How Does Farming Affect the Environment?

Description/Organizer:
The third theme of geography is human/environment interaction. This lesson looks at the impact of the farmer on his environment. Geography matters to Kentucky agriculture. There are five lessons on geography because of the five themes. All five themes are equally important to Kentucky’s agriculture and environment. When farmers interact with their surroundings, what are the positive and negative effects on the environment?

Background Information:
Farming can have a positive and/or negative impact on the environment. This depends on the practices of the farmer. The impact can relate to soil, types of cultivation, water and uses of the land, to name a few. The effects can impact the air we breathe, erosion of the soil and wildlife habitat. Students will learn about the powerful impact the farmer has on the environment. This lesson, the previous two lessons, and the following two lessons emphasize one of the five themes of geography: location, place, environment, movement, and regions.

Academic Expectations:
2.19 Students recognize and understand the relationship between people and geography and apply their knowledge to real-life situations.
1.2 Students make sense of a variety of materials they read.

Program of Studies:
Big Idea: Communication/Technology
Primary Enduring Knowledge – Understandings
Students will understand that
- Technology in school and the workplace can enhance learning and provide access to information and resources.

Big Idea: Communication/Technology
Grades 4 & 5 Enduring Knowledge – Understandings
Students will understand that
- Technology skills can enhance learning and impact productivity at home, school and the workplace.

Big Idea: Reflecting and Responding to Text (Reading)
Grades Primary, 4 & 5 Enduring Knowledge – Understandings
Students will understand that
- References from texts provide evidence of applying ideas and making text-to-self, text-to-texts, and texts-to-real world connections.

LEVEL: Grades 3 – 5
SUBJECTS: Reading, Social Studies and Practical Living
BRIEF DESCRIPTION: This lesson looks at the impact of the farmer on his environment.
STUDENT OBJECTIVES:
- Students will read research relating to the farmer and the environment.
- Students will determine the environmental impact of farming from analyzing the information.
- Students will make an economic connection of farming and the environment from the perception of the farmer.

ESTIMATED TEACHING TIME:
Three 60-minute sessions
RELATED LESSONS:
- What Is the Location of Kentucky Agriculture?
- In What Kinds of Places Do Kentucky Farmers Produce/Raise Their Crops?
- Where Do Kentucky Agricultural Products Go?
- In What Regions Can Kentucky Agricultural Products Be Found?
Big Idea: Speaking, Listening, and Observing
Grades Primary, 4 & 5 Enduring Knowledge – Understandings
Students will understand that
• Communication, both formal and informal, integrates listening, observing/viewing, reading, writing and speaking with confidence. Different levels of discourse are appropriate for different contexts, occasions, purposes and audiences.

Big Idea: Geography
Primary Enduring Knowledge – Understandings
Students will understand that
• The use of geographic tools (e.g., maps, globes, charts, graphs) and mental maps help to locate places, recognize patterns and identify geographic features.

Big Idea: Geography
Grades 4 & 5 Enduring Knowledge – Understandings
Students will understand
• The use of geographic tools (e.g., maps, globes, charts, graphs) and mental maps help interpret information and understand and analyze patterns, spatial data and geographic issues.
• Regions help us to see the earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups.

Big Idea: Economics
Primary Enduring Knowledge – Understandings
Students will understand that
• Individuals, groups and businesses in the community demonstrate interdependence as they make economic decisions about the use of resources (e.g., natural, human, capital) in the production, distribution, and consumption of goods and services.

Big Idea: Economics
Grade 4 Enduring Knowledge – Understandings
Students will understand that
• Individuals, groups and businesses demonstrate interdependence as they make economic decisions about the use of resources (e.g., natural, human, capital) in the production, distribution, and consumption of goods and services.

Big Idea: The Earth and the Universe (Earth/Space Science)
Grade 4 Enduring Knowledge – Understandings
Students will understand that
• Classifying earth materials according to their properties allows decisions to be made about their usefulness for various purposes.

Big Idea: Economics
Grade 5 Enduring Knowledge – Understandings
Students will understand that
• Individuals, groups and businesses in the United States demonstrate interdependence as they make economic decisions about the use of resources (e.g., natural, human, capital) in the production, distribution, and consumption of goods and services.
Core Content:
RD-EP-2.0.7 – Students will make inferences or draw conclusions based on what is read. DOK3
SS-EP-3.3.1 - Students will define basic economic terms related to markets (e.g., market economy, markets, wants and needs, goods and services, profit, consumer, producer, supply and demand, barter, money, trade, advertising). DOK 2
SS-04-3.3.1 - Students will give examples of markets; explain how they function and how the prices of goods and services are determined by supply and demand. DOK 2
SS-05-3.3.1 - Students will give examples of markets in different periods of U.S. History (Colonization, Expansion, Industrialization, Twentieth Century to Present) and explain similarities and differences. DOK 2
SS-EP-4.4.1 - Students will describe ways people adapt to/modify the physical environment to meet their basic needs (food, shelter, clothing). DOK 1
SS-04-4.4.1 - Students will explain and give examples of how people adapted to/modified the physical environment (e.g., natural resources, physical geography, natural disasters) to meet their needs during the history of Kentucky and explain its impact on the environment today. DOK 3
SS-05-4.4.1 - Students will explain and give examples of how people adapted to/modified the physical environment (e.g., natural resources, physical geography, natural disasters) to meet their needs during the history of the U.S. (Colonization, Expansion) and analyze the impact on their environment. DOK 3
PL- EP-3.1.04 - Students will identify consumer actions (reusing, reducing, recycling) that impact the environment. DOK 1
PL-04-3.1.04 - Students will identify and describe consumer actions (reusing, reducing, recycling) that impact the environment. DOK 2
PL-05-3.1.04 - Students will describe consumer actions (reusing, reducing, recycling) and identify ways these actions impact the environment (e.g., conserving resources, reducing pollution, reducing solid waste). DOK 2

Concepts:
Environmental impact, “green practices,” no-till farming, pesticides, market, supply, demand

Prepare:
- Secure use of computer lab for research or use classroom computers.
- Copy articles on agriculture and environment. The articles should emphasize people’s interaction with the environment.
- Contact speakers from farm organizations and wildlife officials.

Essential Question:
1. How does agriculture impact the environment?

Teach:
1. Introduce human environmental interaction to students in regard to the farmer’s impact on the environment.
2. Begin by reading a book to students entitled “Soil” by Christin Ditchfield and Linda Cornwell.
3. Have students engage in Internet research about the environmental impact of farming.

4. Provide articles for the students to read, summarize and debate before the class. One group will take the supporting role and the other will be the opposition. They will present their arguments to the class. (Suggested articles can be found in Teacher Resources and Web Sites on pages 4-5.)

5. Connect supply and demand in markets to the impact on the environment in a class discussion.

6. Have students choose a farming practice (i.e. fertilizing, no-till, etc.) and make a chart for that practice showing how it helps or harms the environment.

**Assessment:**
Open Response question: Explain the situation of a farmer being a friend or foe of the environment. Give at least three specific details to support your stance.

**Rubric**

<table>
<thead>
<tr>
<th>Category</th>
<th>Student Descriptors</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>Statement is clearly proven with three details to back it up.</td>
</tr>
<tr>
<td>3</td>
<td>Statement is made but details are weak.</td>
</tr>
<tr>
<td>2</td>
<td>Statement given but only two detail statements given.</td>
</tr>
<tr>
<td>1</td>
<td>Statement has only one detail as proof.</td>
</tr>
</tbody>
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**Connect:**
Mathematics: Determine the size of an acre and relate that area to Kentucky’s average farm size.

**Teacher Resources:**
- **Cycling Back to Nature: Food Production and Pesticides** (Mary Kroll, Katie Clapp, Mary Hoff) Children participating in the 4-H Environmental Stewardship program are making a commitment to action. This curriculum is part of the Cycling Back to Nature Series within this program and utilizes all five steps of the experiential learning model: experience, share results, process, generalize, and apply. It is intended to be used in both formal (K-12) and nonformal settings. Contents: ecosystem basics; living and nonliving — a closer look; basics of agriculture and food production; pesticides and the environment; minimizing exposure to pesticides; and world population and food production.
- **Farming** (Ann Love, Pat Cupples, and Jane Drake) This picture book uses fictional characters to present information. Farming introduces Nick, who lives on a vegetable farm in Ohio, and his cousin Karin, who lives on a cattle ranch in Nebraska. Each describes his or her family's particular type of agriculture, explaining the necessary chores, processes, and equipment.
- **Nature** (Marjorie Eberts) This book provides an introduction to various nature-related careers, using portraits of people working in such jobs as environmental scientist, farmer, commercial fisher, and camp director.
- **Soil** (Christin Ditchfield, Linda Cornwell, and Jan Jenner) Soil is nearly everywhere you look.
• One Good Apple: Growing Our Food for the Sake of the Earth (Catherine Paladino) This attractive and informative photo-essay offers a clear introduction to the advantages and methods of organic farming.

Web Sites:
• http://www.ers.usda.gov/briefing/Organic/- Economic Research Service/USDA – Organic farming became one of the fastest growing segments of U.S. agriculture during the 1990's. U.S. producers are turning to certified organic farming systems as a potential way to lower input costs, decrease reliance on nonrenewable resources, capture high-value markets and premium prices, and boost farm income.
• http://www.ers.usda.gov/AmberWaves/- Amber Waves is published five times per year (April, June, September, and November) by the U.S. Department of Agriculture, Economic Research Service.
• http://www.ageducate.org – American Farm Bureau Foundation for Agriculture, a clearinghouse for ideas, resources and links.
• http://www.foodlandpeople.org/- Project Food, Land & People is a nonprofit organization committed to helping people of all ages better understand the interrelationships among agriculture, the environment, and people of the world.
• http://www.kidsregen.org/- Kids Regen.Org. Healthy Soil, Healthy Food, Healthy People’s mission is to empower children to make healthy choices for the environment, and for themselves.
• www.kyagr.com - Kentucky Department of Agriculture. Click on “Programs” at the top of the page.
• http://www.commoditygrowers.com/- Commodity Growers Cooperative (CGC), an affiliate of the Burley Tobacco Growers Cooperative Association, developed this Web site to provide information to the numerous farmers who call and request information about everything from grapes to goats, from Internet marketing to exports and from writing a business plan to starting a coop. CGC has worked since 1993 to help tobacco farmers seeking to diversify their family farm operations and develop markets for other products to supplement farm income. The goal of Commodity Growers Cooperative is to build prosperous family farms and strong communities through information technology, agriculture diversification, coalition focus, and policy development.