PART III

MAINE LEARNING RESULTS
Applicable to the Lamoine Water Curriculum

M. Classifying Life Forms

Pre k-2

#1 Identify the differences between living and non-living things

Grades 3-4

#3 Describe the different living things within a habitat

Grades 5-8

#3 Describe some structural and behavioral adaptations that allow organisms to survive in a changing habitat

Secondary Grades

#3 Analyze the basic characteristics of living things, including their need for food water, and gases and the ability to reproduce.

B. Ecology

Pre k-2

#1 Identify ways that living things depend on their environment

#3 Give examples of how one change in a system affects other pats of the system

#5 Describe a familiar local environment

Grades 3-4

#4 Investigate the connection between major living and non-living components of a local ecosystem.

Grades 5-8

#2 Analyze how the finite resources in an ecosystem limit the types and populations of organisms within it.

#3 Describe succession and other ways that ecosystems can change over time.

#5 Describe various mechanisms found in the natural world for transporting living and non-living matter and the results of such movements.

Secondary Grades

#1 Illustrate the cycles of matter in the environment and explain their interrelationships

#3 Analyze the factors that effect population size

#4 Analyze the impact of human and other activities on the type and pace of change in the ecosystem

N. Continuity and Change

Pre k-2

#2 Identify characteristics that help organisms live in their environment

Grades 3-4

#3 Explain how adaptations, in response to change over time, may increase a species' chance of survival

Grades 5-8

#3 Provide examples of natural and artificial selection and its role in species changes over time

Secondary Grades

#3 Explain and document the importance of relatively short term changes(i.e., one generation) on a species survival

E. Structure of Matter

Pre K-2

NONE

Grades 3-4

#1 Describe how the physical properties of objects sometimes change when one object chemically combines with a nother

#2 Explaine how matter changes in both chemical and physical ways

Grades 5-8

#1 Predict and test whether objects will float or sink based on qualitative and quantitative understanding of the concepts of density and buoyancy

#2 Describe the evidence that all matter is made up of particles called atoms that are made up of certain smaller particles

Secondary Grades

#4 Describe an application of the Law of Conservation of Matter

#5 Describe how atoms are joined by chemical bonding

#6 Compare the physical and chemical characteristics of elements

O. The Earth

Pre k-2

#3 Observe changes that are caused by water, snow, wind, and ice.

Grades 3-4

#4 Illustrate how water nd other substances go through a cyclic process of change in the environment

Grades 5-8

#2 Describe how soils are formed and why they differ from one place to another

#4 Describe factor that can cause short term and long term changes to the earth.

#6 Describe the many products used by humans that are derived from the materials
in the earth's crust

#7 Demonstrate factors effecting the flow of groundwater

Secondary Grades

NONE

P. Motion

Secondary Grades ONLY

#4 Describe how forces affect fluids (air & water)

#6 Describe how forces within and between atoms effect their behavior and the properties of matter

J. Inquiry and Problem Solving

All apply from all grades!

Elementary Grades Pre-K-2

#1 Make accurate observations using appropriate tools and units of measure.

#2 Ask questions and propose strategies and materials to use in seeking answers to questions.

#3 Use results in a purposeful way, which includes making predictions based on patterns they have observed.

#4 Identify products which were invented to solve a problem.

Grades 3-4

#1 Make accurate observations using appropriate tools and units of measure.

#2 Conduct scientific investigations: make observations, collect and analyze data, and do experiments.

#3 Use results in a purposeful way: design fair tests, make predictions based on observed patterns, and interpret data to make further predictions.

#4 Design and build an invention.

#5 Explain how differences in time, place, or experimenter can lead to different data.

#6 Explain how different conclusions can be derived from the same data.

Grades 5-8

#1 Make accurate observations using appropriate tools and units of measure.

#2 Design and conduct scientific investigations which include controlled experiments and systematic observations. Collect and analyze data, and draw conclusions fairly.

#3 Verify and evaluate scientific investigations and use the results in a purposeful way.

#4 Compare and contrast the processes of scientific inquiry and the technological method.

#5 Explain how personal bias can affect observations.

#6 Design, construct, and test a device (invention) that solves a special problem.

Secondary Grades

#1 Make accurate observations using appropriate tools and units of measure.

#2 Verify, evaluate, and use results in a purposeful way. This includes analyzing and interpreting data, making predictions based on observed patterns, testing solutions against the original problem conditions, and formulating additional questions.

#3 Demonstrate the ability to use scientific inquiry and technological method with short term and long term investigations, recognizing that there is more than one

way to solve a problem. Demonstrate knowledge of when to try different strategies.

#4 Design and construct a device to perform a specific function, then redesign for improvement (e.g., performance, cost).

K. Scientific Reasoning

All apply from all grades!

Pre-K-2

#1 Examine strengths and weaknesses of simple arguments.

#2 Distinguish between important and unimportant information in simple arguments.

#3 Make observations.

#4 Participate in brainstorming activities.

#5 Use various forms of simple logic.

#6 Discover relationships and patterns.

Grades 3-4

#1 Give alternative explanations for observed phenomena.

#2 Describe how feelings can distort reasoning.

#3 Draw conclusions about observations.

#4 Use various types of evidence (e.g., logical, quantitative) to support a claim.

#5 Demonstrate an understanding that ideas are more believable when supported by good reasons.

#6 Practice and apply simple logic, intuitive thinking, and brainstorming.

Grades 5-8

#1 Examine the ways people form generalizations.

#2 Identify exceptions to proposed generalizations.

#3 Identify basic informal fallacies in arguments.

#4 Analyze means of slanting information.

#5 Identify stereotypes.

#6 Support reasoning by using a variety of evidence.

#7 Show that proving a hypothesis false is easier than proving it true, and explain why.

#8 Construct logical arguments.

#9 Apply analogous reasoning.

Secondary Grades

1 Judge the accuracy of alternative explanations by identifying the evidence necessary to support them.

#2 Explain why agreement among people does not make an argument valid.

#3 Develop generalizations based on observations.

#4 Determine when there is a need to revise studies in order to improve their validity through better sampling, controls or data analysis techniques.

#5 Produce inductive and deductive arguments to support conjecture.

#6 Analyze situations where more than one logical conclusion can be drawn.

L. Communication

All apply from all grades!

Pre-K-2

#1 Describe and compare things in terms of number, shape, texture, size, weight, color, and behavior.

#2 Read and write instructions to be followed or instructions which explain procedures.

#3 Ask clarifying questions.

#4 Explain problem-solving processes using verbal, pictorial, and written methods.

#5 Make and read simple graphs.

#6 Use objects and pictures to represent scientific and technological ideas.

Grades 3-4

#1 Record results of experiments or activities (e.g., interviews, discussions, field work) and summarize and communicate what they have learned.

#2 Ask clarifying and extending questions.

#3 Reflect on work in science and technology using such activities as discussions, journals, and self-assessment.

#4 Make and/or use sketches, tables, graphs, physical representations, and manipulatives to explain procedures and ideas.

#5 Gather and effectively present information, using a variety of media including computers (e.g., spreadsheets, word processing, programming, graphics, modeling).

#6 Cite examples of bias in information sources and question the validity of information from varied sources.

#7 Function effectively in groups within various assigned roles (e.g., reader, recorder).

Grades 5-8

#1 Discuss scientific and technological ideas and make conjectures and convincing arguments.

#2 Defend problem-solving strategies and solutions.

#3 Evaluate individual and group communication for clarity, and work to improve communication.

#4 Make and use scale drawings, maps, and three-dimensional models to represent real objects, find locations, and describe relationships.

#5 Access information at remote sites using telecommunications.

#6 Identify and perform roles necessary to accomplish group tasks.

Secondary Grades

#1 Analyze research or other literature for accuracy in the design and findings of experiments.

#2 Use journals and self-assessment to describe and analyze scientific and technological experiences and to reflect on problem-solving processes.

#3 Make and use appropriate symbols, pictures, diagrams, scale drawings, and models to represent and simplify real-life situations and to solve problems.

#4 Employ graphs, tables, and maps in making arguments and drawing conclusions.
#5 Critique models, stating how they do and do not effectively represent the real henomenon.
#6 Evaluate the communication capabilities of new kinds of media (e.g., cameras with computer disks instead of film).
#7 Use computers to organize data, generate models, and do research for problem solving.
#8 Engage in a debate, on a scientific issue, where both points of view are based on the same set of information.

M. Implications of Science and Technology

Pre K-2

#4 Demonstrate some practices for recycling and care of resources.
#5 Explain how their lives would be different without specific inventions or scientific knowledge.

Grades 3-4

#1 Explore how cultures have found different technological solutions to deal with similar needs or problems (e.g., construction, clothing, agricultural tools and methods).
#4 Explain practices for conservation in daily life, based on a recognition that renewable and non-renewable resources have limits.

Grades 5-8

#3 Discuss the ethical issues surrounding a specific scientific or technological development.
#4 Describe an individual's biological and other impacts on an environmental system.
#7 Explain the connections between industry, natural resources, population, and economic development.

Secondary Grades

#1 Examine the impact of political decisions on science and technology.
#2 Demonstrate the importance of resource management, controlling environmental impacts, and maintaining natural ecosystems.
#5 Examine the historical relationships between prevailing cultural beliefs and breakthroughs in science and technology.
#6 Research issues that illustrate the effects of technological imbalances and suggest some solutions.