GEORGIA PROJECT WET

Water Education for Teachers

CREATING STEM UNITS WITH PROJECT WET

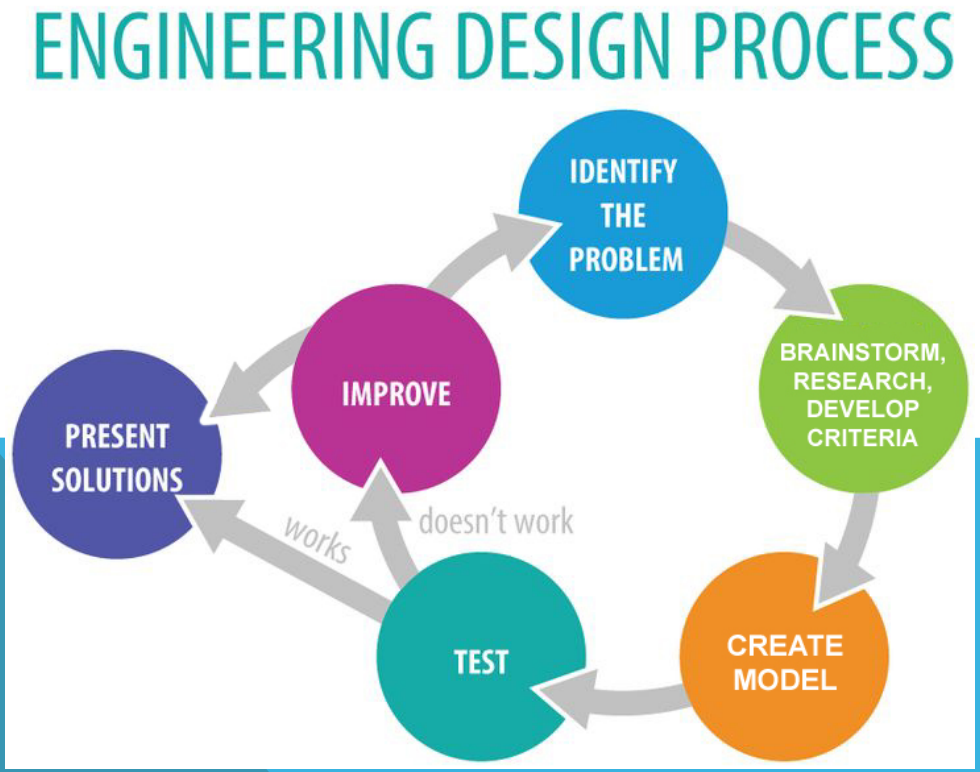
SCIENCE • TECHNOLOGY • ENGINEERING • MATHEMATICS

STEM Connection

STEM LESSON CHARACTERISTICS

1. STEM lessons focus on real-world issues and problems.

2. STEM lessons are guided by



3. STEM lessons immerse students in hands-on inquiry and open-ended exploration.

4. STEM lessons involve students in productive teamwork.

5. STEM lessons apply rigorous math and science content your students are learning.

6. STEM lessons allow for multiple right answers and reframe failure as a necessary part of learning.

STEM WEB RESOURCES:

TeachEngineering

USGS Water Education

National Geographic GIS

STEMWorks

STANDARDS

GSE Earth and Space Science

S1E1. Obtain, evaluate, and communicate weather data to identify weather patterns.

S2E3. Obtain, evaluate, and communicate information about how weather, plants, animals, and humans cause changes to the environment.

S3L2. Obtain, evaluate, and communicate information about the effects of pollution (air, land, and water) and humans on the environment.

S4E3. Obtain, evaluate, and communicate information to demonstrate the water cycle.

S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.

S5E1. Obtain, evaluate, and communicate information to identify surface features on the Earth caused by constructive and/or destructive processes.

S6E3. Obtain, evaluate, and communicate information to recognize the significant role of water in Earth processes.

S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments.

S8P5. Obtain, evaluate, and communicate information about gravity, electricity, and magnetism as major forces acting in nature.

SES3. Obtain, evaluate, and communicate information to explore the actions of water, wind, ice, and gravity as they relate to landscape change.

SES5. Obtain, evaluate, and communicate information to investigate the interaction of solar energy and Earth's systems to produce weather and climate

SES6. Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems.

GSE Math

MGSE6.NS.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts.

MGSE6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

MGSE6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

MGSE6.G.1 Find area of right triangles, other triangles, quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

MGSE7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

STEM UNIT IDEAS

- Watersheds
- Rainwater/Weather
- Groundwater
- Urban Water Distribution System and School Water Audit program
- Physical Properties of Water
- Non-Point Source Pollution
- Water Chemistry
- Water Quality
- Water Quantity
- Water Cycle

WATERSHED UNIT

Start with the activities that fit the topic.

Project WET

Seeing Watersheds pg. 187

Color Me a Watershed pg. 239

The Urban Watershed – Stormwater Edition Activities:

Watershed in Your Hand pg. 15

Greening the Asphalt pg. 103

What GUIDING QUESTIONS do you have with these activities?

WATERSHED UNIT

Seeing Watersheds pg. 187

- What is a watershed?
- What watersheds do you live in?
- What watersheds supply our water?

Color Me a Watershed pg. 239

- How do growth and land development affect the watershed?
- What happens to stormwater and runoff?

Watershed in Your Hand pg. 15

- What is the difference between natural and human-made WS?

Greening the Asphalt pg. 103

- How is water managed in a city environment?

WATERSHED UNIT

Objectives:

- **Simulate a watershed and begin to understand how it functions**
  - Identify the components of a watershed
  - Predict where water will flow in a watershed
- **Recognize that population growth and settlement cause changes in land use.**
  - Analyze how land use variations in a watershed can affect the runoff of water.
- **Understand how surface water is managed through containment and distribution.**
- **Use tools to analyze real-life location and data analysis. Google Earth, Web2.0, Excel**

GUIDED DESIGN CHALLENGE: STORMWATER MANAGEMENT

Real-world problem:

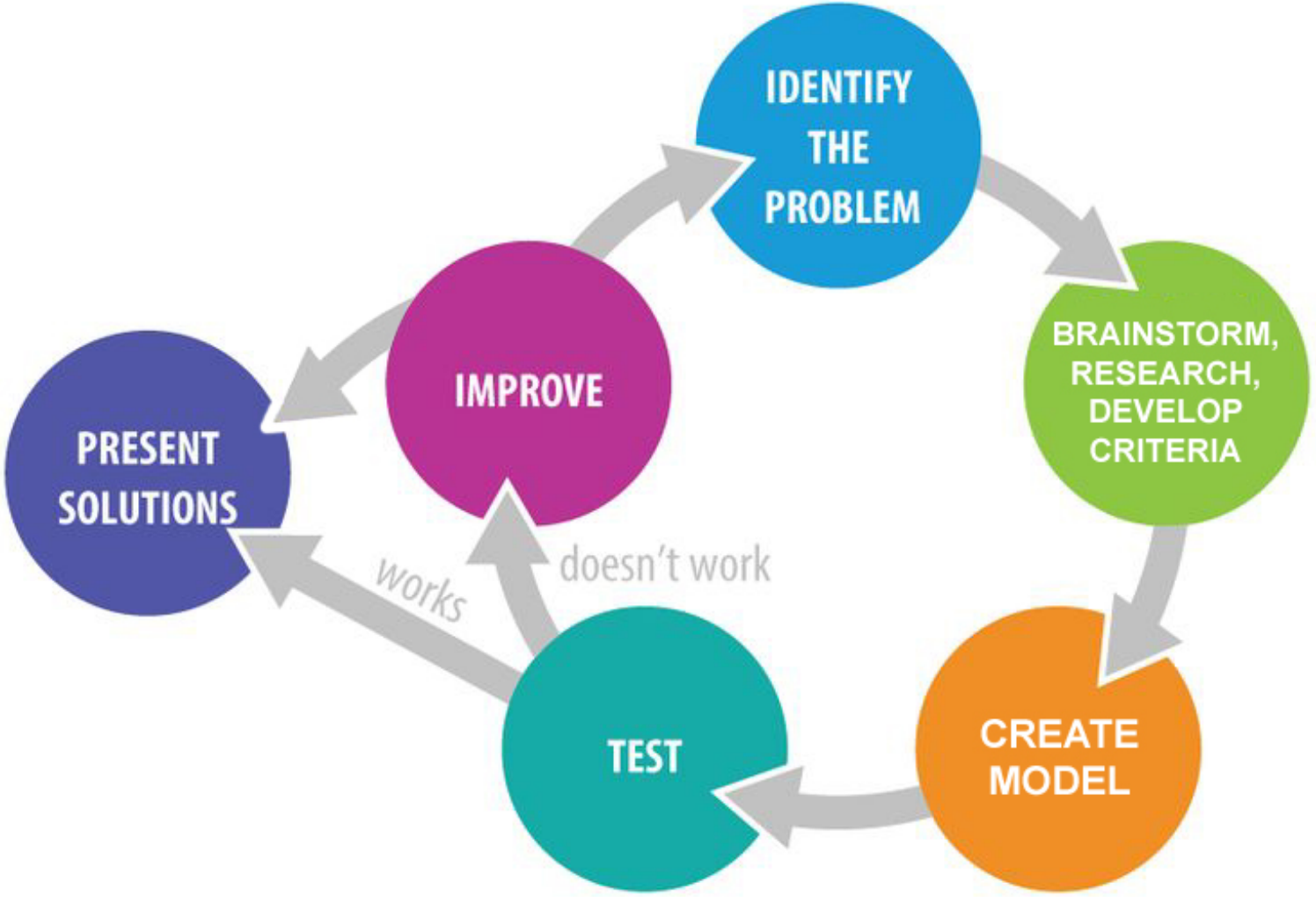
Stormwater needs to be managed to reduce erosion and runoff, and increase ground absorption and water distribution.

Design Challenge:

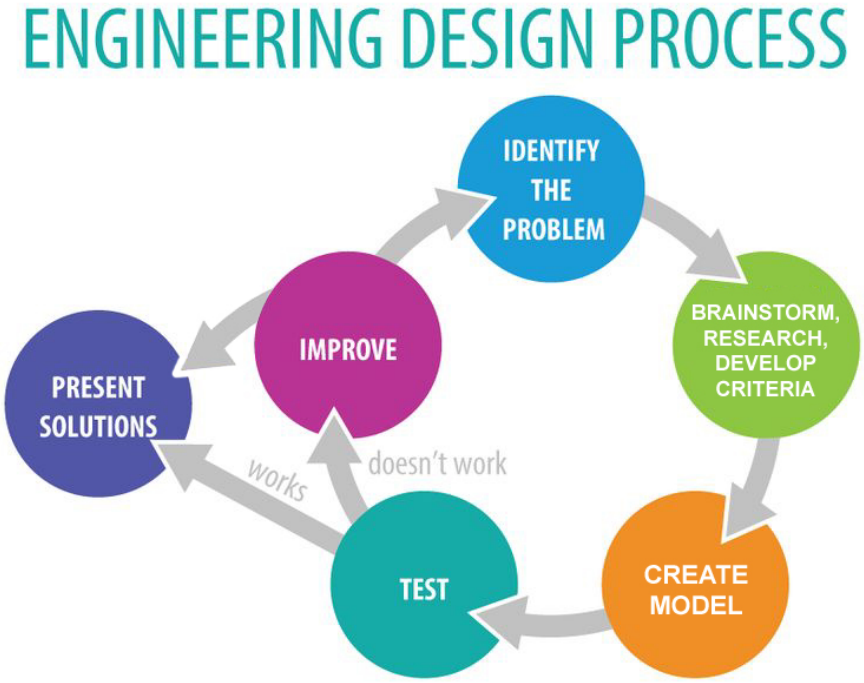
Each group will design a neighborhood that employs water management systems that include 4 of the following:

- Porous concrete
- Berms and Swales
- Rain Barrels and Cisterns
- Rain Gardens
- Curb cuts to basins

ENGINEERING DESIGN PROCESS



1. **Identify the unit focus based on standards and grade level:**
   - Rainwater/Weather
   - Groundwater
   - Urban Water Distribution System and School Water Audit program
   - Physical Properties of Water
   - Non-Point Source Pollution
   - Water Chemistry
   - Water Quality
   - Water Quantity
   - Water Cycle



2. Research the Project WET and Urban Watershed activities that focus on the topic.

3. Identify the objectives that lead to the standards.

4. Identify the Enduring Understandings and the Essential Questions.

5. Research engineering project ideas that use the skills and knowledge gained from the activities and fit the standards and grade level.

6. What is your assessment?

7. Create your instruction sequence.