NGSS Standards For 5th Grade

RiverXchange® is a hands-on, project based, experiential learning program that correlates strongly to the Next Generation Science Standards for 5th grade. Our correlation is demonstrated below through the lens of the 3 dimensions of NGSS and references performance expectations as a guide for assessment.

3 Dimensions of NGSS:

- Science and Engineering Practices
- Disciplinary Core Ideas
- Cross Cutting Concepts

The Next Generation Science Standards are a part of the NM Stem-Ready Standards (K-5 course map) which were implemented in 2018 by the NMPED. On-going training and support are needed for full implementation and this is why RiverXchange® emphasizes NGSS in our program and teacher training.

Science and Engineering Practices (SEPs)

These practices are commonly framed as "what we do" in science & engineering and are reflected in the hands-on learning opportunities in our presentations and conservation field trips. RiverXchange® students will engage in all of the SEPs across the program when implementing the action project.

- Demonstrate grade-appropriate proficiency in developing and using models
    - Correlation: Teacher Led Watershed Model
- Planning and carrying out investigations
    - Correlation: Drinking Water Leaky Faucet, Action Project
- Analyzing and interpreting data
    - Correlation: Drinking Water Leaky Faucet, Action Project
- Using mathematics and computational thinking,
    - Correlation: Drinking Water Leaky Faucet
- Engaging in argument from evidence
    - All Presentations & Reflections, Action Project
- Obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.
    - Correlation: Presentation Reflections, Action Project

Below the information is arranged by Topic and Core Idea, followed by the performance standard (NGSS link in blue and description in red) and RiverXchange® correlation.

Motion and Stability: Forces and Interactions

Disciplinary Core Ideas

PS2.B: Types of Interactions

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

Watershed Model Correlation: Students demonstrate on their watershed model that water flows from the highest point in a watershed to the lowest point, and gathers in the same water body.

Wastewater Presentation Correlation: Students demonstrate that wastewater is treated through a system of filtration and settling of sewage.

Stormwater Presentation Correlation: Students demonstrate that pollutants on the watershed will travel downward towards the same body of water.

From Molecules to Organisms: Structures and Processes

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

River History and Conservation Correlation: Students demonstrate that the Cottonwoods are dependent on the flooding of Rio Grande as a water source for regeneration of the Bosque, and that with flood control measures Cottonwoods lack a consistent water source to regenerate. Students help re-establish trees in the Bosque by planting cottonwood and willow poles (branches cut from established trees) in the water table.

Ecosystems: Interactions, Energy, and Dynamics

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Watershed Model/Stormwater Presentation Correlation: Students demonstrate the movement of water across the watershed as an essential resource for the ecosystem and the subsequent impacts of pollution as they move through that ecosystem, such as how poor water quality can cause inhospitable habitats and contaminated resources for human and non-human inhabitants in the watershed.

River History and Conservation Correlation: Through the River of Change Model students demonstrate the impacts of flood control on the resource availability of water and the resulting impacts on the ecosystem, such as the challenges of Cottonwood regeneration and water availability concerns for human usage.

Earth's Systems

Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

ESS2.C: The Roles of Water in Earth's Surface Processes

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS2-2. Describe and graph the amounts and percentages of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Watershed Model/Stormwater Presentation Correlation: Students demonstrate that the watershed is influenced by the water cycle and creates systems of water flow to the same body of water (from peaks to valleys, through arroyos, streams and rivers) providing resources, nutrients and energy to the ecosystem.

River History and Conservation Correlation: Students demonstrate how the Rio Grande flow and course has changed due to flood control and drought, and the resultant impacts; such as increased flows and erosion, and decreased flows and reduced water availability for the ecosystem.

Earth and Human Activity

Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Drinking Water Presentation Correlation: Students collect data on water availability and on water wasted from leaky faucets to construct practical solutions to prevent leaks and irresponsible use of drinking water.

Wastewater Presentation Correlation: Student's use a model to demonstrate the stages of wastewater treatment based on natural systems that filter, settle, and clean sewage from water.

Stormwater Presentation Correlation: Students demonstrate stormwater pollution prevention strategies such as picking up dog waste to prevent E. Coli contamination, wetland construction to improve water quality entering the Rio Grande, and reducing herbicide and pesticide use to keep harmful chemicals and nutrients out of the Rio Grande.

Agriculture and Water Presentation: Students use a model to demonstrate water conservation techniques used by farmers through various irrigation systems.

River History and Conservation: Students use models representing the Rio Grande at different points in history to demonstrate the benefits and consequences of flood control strategies and current mitigation efforts to conserve the riparian ecosystem and water resources in the Middle Rio Grande Watershed.

Engineering Design

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems
ETS1.B: Developing Possible Solutions
ETS1.C: Optimizing the Design Solution

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The engineering design unit standards above could be achieved through the action project stages.

Crosscutting Concepts

1. Patterns
Ex: the water cycle and climate determine water availability and yearly precipitation

2. Cause and Effect
Ex: flood control management of the Rio Grande impacts the ecosystem

3. Scale, Proportion, and Quantity
Ex: a watershed can be examined through various scales (city, region, country) and the scale influences the relationship between water availability and ecosystems (i.e.proportions) and water availability or quantity.

4. Systems and System Models
Ex: A watershed is a system of interactions and models are used frequently to demonstrate how those systems work.

5. Energy and Matter
Ex: Water is matter that influences energy cycles

6. Structure and Function
Ex: A watershed is a land structure that has multiple functions such as moving water, collecting water and cleaning water.

7. Stability and Change
Ex: The stability of our ecosystem is dependent on the changes made to our watershed.

***NM Stem Ready! 5th Grade Standards (Highlighted are RX correlated)**
Structure and Properties of Matter
5-PS1-1 5-PS1-2 5-PS1-3 5-PS1-4

Matter and Energy in Organisms and Ecosystems
5-PS3-1 **5-LS1-1 5-LS2-1**

Earth's Systems
5-ESS2-1; 5-ESS2-2; 5-ESS3-1

Space Systems: Stars and the Solar System
5-PS2-1 5-ESS1-1 5-ESS1-2

NM Specific Standard 5-SS-1 NM

08/09/2022