

Grade Level Content Expectations
Correlations to Stream Leaders Water Quality Monitoring Program
Middle School

Sixth Grade

Inquiry Process

K-7 Standard S.IP: *Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.*

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

S.IP.06.11 Generate scientific questions based on observations, investigations, and research.

S.IP.06.12 Design and conduct scientific investigations.

S.IP.06.13 Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, models, sieves, microscopes) appropriate to scientific investigations.

S.IP.06.14 Use metric measurement devices in an investigation.

S.IP.06.15 Construct charts and graphs from data and observations.

S.IP.06.16 Identify patterns in data.

Inquiry Analysis and Communication

K-7 Standard S.IA: *Develop an understanding that scientific inquiry and investigations require analysis and communication of findings, using appropriate technology.*

S.IA.M.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

S.IA.06.11 Analyze information from data tables and graphs to answer scientific questions.

S.IA.06.12 Evaluate data, claims, and personal knowledge through collaborative science discourse.

S.IA.06.13 Communicate and defend findings of observations and investigations using evidence.

S.IA.06.14 Draw conclusions from sets of data from multiple trials of a scientific investigation.

S.IA.06.15 Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.

Reflection and Social Implications

K-7 Standard S.RS: *Develop an understanding that claims and evidence for their scientific merit should be analyzed. Understand how scientists decide what constitutes scientific knowledge. Develop an understanding of the importance of reflection on*

scientific knowledge and its application to new situations to better understand the role of science in society and technology.

S.RS.M.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision-making and the application of science throughout history and within society.

S.RS.06.11 Evaluate the strengths and weaknesses of claims, arguments, and data.

S.RS.06.12 Describe limitations in personal and scientific knowledge.

S.RS.06.13 Identify the need for evidence in making scientific decisions.

S.RS.06.14 Evaluate scientific explanations based on current evidence and scientific principles.

S.RS.06.15 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities. .

S.RS.06.17 Describe the effect humans and other organisms have on the balance of the natural world.

Ecosystems

K-7 Standard L.EC: *Develop an understanding of the interdependence of the variety of populations, communities and ecosystems, including those in the Great Lakes region. Develop an understanding of different types of interdependence and that biotic (living) and abiotic (non-living) factors affect the balance of an ecosystem. Understand that all organisms cause changes, some detrimental and others beneficial, in the environment where they live.*

L.EC.M.1 Interactions of Organisms- Organisms of one species form a population. Populations of different organisms interact and form communities. Living communities and nonliving factors that interact with them form ecosystems.

L.EC.06.11 Identify and describe examples of populations, communities, and ecosystems including the Great Lakes region. *

L.EC.M.3 Biotic and Abiotic Factors- The number of organisms and populations an ecosystem can support depends on the biotic (living) resources available and abiotic (nonliving) factors, such as quality of light and water, range of temperatures, and soil composition.

L.EC.06.31 Identify the living (biotic) and nonliving (abiotic) components of an ecosystem.

L.EC.06.32 Identify the factors in an ecosystem that influence changes in population size.

L.EC.M.4 Environmental Impact of Organisms- All organisms (including humans) cause change in the environment where they live. Some of the changes are harmful to the organism or other organisms, whereas others are helpful.

L.EC.06.41 Describe how human beings are part of the ecosystem of the Earth and that human activity can purposefully, or accidentally, alter the balance in ecosystems.

L.EC.06.42 Predict possible consequences of overpopulation of organisms, including humans, (for example: species extinction, resource

Seventh Grade

Inquiry Process

K-7 Standard S.IP: *Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.*

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

S.IP.07.11 Generate scientific questions based on observations, investigations, and research.

S.IP.07.12 Design and conduct scientific investigations.

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.

S.IP.07.14 Use metric measurement devices in an investigation.

S.IP.07.15 Construct charts and graphs from data and observations.

S.IP.07.16 Identify patterns in data.

Inquiry Analysis and Communication

K-7 Standard S.IA: *Develop an understanding that scientific inquiry and investigations require analysis and communication of findings, using appropriate technology.*

S.IA.M.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

S.IA.07.11 Analyze information from data tables and graphs to answer scientific questions.

S.IA.07.12 Evaluate data, claims, and personal knowledge through collaborative science discourse.

S.IA.17.13 Communicate and defend findings of observations and investigations.

S.IA.07.14 Draw conclusions from sets of data from multiple trials of a scientific investigation to draw conclusions.

S.IA.07.15 Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.

Reflection and Social Implications

K-7 Standard S.RS: *Develop an understanding that claims and evidence for their scientific merit should be analyzed. Understand how scientists decide what constitutes scientific knowledge. Develop an understanding of the importance of reflection on scientific knowledge and its application to new situations to better understand the role of science in society and technology.*

S.RS.M.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision-making and the application of science throughout history and within society.

S.RS.07.11 Evaluate the strengths and weaknesses of claims, arguments, and data.

S.RS.07.12 Describe limitations in personal and scientific knowledge.

S.RS.07.13 Identify the need for evidence in making scientific decisions.

S.RS.07.14 Evaluate scientific explanations based on current evidence and scientific principles.

S.RS.07.15 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.

S.RS.07.16 Design solutions to problems using technology.

S.RS.07.17 Describe the effect humans and other organisms have on the balance of the natural world.

S.RS.07.18 Describe what science and technology

Earth Systems

E.ES.M.4 Human Consequences- Human activities have changed the land, oceans, and atmosphere of the Earth resulting in the reduction of the number and variety of wild plants and animals, sometimes causing extinction of species.

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.

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.

K-7 Standard E.ES: Develop an understanding of the warming of the Earth by the sun as the major source of energy for

phenomenon on Earth and how the sun's warming relates to weather, climate, seasons, and the water cycle. Understand how human interaction and use of natural resources affects the environment.

E.ES.M.8 Water Cycle- Water circulates through the four spheres of the Earth in what is known as the “water cycle.”

E.ES.07.82 Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater.

Grade Level Content Expectations
Correlations to Stream Leaders Water Quality Monitoring Program
High School

HIGH SCHOOL SCIENCE CONTENT EXPECTATIONS / EARTH SCIENCE

E1.1 Scientific Inquiry

- E1.1A Generate new questions that can be investigated in the laboratory or field.
- E1.1B Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions.
- E1.1C Conduct scientific investigations using appropriate tools and techniques (e.g., selecting an instrument that measures the desired quantity—length, volume, weight, time interval, temperature—with the appropriate level of precision).
- E1.1D Identify patterns in data and relate them to theoretical models.
- E1.1E Describe a reason for a given conclusion using evidence from an investigation.

E1.2 Scientific Reflection and Social Implications

- E1.2A Critique whether or not specific questions can be answered through scientific investigations.
- E1.2B Identify and critique arguments about personal or societal issues based on scientific evidence.
- E1.2C Develop an understanding of a scientific concept by accessing information from multiple sources.
Evaluate the scientific accuracy and significance of the information.
- E1.2D Evaluate scientific explanations in a peer review process or discussion format.
- E1.2E Evaluate the future career and occupational prospects of science fields.

E2.4 Resources and Human Impacts on Earth Systems

- E2.4B Explain how the impact of human activities on the environment (e.g., deforestation, air pollution, coral reef destruction) can be understood through the analysis of interactions between the four Earth systems.

E4.1 Hydrogeology

- E4.1A Compare and contrast surface water systems (lakes, rivers, streams, wetlands) and groundwater in regard to

their relative sizes as Earth's freshwater reservoirs and the dynamics of water movement (inputs and outputs, residence times, sustainability).

E4.1B Explain the features and processes of groundwater systems and how the sustainability of North American aquifers has changed in recent history (e.g., the past 100 years) qualitatively using the concepts of recharge, residence time, inputs, and outputs.

E4.1C Explain how water quality in both groundwater and surface systems is impacted by land use decisions.

HIGH SCHOOL SCIENCE CONTENT EXPECTATIONS / BIOLOGY

B1.1 Scientific Inquiry

B1.1A Generate new questions that can be investigated in the laboratory or field.

B1.1B Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions.

B1.1C Conduct scientific investigations using appropriate tools and techniques

B1.1D Identify patterns in data and relate them to theoretical models.

B1.1E Describe a reason for a given conclusion using evidence from an investigation.

B1.2 Scientific Reflection and Social Implications

B1.2A Critique whether or not specific questions can be answered through scientific investigations.

B1.2B Identify and critique arguments about personal or societal issues based on scientific evidence.

B1.2C Develop an understanding of a scientific concept by accessing information from multiple sources. Evaluate the scientific accuracy and significance of the information.

B1.2D Evaluate scientific explanations in a peer review process or discussion format.

B1.2E Evaluate the future career and occupational prospects of science fields.

B3.4 Changes in Ecosystems

B3.4A Describe ecosystem stability. Understand that if a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages of succession that eventually result in a system similar to the original one.

B3.4B Recognize and describe that a great diversity of species increases the chance that at least some living organisms will survive in the face of cataclysmic changes in the environment.

B3.4C Examine the negative impact of human activities.