



## **Planting With Purpose: Protecting Soil and Water in Sevier County**

**Grade Level:** 5–6

**Time Required:** 60–75 minutes

**Subject Areas:** Science, Environmental Education, Civic Responsibility

### **Lesson Synopsis**

Students analyze how spring planting supports ecosystem stability, protects watersheds, and reduces erosion in Sevier County. Through modeling and discussion, students explore the connection between plant root systems, stormwater runoff, biodiversity, and human environmental impact.

This lesson is important because Sevier County’s mountainous terrain and seasonal rainfall increase the risk of sediment entering waterways. Native planting strengthens ecosystem resilience, supports pollinators, and protects the natural beauty that sustains tourism and community well-being.

### **Learning Objectives**

By the end of the lesson, students will be able to:

1. Define watershed, runoff, sediment, biodiversity, and native species.
2. Explain how plant roots reduce erosion and stormwater runoff.
3. Analyze how planting decisions affect ecosystem stability.
4. Describe how native plants support pollinators and wildlife.
5. Propose a planting strategy that protects local waterways.

### **Tennessee Standards Alignment**

#### **5th Grade**

5.LS1.3 – Explain how plants obtain materials needed for growth.

5.ESS3.1 – Use evidence to support how human activities impact Earth’s systems.

#### **6th Grade**

6.LS2.2 – Analyze how changes in ecosystems affect populations.

6.ESS2.2 – Explain how water moves through Earth’s systems.

6.ESS3.3 – Assess the impacts of human activities on ecosystems.

### **Background Information for Instructor**

Spring planting aligns with ecological conditions:

- Warmer soil supports germination.
- Increased rainfall supports early root development.
- Active pollinator season supports plant reproduction.

### **In Sevier County:**

- Steep slopes increase runoff speed.
- Sediment can enter streams and harm aquatic life.
- Development and tourism increase land disturbance.

Native plants often develop deeper root systems that stabilize soil more effectively than shallow-rooted turf grasses. They require less fertilizer and irrigation once established, reducing chemical runoff into waterways.

Planting decisions directly affect watershed health and ecosystem resilience.

### **Key Vocabulary**

Watershed – An area of land where all water drains to a common body of water.

Runoff – Rainwater that flows over land instead of soaking in.

Sediment – Soil particles carried by water.

Biodiversity – The variety of living organisms in an ecosystem.

Ecosystem resilience – The ability of an ecosystem to recover from disturbance.

Native species – Species that naturally occur in a region.

### **Why This Matters in Sevier County**

- Heavy rainfall increases erosion risk.
- Sediment impacts aquatic ecosystems.
- Pollinators support agriculture and wild plant reproduction.
- Tourism depends on healthy forests and waterways.
- Responsible planting strengthens long-term environmental sustainability.

Students learn that landscaping choices are environmental decisions.

### **Lesson Procedure**

#### **1. Hook (10 minutes)**

Ask:

- Where does rainwater go after a storm?
- What happens to soil on a steep hill without plants?
- How might that affect rivers in Sevier County?

Introduce the concept of watersheds.

#### **2. Vocabulary & Concept Discussion (10 minutes)**

Students define watershed, runoff, and sediment.

Ask:

How do these terms connect to planting?

Encourage evidence-based explanations.

#### **3. Demonstration: Runoff Model (20 minutes)**

Materials:

- Two trays (bare soil vs. planted soil or grass)
- Water pitcher

Pour equal water onto both. Observe runoff and sediment movement.

Discuss:

- Which tray lost more soil?
- How did roots affect runoff?
- How does this connect to real storms in Sevier County?

#### **4. Application Discussion (10–15 minutes)**

Questions:

- Why are native plants better adapted to local soil and climate?
- How does planting improve biodiversity?

- How do human landscaping choices affect watershed health?
- Should communities prioritize native planting? Why?

### **5. Civic Connection Activity (10–15 minutes)**

Students design a “Storm-Smart Planting Plan” for:

- A schoolyard
- A park
- A hillside near a neighborhood

Plan must include:

- Placement of plants
- Explanation of erosion prevention
- Benefit to wildlife
- Benefit to water quality

### **Evaluation of Student Understanding**

#### **Exit Ticket (5 minutes)**

Students answer:

1. Define watershed.
2. Explain how plant roots reduce runoff.
3. Describe one benefit of native plants.
4. Explain how planting protects Sevier County’s waterways.

#### **Informal Assessment**

- Participation in discussion
- Accuracy of vocabulary use
- Engagement during runoff model

#### **Formal Assessment Option**

Short written paragraph:

Explain how planting native plants increases ecosystem resilience in Sevier County.

Storm-Smart Planting Plan Template:

**Student Planning Template**

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

Part 1: Site Description

Where is your planting area?

- Schoolyard
- Park
- Neighborhood
- Hillside
- Other: \_\_\_\_\_

Describe your site:

- Is it flat or sloped? \_\_\_\_\_
- Is there bare soil? \_\_\_\_\_
- Is there a storm drain or nearby stream? \_\_\_\_\_
- What problem are you trying to solve? (erosion, runoff, lack of habitat, etc.)

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Part 2: Identify the Environmental Problem

Circle the main issue(s):

- Soil erosion
- Fast stormwater runoff
- Sediment in water
- Lack of pollinators
- Flooding
- Poor soil health

Explain how this problem affects Sevier County:

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Part 3: Goals of Your Plan

My Storm-Smart Planting Plan will:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Part 4: Plant Selection (Choose Native Plants)

List at least 3 native plants you would use.

Plant #1: \_\_\_\_\_

Type:  Grass  Flower  Shrub

Why did you choose it?

Plant #2: \_\_\_\_\_

Type:  Grass  Flower  Shrub

Why did you choose it?

Plant #3: \_\_\_\_\_

Type:  Grass  Flower  Shrub

Why did you choose it?

Optional Plant #4: \_\_\_\_\_

Part 5: Plant Placement Plan

Draw a simple map of your planting area below.  
(Label where plants will go and show water flow direction.)

Explain your placement decisions:

- What will you plant at the top? Why?

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- What will you plant in the middle? Why?

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- What will you plant at the bottom? Why?

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#### Part 6: How Your Plan Protects the Environment

Use vocabulary words in your answers.

How will your plan reduce erosion?

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How will your plan reduce runoff?

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How will your plan protect the watershed?

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How will your plan increase biodiversity?

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#### Part 7: Civic Responsibility

Why is this planting plan important for Sevier County?

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How does this connect to the mission of Keep Sevier Beautiful?

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## Reflection

In 3–5 sentences, explain how planting native plants in spring helps protect soil and water in Sevier County.

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## **Example: Storm-Smart Planting Plan**

**Project Type:** Civic Environmental Design Proposal

**Location:** Sevier County Elementary School – Sloped Playground Area

### **1. Site Description**

The planting area is a grassy slope behind the playground that leads down toward a storm drain. During heavy rain, water flows downhill quickly and carries soil into the drain. The area has patches of bare soil where grass does not grow well.

Problem Identified:

- Soil erosion
- Fast stormwater runoff
- Sediment entering storm drains
- Limited pollinator habitat

### **2. Goals of the Plan**

1. Reduce soil erosion on the slope.
2. Slow down stormwater runoff.
3. Improve water quality before it enters the storm drain.
4. Increase habitat for pollinators and wildlife.
5. Beautify the school grounds.

### **3. Plant Selection (Native to Tennessee)**

#### **Deep-Rooted Grasses**

Switchgrass

- Deep root system (can grow several feet underground)
- Excellent for stabilizing soil

Little Bluestem

- Tolerates dry and wet conditions
- Prevents erosion on slopes

#### **Native Flowering Plants (Pollinator Support)**

Black-Eyed Susan

- Attracts bees and butterflies
- Blooms in summer

Purple Coneflower

- Supports pollinators
- Drought tolerant

Milkweed

- Essential for monarch butterflies
- Deep root system helps stabilize soil

#### **Native Shrubs (Water Filtration & Structure)**

Buttonbush (if near wetter areas)

- Thrives near water
- Provides bird habitat

#### **4. Plant Placement Plan**

Top of the Slope:

- Native grasses to anchor soil at the highest erosion point.

Middle of the Slope:

- Mix of grasses and flowering plants to slow water flow.

Bottom of the Slope (Near Storm Drain):

- Dense planting of shrubs and deep-rooted grasses to act as a natural filter.
- This area absorbs and filters runoff before it enters the drain.

This layered approach reduces water speed and increases infiltration into the soil.

#### **6. How This Plan Prevents Erosion**

- Deep roots hold soil in place.
- Plant stems slow down moving water.
- Leaves absorb rainfall impact.
- Dense planting reduces bare soil exposure.

Result: Less sediment enters storm drains and local waterways.

#### **6. Benefits to Wildlife**

- Provides nectar for bees and butterflies.
- Offers seeds for birds.
- Supports beneficial insects.
- Increases biodiversity on school grounds.

#### **7. Benefits to Water Quality**

- Slows runoff.
- Filters sediment.
- Reduces pollutants entering streams.
- Protects local watersheds in Sevier County.

#### **8. Community & Civic Impact**

This planting plan:

- Protects local waterways.
- Demonstrates environmental responsibility.
- Supports the mission of Keep Sevier Beautiful.
- Creates a hands-on stewardship opportunity for students.