prior knowledge and consent are required for research involving human subjects or potential damage to property	N/C
	Science cannot answer all questions and technology cannot solve all human problems or meet all human needs	A20, B18, C11, C12, D6, D7

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E. HISTORY AND NATURE OF SCIENCE

Science as a Human Endeavor		
	A diversity of people work, either cooperatively or individually, in science and related fields	A4, A5, B2, C12
	Science requires different abilities, depending on the field of study and type of inquiry	A4, A5, A20, B2, B16, C9
Nature of Science		
	Scientists formulate and test explanations of nature using observations, experiments, and models	A2, A4–5, A6–13, B3–B5, B7, B9, B14–16, C2–C4, C8, C10, D3, D4
	In areas of scientific research, scientists may disagree and produce conflicting explanations	A4, A5, A20, B6, B10, D6
	Scientific inquiry involves evaluating and reviewing scientific ideas and processes	A2, A4–5, A6–13, B3–B5, B7, B9, B14–16, C2–C4, C8, C10, D3, D4
History of Science		
	Many individuals have contributed to the traditions of science	A4, A5, B2, B4, B7, C2, C3
	Throughout its history, science has been practiced by different individuals in different cultures	A4, A5, B4, B15
	Tracing the history of science can show changes in scientific ideas over time	A4, A5, B15, C2, C3, C4

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