Curriculum and Educational Resources for Educators (Grades 3-5)

The National 4-H Council’s 2020 Ag Innovators (AIE) Challenge is the Water Connects Us All Challenge that was developed at Iowa State University Extension and Outreach. This AIE Challenge is a STEM-focused annual program that challenges young people to explore a model of a wetland, foster critical thinking skills, and engage with a real-world agriculture challenge. This collaborative, hands-on challenge helps youth:

- Learn about the importance of water and how it connects us all
- Understand how wetlands provide important ecosystem services
- Create models engineered conservation practices that improve water quality
- Explore career connections related to agriculture and conservation
- Explore conservation practices that improve water quality.

Curriculum Overview

The Water Connects Us All Challenge uses a series of hands-on activities to teach youth about water, watersheds, ecosystem services, the intersection between the nitrogen cycle and crop production, issues with water pollution, and conservation practices to mitigate water pollution.

Activity 1: Background information via discussion and powerpoint
Activity 2: How wetlands work
Activity 3: Engineered Conservation Practices
Activity 4: Watershed Management Authority - Students negotiate with their team to identify and implement practices to have the greatest impact for the community.
Resources provided

- Facilitator Guide with directions for leading the activities
- PowerPoint that provides background information and fosters discussion
- Supplies to conduct the hands-on learning experiences
- Engagement with trained educators who can lead activities via video conference
- An opportunity for educators to participate in virtual professional development

NGSS Performance Expectations / Standards

5-ESS2-1
4-ESS2-1
4-ESS2-2
3-ESS3-1
Developing and Using Models

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To request resources for your school, please complete this google form:
Registration Form (https://forms.gle/RnTb3MSVoZbi8Bye9)
**NGSS Performance Expectations / Standards**

5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.]

4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.]

4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth’s features. [Clarification Statement: Maps can include topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

**Science and Engineering Practices:**

A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations.

**Developing and Using Models**

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Identify limitations of models.
- Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- Develop and/or use models to describe and/or predict phenomena.
- Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.