



Fifth Grade Curriculum: Wheat Farming and Climate Change in the Inland Pacific Northwest



“If your plan is for one year, plant rice. If your plan is for ten years, plant trees. If your plan is for 100 years, educate children.” —Confucius

Dear Educator:

The Regional Approaches to Climate Change for Pacific Northwest Agriculture (REACCH) project was designed to enhance the sustainability of cereal production systems in the inland Pacific Northwest. This multi-state project is unique in how it has engaged scientists, farmers, and educators in addressing the complex problem of sustainable cereal production in a changing climate. REACCH is more broadly and deeply integrated and more comprehensively coordinated than previous research projects of its kind, bringing together climate, cropping systems, economic models, agricultural economics, rural sociology, agronomy, soil science, crop protection and other disciplines in an integrated, transdisciplinary manner.

You are receiving this curriculum as a fifth-grade teacher in one of the three participating states; Idaho, Washington, and Oregon. A goal of this project was to develop free, useful, high-quality curricula. We are pleased to give the final product to you and your students. The curriculum was pilot tested by the developer, and a video presentation from the students in that class is available on the REACCH website.

The following principles guided the development of this curriculum:

- Accurate and current scientific content
- Age-appropriate dissemination of content
- Active teaching approach that considers differing learning styles
- Additional resources and/or activities for enhancing or differentiating content
- Incorporation of the Next Generation Science Standards and Common Core State Standards for math and English language arts and literacy

A main goal of the REACCH project is to prepare scientists and educators to create and promote practical, science-based agricultural approaches to climate change adaptation and mitigation. The REACCH education team has developed innovative approaches to incorporating agriculture and climate change topics into K–12 curricula in order to prepare citizens and professionals for the climate- and agriculture-related challenges they will face in the future. As the Greek philosopher Diogenes once said, “The foundation of every state is the education of its youth.”

For further information on content, student work examples, case study videos and image galleries, please visit our website www.reacchpna.org. This website has extensive information relating to the research conducted during the six-year project. Additional resources to enhance the curriculum and inform your instruction are also available under the Education tab.

We hope to update and improve this curriculum over time, and look forward to receiving your comments, corrections, and suggestions. Please send them to Kattlyn Wolf at kwolf@uidaho.edu. Please share this curriculum with others in your school, middle school teachers, Scouts, 4-H, etc. If you do not want this printed curriculum, kindly return it to Kattlyn Wolf, University of Idaho, 875 Perimeter Drive MS 2040, Moscow, ID 83844-2040.



Introduction

Curriculum Overview

This curriculum is designed to assist fourth- through sixth-grade teachers in incorporating agriculture and climate change science into their classrooms. The curriculum is specifically designed to meet fifth-grade standards for science (Next Generation Science Standards and Idaho state) and English language arts and literacy Common Core standards for Oregon, Washington, and Idaho. (Note: one lesson also hits a Common Core math standard.)

Although the curriculum is designed for four weeks, five days a week, two hours a day, teachers will find that they can modify it to meet their specific needs regarding implementation timing. This curriculum is designed to be place-based (inland Pacific Northwest) and scientifically sound, based on current research conducted by REACCH scientists.

All lessons are designed to be hands-on, inquiry-based, and standards-based to actively engage students in successful learning. While most texts are designed to be in the fourth- to sixth-grade Lexile range (as defined by Common Core State Standards), other texts are intentionally more difficult in order to provide opportunities for reading and comprehension of complex texts. Below is an overview of the major topics covered in the four-week curriculum and an overview of individual lesson plan components.

Major topics

Week 1: How Do Wheat Plants Grow?

The lessons cover these topics: what plants need to grow, photosynthesis, water cycle and role of plants, wheat plant structures and functions, wheat life cycle, wheat plant systems model (end of week assessment).

Week 2: How Is Wheat Farming in the Inland Pacific Northwest Impacted by Climate Change?

The lessons cover these topics: history of wheat farming in the inland Pacific Northwest, inputs and outputs of a wheat farm, global climate change (carbon dioxide, temperature, greenhouse effect), climate change (temperature and precipitation) in the inland Pacific Northwest, how climate change is influencing wheat agriculture in the region, wheat farm system model (end of week assessment).

Week 3: What Is Happening on My Wheat Farm?

Students will be divided into groups, and each group will receive one of three scenarios. They will analyze data to discover what is happening on their farm, and then spend the week learning about potential solutions to address the problems they are facing on their farm. The topics of the three scenarios are:

- Scenario 1: Aphids on a Wheat Farm in Moscow, Idaho
- Scenario 2: Hotter, Drier Summers on a Wheat Farm in Pendleton, Oregon
- Scenario 3: Wetter, Warmer Winters on a Wheat Farm in Walla Walla, Washington



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Week 4: What Will I Do? Evidence-Based Opinion Essays and Formal Presentation

Students will spend the week writing opinion essays about what they think is needed to address the problems they are facing on their farm. Students will cite textual evidence from their research to support their thesis statements and all supporting opinions and claims. At the end of the week, students will present their cases and proposed solutions to their class. The REACCH education team encourages teachers using this curriculum to have students make formal presentations to a group of local farmers and/or scientists. Research has shown that student work and interaction in real-world contexts enhances student motivation, engagement, and learning.

Lesson Plan Components

Detailed lesson plans for each day are provided. Each lesson plan includes the following:

- Lesson overview
- Alignment to fifth-grade ELA Common Core and Science standards (for Oregon, Washington, and Idaho)
- Learning targets for the lesson, aligned to specific standards
- List of materials needed
- Complete lesson descriptions (All lessons are designed to be hands-on, inquiry-based, standards-based, place-based, and scientifically sound.)
- List of resources used in lesson development (Some lessons also include additional resources or recommendations for extension activities.)
- Handouts, graphic organizers, and supplementary materials (unless otherwise noted and attached as separate documents)