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**Huron-Clinton
Metroparks**



MAPLE SUGARING

KENSINGTON FARM CENTER SCHOOL PROGRAMS

**CORRESPONDING GRADE LEVEL CONTENT
EXPECTATIONS**

For Science v.1.09 and Social Studies v.12/07

KENSINGTON FARM CENTER SCHOOL PROGRAMS
CORRESPONDING GRADE LEVEL CONTENT EXPECTATIONS
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School programs at the Kensington Farm Center are a surprisingly effective tool available to teachers concerned with meeting targeted learning standards.

Integrating agriculture into the elementary curriculum is a natural and important process. As more and more rural areas become urbanized, fewer children are actually associated with food and fiber production and the value behind the process. According to some estimates, just 2-3% of the U.S. population produces the food and fiber that the rest of the population consumes. Yet agriculture is a vital aspect of society. It is therefore important for students to develop an awareness of the science behind the foods and fibers they use and to make a connection with their state and country's agricultural pasts. School programs at the Kensington Farm Center allow students to do just that, gaining a first-hand perspective on the basic elements of agriculture as they experience the sights, sounds and smells of farm life.

Students will engage in drawing their own connections through first-hand contact with their subject matter. A program at the Farm Center may be a resource for teachers by either laying a foundation for successful assimilation of concepts or as an effective tool for unit review. In addition, each program targets many of the core concepts essential in grade specific Science and Social Studies learning expectations as outlined by the Michigan Department of Education. This document is offered to assist you with your unit development. Arranged by program topic and grade level, look to the end of each discipline standard for additional info (*in italics*) on how the program will meet the listed expectations. In some instances, the program may not meet all of the requirements of an expectation but can be a useful addition for student comprehension as a recall aid.

MAPLE SUGARING

Students will discover how unique maple sugaring is to our region. Students will learn how to correctly select maple trees for tapping, tap a tree, learn about the physical change of sap to syrup, and hear stories of the Native American sugaring time.

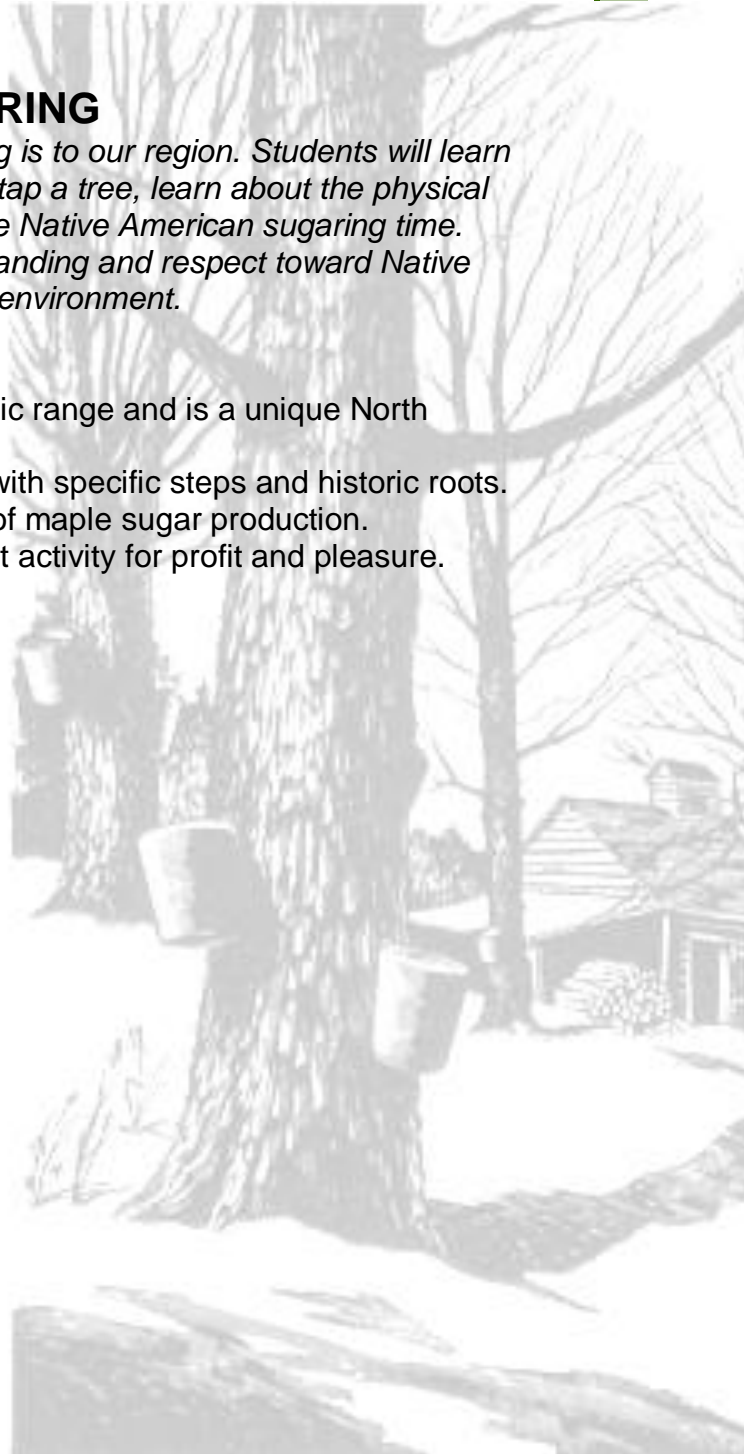
Students will achieve a higher level of understanding and respect toward Native American people and the environment.

Big Ideas

- Maple sugar production has a limited geographic range and is a unique North American enterprise.
- Maple sugar production is a scientific process with specific steps and historic roots.
- Natural processes are involved in every stage of maple sugar production.
- Maple sugar production is a weather dependant activity for profit and pleasure.

Concepts

- primary and secondary sources
- traditional stories
- comparisons
- settler
- cardinal directions
- American Indians
- Anishinaabeg
- natural resource use
- production
- goods and services
- properties of water
- water movement
- life requirements
- observable characteristics of plants
- classification
- measurable physical properties
- material composition



*Grade Level Content
Expectations for*
KINDERGARTEN

SCIENCE

SCIENCE PROCESSES

Inquiry Process

S.IP.00.11

Make purposeful observation of the natural world using the appropriate senses.

S.IP.00.12

Generate questions based on observations.

S.IP.00.14

Manipulate simple tools (for example: hand lens, pencils, balances, non-standard objects for measurement) that aid observation and data collection.

S.IP.00.15

Make accurate measurements with appropriate (non-standard) units for the measurement tool.

Students will learn about identifying maple trees for tapping based on observable characteristics and measurements. Students will assist in selecting trees based on these, including the use of calipers.

Inquiry Analysis and Communication

S.IA.00.13

Communicate and present findings of observations.

Students will participate in a search based on outlined parameters and answer to their findings.

LIFE SCIENCE

Organization of Living Things

L.OL.00.11

Identify that living things have basic needs.

EARTH SCIENCE

Solid Earth

E.SE.00.11

Identify Earth materials that occur in nature (sand, rocks, soil, water).

E.SE.00.12

Describe how Earth materials contribute to the growth of plant and animal life.

SOCIAL STUDIES*HISTORY*

H2 Living and Working Together

K – H2.0.1

Distinguish among yesterday, today, tomorrow.

K – H2.0.3

Identify the beginning, middle, and end of historical narratives or stories.

K – H2.0.4

Describe ways people learn about the past (e.g., photos, artifacts, diaries, stories, videos).

*Students will be introduced to oral tradition and some of the Native American folklore of maple sugar making.**GEOGRAPHY*

G5 Environment and Society

K – G5.0.1

Describe ways people use the environment to meet human needs and wants (e.g., food, shelter, clothing).

*Students will observe the use of trees for human wants.**ECONOMICS*

E1 Market Economy

K - E1.0.1

Describe economic wants they have experienced.

K - E1.0.2

Distinguish between goods and services.

*Students will recognize that maple syrup is a product that can be purchased.*SCIENCE*SCIENCE PROCESSES*

Inquiry Process

S.IP.01.11

Make purposeful observation of the natural world using the appropriate senses.

S.IP.01.12

Generate questions based on observations.



*Grade Level Content
Expectations for
FIRST GRADE*

**S.IP.01.13**

Plan and conduct simple investigations.

S.IP.01.14

Manipulate simple tools (for example: hand lens, pencils, rulers, thermometers, rain gauges, balances, non-standard objects for measurement) that aid observation and data collection.

S.IP.01.15

Make accurate measurements with appropriate (non-standard) units for the measurement tool.

Students will learn about identifying maple trees for tapping based on observable characteristics and measurements. Students will assist in selecting trees based on these, including the use of calipers.

Inquiry Analysis and Communication**S.IA.01.13**

Communicate and present findings of observations.

Students will participate in a search based on outlined parameters and answer to their findings.

EARTH SCIENCE**Earth Systems****E.ES.01.12**

Demonstrate the importance of sunlight and warmth in plant growth.

E.ES.01.21

Compare daily changes in the weather related to temperature (cold, hot, warm, cool); cloud cover (cloudy, partly cloudy, foggy); precipitation (rain, snow, hail, freezing rain); wind (breezy, windy, calm).

E.ES.01.22

Describe and compare weather related to the four seasons in terms of temperature, cloud cover, precipitation, and wind.

Students will learn about the contribution of sun light energy in the life processes of maple trees.

Students will observe how daily and seasonal weather conditions contribute to the maple sugaring process.

SOCIAL STUDIES**GEOGRAPHY****G2 Places and Regions****1 – G2.0.1**

Distinguish between physical (e.g., clouds, trees, weather) and human (e.g., buildings, playgrounds, sidewalks) characteristics of places.

Students will be introduced to the sugar bush, which is comprised of natural and human components.

ECONOMICS**E1 Market Economy****1 – E1.0.1**

Distinguish between producers and consumers of goods and services.

1 – E1.0.2

Describe ways in which families consume goods and services.

1 – E1.0.4

Describe reasons why people voluntarily trade.

1 – E1.0.5

Describe ways in which people earn money (e.g., providing goods and services to others, jobs).

Students will recognize that maple syrup is a product that can be purchased and that their family probably consumes. They will also recognize that maple producers can make money by selling their products to others.

SCIENCE**SCIENCE PROCESSES****Inquiry Process****S.IP.02.11**

Make purposeful observation of the natural world using the appropriate senses.

S.IP.02.12

Generate questions based on observations.

Students will be able to ask informative questions based on experiences and observations.



*Grade Level Content
Expectations for
SECOND GRADE*

**S.IP.02.13**

Plan and conduct simple investigations.

S.IP.02.14

Manipulate simple tools (ruler, meter stick, measuring cups, hand lens, thermometer, balance) that aid observation and data collection.

S.IP.02.15

Make accurate measurements with appropriate units (meter, centimeter) for the measurement tool.
Students will learn about identifying maple trees for tapping based on observable characteristics and measurements. Students will assist in selecting trees based on these, including the use of calipers.

Inquiry Analysis and Communication**S.IA.02.13**

Communicate and present findings of observations.
Students will participate in a search based on outlined parameters and answer to their findings.

PHYSICAL SCIENCE**Properties of Matter****P.PM.02.12**

Describe objects and substances according to their properties (color, size, shape, texture, hardness, liquid or solid, sinking or floating).

P.PM.02.41

Recognize that some objects are composed of a single substance (water, sugar, salt) and others are composed of more than one substance (salt and pepper, mixed dry beans).
At the evaporator, students will witness sap as a liquid, gas and a sugar solution.

LIFE SCIENCE**Organization of Living Things****L.OL.02.14**

Identify the needs of plants.
Students will be introduced to the physical requirements of life for a maple tree.

Heredity**L.HE.02.13**

Identify characteristics of plants (for example: leaf shape, flower type, color, size) that are passed on from parents to young.

Students will understand that all maples share inherited characteristics.

EARTH SCIENCE**Fluid Earth****E.FE.02.13**

Describe the properties of water as a liquid (visible, flowing, shape of container and recognize rain, dew, and fog as water in its liquid state).

E.FE.02.14

Describe the properties of water as a solid (hard, visible, frozen, cold) and recognize ice, snow, and hail as water in its solid state.

E.FE.02.21

Describe how rain collects on the surface of the Earth and flows downhill into bodies of water (streams, rivers, lakes, oceans) or into the ground.

Students will be introduced to the fact that trees use water that they obtain through the earth's water cycle. Students will witness how sap is water in the liquid state and must be changed to a gas for maple sugar production.

SOCIAL STUDIES**HISTORY**

H2 Living and Working Together in Communities

2 – H2.0.4

Describe changes in the local community over time (e.g., types of businesses, architecture and landscape, jobs, transportation, population).

Students will be introduced to different types of maple producing camps, from early to modern.

GEOGRAPHY

G4 Human Systems

2 – G4.0.1

Describe land use in the community (e.g., where people live, where services are provided, where products are made).





*Grade Level Content
Expectations for
THIRD GRADE*

Students will recognize that the sugar bush is an area where maple products are made.

ECONOMICS

E1 Market Economy

2 – E1.0.4

Describe the natural, human, and capital resources needed for production of a good or service in a community.

Students will be introduced to the trees, human effort and materials needed for production of maple syrup.

SCIENCE

SCIENCE PROCESSES

Inquiry Process

S.IP.03.11

Make purposeful observation of the natural world using the appropriate senses.

S.IP.03.12

Generate questions based on observations.

Students will be able to ask informative questions based on experiences and observations.

S.IP.03.13

Plan and conduct simple and fair investigations.

S.IP.03.14

Manipulate simple tools that aid observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer).

S.IP.03.15

Make accurate measurements with appropriate units (centimeters, meters, Celsius, grams, seconds, minutes) for the measurement tool.

Students will learn about identifying maple trees for tapping based on observable characteristics and measurements. Students will assist in selecting trees based on these, including the use of calipers.

Inquiry Analysis and Communication

S.IA.03.13

Communicate and present findings of observations and investigations.

Students will participate in a search based on outlined parameters and answer to their findings.

LIFE SCIENCE

Organization of Living Things

L.OL.03.31

Describe the function of the following plant parts: flower, stem, root, and leaf.

Students will understand how the stem (trunk), roots, and leaves of the maple trees function together.

L.OL.03.41

Classify plants on the basis of observable physical characteristics (roots, leaves, stems, and flowers).

Students will learn how to distinguish maples from other trees by bark, and twig and bud arrangement.

EARTH SCIENCE

Earth Systems

E.ES.03.41

Identify natural resources (metals, fuels, fresh water, fertile soil, and forests).

E.ES.03.42

Classify renewable (fresh water, fertile soil, forests) and non-renewable (fuels, metals) resources.

E.ES.03.51

Describe ways humans are dependent on the natural environment (forests, water, clean air, Earth materials) and constructed environments (homes, neighborhoods, shopping malls, factories, and industry).

E.ES.03.52

Describe helpful or harmful effects of humans on the environment (garbage, habitat destruction, land management, renewable, and non-renewable resources).

Students will learn how the product of maple syrup is dependant on the natural resources of trees and water. Students will also be introduced to good forest





management practices in learning the process of selecting the appropriate (healthy and mature) trees.

SOCIAL STUDIES

HISTORY

H3 History of Michigan (Through Statehood)

3 – H3.0.1

Identify questions historians ask in examining the past in Michigan (e.g., What happened? When did it happen? Who was involved? How and why did it happen?)

3 – H3.0.2

Explain how historians use primary and secondary sources to answer questions about the past.

3 – H3.0.4

Draw upon traditional stories of American Indians (e.g., Anishinaabeg - Ojibway (Chippewa), Odawa (Ottawa), Potawatomi; Menominee; Huron Indians) who lived in Michigan in order to make generalizations about their beliefs.

3 – H3.0.5

Use informational text and visual data to compare how American Indians and settlers in the early history of Michigan adapted to, used, and modified their environment.

3 – H3.0.6

Use a variety of sources to describe interactions that occurred between American Indians and the first European explorers and settlers in Michigan.

3 – H3.0.10

Create a timeline to sequence early Michigan history (American Indians, exploration, settlement, statehood). *Students will be introduced to oral tradition and some of the Native American folklore of maple sugar making. Students will become acquainted with how Native Americans shared traditional methods of sugar making with European settlers and how European settlers modified these techniques for their own use. Students will be able to sequence the order of techniques from older to newer.*

GEOGRAPHY**G4 Human Systems****3 – G4.0.1**

Describe major kinds of economic activity in Michigan today, such as agriculture (e.g., corn, cherries, dairy), manufacturing (e.g., automobiles, wood products), services and tourism, research and development (e.g., Automation Alley, life sciences corridor, university communities), and explain the factors influencing the location of these economic activities.

Students will understand how and why maple sugar production has a limited geographic range and is a unique North American enterprise.

G5 Environment and Society**3 – G5.0.2**

Describe how people adapt to, use, and modify the natural resources of Michigan.

Students will learn how the product of maple syrup is dependant on the natural resources of trees and water. Students will also be introduced to good forest management practices in learning the process of selecting the appropriate (healthy and mature) trees.

ECONOMY**E2 National Economy****3 – E2.0.1**

Using a Michigan example, describe how specialization leads to increased interdependence (cherries grown in Michigan are sold in Florida; oranges grown in Florida are sold in Michigan).

Students will be introduced to a product (maple syrup) made in Michigan which may be exported to other states that cannot produce it.

SCIENCE**SCIENCE PROCESSES****Inquiry Process****S.IP.04.11**

Make purposeful observation of the natural world using the appropriate senses.



*Grade Level Content
Expectations for
FOURTH GRADE*

**S.IP.04.12**

Generate questions based on observations.

Students will be able to ask informative questions based on experiences and observations.

S.IP.04.13

Plan and conduct simple and fair investigations.

S.IP.04.14

Manipulate simple tools that aid observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer, graduated cylinder/beaker).

S.IP.04.15

Make accurate measurements with appropriate units (millimeters centimeters, meters, milliliters, liters, Celsius, grams, seconds, minutes) for the measurement tool.

Students will learn about identifying maple trees for tapping based on observable characteristics and measurements. Students will assist in selecting trees based on these, including the use of calipers.

Inquiry Analysis and Communication**S.IA.04.13**

Communicate and present findings of observations and investigations.

Students will participate in a search based on outlined parameters and answer to their findings.

PHYSICAL SCIENCE**Properties of Matter****P.PM.04.23**

Compare and contrast the states (solids, liquids, gases) of matter.

Students will witness how sap is water in the liquid state and must be changed to a gas for maple sugar production.

Changes in Matter**P.CM.04.11**

Explain how matter can change from one state (liquid, solid, gas) to another by heating and cooling.

Students will witness how sap is water in the liquid state and must be changed to a gas by the introduction of heat for maple sugar production. The heat element used is in the form of a wood-fire.

LIFE SCIENCE

Organization of Living Things

L.OL.04.15

Determine that plants require air, water, light, and a source of energy and building material for growth and repair.

Students will be introduced to the physical requirements of life for a maple tree including the process of photosynthesis.

SOCIAL STUDIES

GEOGRAPHY

G1 The World in Spatial Terms

4 – G1.0.1

Identify questions geographers ask in examining the United States (e.g., Where it is? What is it like there? How is it connected to other places?).

4 – G1.0.2

Use cardinal and intermediate directions to describe the relative location of significant places in the United States.

Students will understand how and why maple sugar production has a limited geographic range and is a unique North American enterprise. They will be introduced to the range of maple production in relation to Michigan.

ECONOMICS

E1 Market Economy

4 – E1.0.1

Identify questions economists ask in examining the United States (e.g., What is produced?

How is it produced? How much is produced? Who gets what is produced? What role does the government play in the economy?).

Students will recognize that maple syrup is a product that can be purchased and that their family probably consumes. They will also recognize that maple producers can make money by selling their products to others. They will learn the quantities that may be





*Grade Level Content
Expectations for
FIFTH GRADE*

produced in a sugaring season and the limiting factors for this.

SCIENCE
SCIENCE PROCESSES

Inquiry Process

S.IP.05.11

Generate scientific questions based on observations, investigations, and research.

S.IP.05.12

Design and conduct scientific investigations.

S.IP.05.13

Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens) appropriate to scientific investigations.

S.IP.05.14

Use metric measurement devices in an investigation.

Students will learn about identifying maple trees for tapping based on observable characteristics and measurements. Students will assist in selecting trees based on these, including the use of calipers.

Inquiry Analysis and Communication

S.IA.05.13

Communicate and defend findings of observations and investigations using evidence.

Students will participate in a search based on outlined parameters and answer to their findings.