State Curriculum - Biology

Pre-requisites Summarized from State Curriculum Skills & Processes Grades 3 – 8	Skills & Processes State Curriculum (SC)	
	Expectation 1.1: The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	**Supplemental Topics**
C. Communicating Scientific Information (Grades 6 – 8) 1. **Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.** c. Give examples of how scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way. d. Criticize the reasoning in arguments in which • fact and opinion are intermingled • Conclusions do not follow logically from the evidence given. • Existence of control groups and the relationship to experimental groups is not made obvious. • Samples are too small, biased, or not representative. f. Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions. g. Recognize that important contributions to the advancement of science, mathematics, and technology have been made by different kinds of people, in different cultures, at different times.	**Indicator 1: The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.** **Objectives** ¾ Recognize a life science issue or problem. ¾ Explain the reasons for an issue or problem. ¾ Describe reasons for controversy related to the issue or problem. ¾ Identify and explain the scientific facts and principles that can be used to solve a problem in science. ¾ Describe solutions to the issue or problem based on evidence.	**Problems and Solutions** Develop, implement, and evaluate an action plan to solve a local issue or problem.
	Indicator 2: The student will modify or affirm scientific ideas according to accumulated evidence. **Objectives** ¾ Collect evidence from various sources to support both sides of an issue or problem. ¾ Recognize authentic sources of data. ¾ Analyze data from investigations to support an idea, issue, or problem.	**Affirm Ideas** Select and defend data that supports ideas, issues, or solutions to problems. Access and process information from print and non-print sources. Verify prior understanding based on analysis of new information.
	Indicator 3: The student will critique arguments that are based on faulty, misleading data or on the incomplete use of numbers. **Objectives** ¾ Identify faulty, incomplete, and/or misleading data. ¾ Explain, through the use of supporting evidence, reasons for faulty or incomplete use of numbers and/or data. ¾ Refute ideas or solutions to problems based on faulty or incomplete data. ¾ Suggest methods to produce appropriate data.	**Critique Arguments** Modify prior understanding based on analysis of new information.

NTB Denotes an indicator not tested on the Biology assessment.

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	Expectation 1.1: The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	**Supplemental Topics**
	Indicator 4: The student will recognize data that are biased. **Objectives** ¾ Identify biased data. - Advertising - Laboratory procedures - Tables and graphs ¾ Recognize sources of biased data.	**Biased Data**
	Indicator 5: The student will explain factors that produce biased data. **Objectives** ¾ Identify factors that produce biased data. ¾ Explain how data can become biased.	**Producing Biased Data** Explain how data can be manipulated during investigations. - Experimental procedures - Display of data - Inappropriate inferences and conclusions Explain reasons for the manipulation of data. - Scientific - Economic

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Pre-requisites Summarized from State Curriculum Skills & Processes Grades 3 – 8	Skills & Processes State Curriculum (SC)	
	Expectation 1.2: The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	**Supplemental Topics**
A. Constructing Knowledge (Grades 3 – 5) 1. **Gather and question data from many different forms of scientific investigations which include reviewing appropriate print resources, observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.** a. Support investigative findings with data found in books, articles, and databases, and identify the sources used and expect others to do the same. b. Select and use appropriate tools: hand lens or microscope (magnifiers), centimeter ruler (length), spring scale (weight), balance (mass), Celsius thermometer (temperature), graduated cylinder (liquid volume), and stopwatch (elapsed time) to augment observations of objects, events, and processes. c. Explain that comparisons of data might not be fair because some conditions are not kept the same. d. Recognize that the results of scientific investigations are seldom exactly the same, and when the differences are large, it is important to try to figure out why. e. Follow directions carefully and keep accurate records of one's work in order to compare data gathered. f. Identify possible reasons for differences in results from investigations including unexpected differences in the methods used or in the circumstances in which the investigation is carried out, and sometimes just because of uncertainties in observations. g. Judge whether measurements and computations of quantities are reasonable in a familiar context by comparing them to typical values when measured to the nearest: - Millimeter - length - Square centimeter - area - Milliliter - volume - Newton - weight - Gram - mass - Second - time - Degree Celsius (C°) - temperature	**Indicator 1: The student will identify meaningful, answerable scientific questions.** **Objectives** ¾ Identify a testable question. ¾ Identify a testable question to address a problem or issue in science.	**Testable Scientific Questions** Recognize that scientific questions come from ○ prior knowledge ○ observations ○ background research ○ results from a laboratory investigation
	NTB **Indicator 2: The student will pose meaningful answerable scientific questions.** **Objectives** ¾ Pose a testable question. ¾ Pose a testable question to address a problem or issue in science.	**Posing Scientific Questions** Develop an investigative question based on ○ prior knowledge ○ observations ○ background research ○ results from a laboratory investigation
	Indicator 3: The student will formulate a working hypothesis. **Objectives** ¾ Recognize and describe a testable hypothesis. ¾ Develop a hypothesis to address the outcome of a problem or issue in science.	**Hypothesis Formation** Recognize and describe the hypothesis in a scientific investigation. Evaluate the scientific validity of the collected print and non-print resources related to the problem or question being researched Recognize and explain how scientifically accurate print and non-print resources can support the development of a working hypothesis

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