Plants, Roots, and Soil

What are the roles of native plants in our ecosystem? How do they help us protect our water ways?

This module focuses on the plant biology and adaptations that make native species suitable for rain gardens. Students will explore root structures, plant traits, seasonal growth patterns, and how native plants support both water absorption and ecosystem health. Through card games, sorting, and design challenges, students will build a plant knowledge base they can use in later modules.

Contents:

Science State Standards:

Version 1A:
- K.1, K.2, K.4, K.6, 1.1, 1.2, 1.3, 1.6

Version 1B:
- 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.2, 3.4, 3.6

Version 2A:
- 4.1, 4.2, 4.4, 5.2, 5.4, 5.5

Version 2B:
- 6.1, 6.4, 6.5

Version 3
- 7.1, 7.4, 7.7, 8.2, 8.3, 8.4, 8.7, B.1.32, 1.37
- Env. 1.3, 1.4, 1.14 P.S. 1.1, 1.3

Teacher's Guide

Objective:

The goal of this module is to:

- Guide students in identifying and categorizing plant traits that improve water absorption and erosion control
- Reinforce the importance of deep root systems and perennial life cycles in rain garden success
- Help students differentiate native from non-native plants and understand their environmental roles
- Use tactile and visual tools to teach how plant structure contributes to runoff reduction
- Encourage reflection on how plant selection supports water filtration, biodiversity, and long-term rain garden health

SCIENCE CENTRAL

Vocabulary List

Rain Garden - A shallow, planted area that collects and filters stormwater runoff from roofs, pavement, and lawns.
Stormwater Runoff - Rainwater or melted snow that flows over hard surfaces and carries pollutants instead of soaking into the ground.
Native Plant - A plant that grows naturally in a region and is adapted to the local environment, wildlife, and climate.
Perennial - A plant that lives for many years and regrows each season without needing to be replanted.
Pollutant - A harmful substance that contaminates water, air, or soil (e.g., fertilizer, oil, pet waste).
Infiltration - The process of water soaking into the soil, rather than running off the surface.
Root System - The network of roots a plant uses to absorb water and hold the soil in place.
Deep Roots - Roots that grow far down into the soil and help break up compacted earth, increase absorption, and reduce erosion.
Shallow Roots - Roots that stay close to the surface and do not provide much support or water absorption.
Fibrous Roots - Thin, spreading roots that form a dense mat and help trap sediment and filter water.
Permeable - A surface or material that allows water to pass through it.
Impermeable - A surface that does not allow water to soak in, causing more runoff (e.g., concrete, asphalt).
Adaptation - A trait or behavior that helps a plant or animal survive in its environment.
Drought-Tolerant - Able to survive with little water during dry periods.
Moisture-Tolerant -Able to survive in soil that stays wet for longer periods of time.
Erosion - The wearing away of soil caused by wind, rain, or moving water.
Mulch Layer - A surface layer of wood chips or organic material that helps retain soil moisture and trap pollutants.
Compacted Soil - Soil that is pressed together tightly, making it hard for water to soak in.
Soil Texture - The feel of soil, determined by the mix of sand, silt, and clay particles. - The feel of soil, determined by the mix of sand, silt, and clay particles.
Rain Garden Basin - The center of the rain garden zone where water collects and stays the longest.
Berm - A raised edge or outer slope of the rain garden, which helps contain water and prevent overflow.
Bloom Time - The season when a plant flowers; different bloom times help support pollinators throughout the year.
Pollinator - An insect or animal (like a bee or butterfly) that helps plants reproduce by moving pollen between flowers.
Runoff Reduction - The act of slowing down or absorbing water to prevent it from quickly washing away soil and pollutants.
Filter (Filtration) - The process of cleaning water by passing it through materials like soil, roots, or mulch.
Zone (Rain Garden) - A planting section based on how wet or dry the area is (center, middle, edge).
Sun/Shade Tolerance - A plant's ability to grow well dependent on the sun and shade conditions.
Wetland - An area of land that is covered or saturated with water

Introduction

What's the Problem?
When rain falls on hard surfaces, like rooftops, driveways, and sidewalks, it can't soak into the ground. Instead, rainwater runs off of these hard surfaces, picking up harmful materials like fertilizers, pesticides, oil, pet waste, and debris. This polluted water rushes into storm drains and eventually reaches our rivers, lakes, and streams. This negatively impacts our water quality, disrupts ecosystems, and can even overwhelm sewer systems during heavy rains.

A single inch of rain falling on a typical residential property can generate over 1,000 gallons of runoff, which can carry pollutants directly into our waterways. Preventing that runoff (or slowing it down) is a key part of protecting local water health.

A Green Solution

Rain gardens are shallow, landscaped areas filled with specially selected native plants that collect, absorb, and filter stormwater runoff. They are designed to temporarily hold rainwater and let it slowly soak into the ground instead of running off into storm drains. These gardens are typically planted in low-lying areas and are shaped so that water flows toward the center.

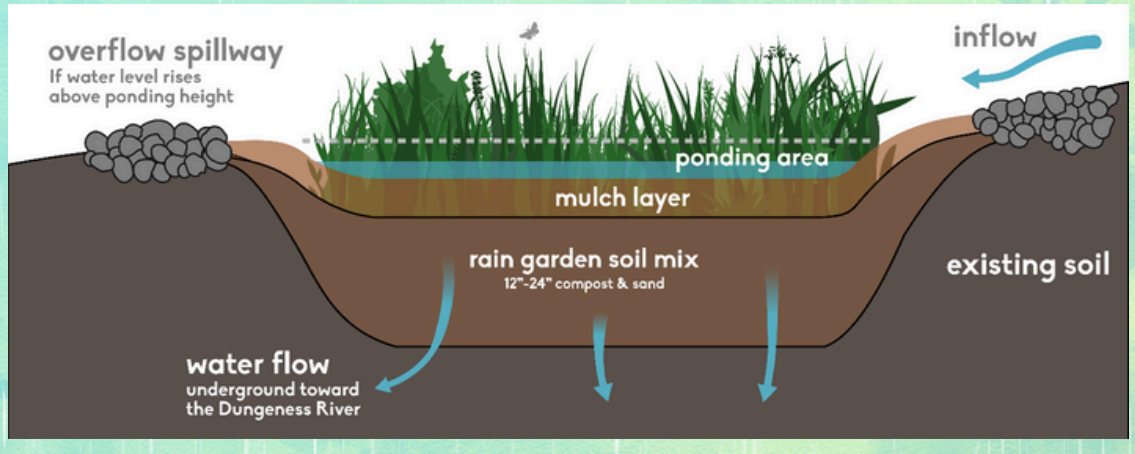
By using perennial native species with deep roots, rain gardens help:

- Increase the amount of water that soaks into the soil
- Filter out pollutants before they reach waterways
- Reduce flooding and erosion
- Replenish underground water supplies
- Provide habitat for birds, butterflies, and other beneficial species

How Plants Help

Each plant in a rain garden plays a specific role. Their effectiveness depends on physical traits like:

- Root depth, as deeper roots help break up compacted soil and allow water to filter through the soil
- Leaf shape and size, which slow rainfall and let water reach the soil
- Plant height and spread, which influence how water moves and where it's absorbed
- Moisture tolerance, which determines whether a plant belongs in the dry outer edges or the wet center
- Native plants are different everywhere, and have adapted to live in different soil, water, and sun conditions all over the world



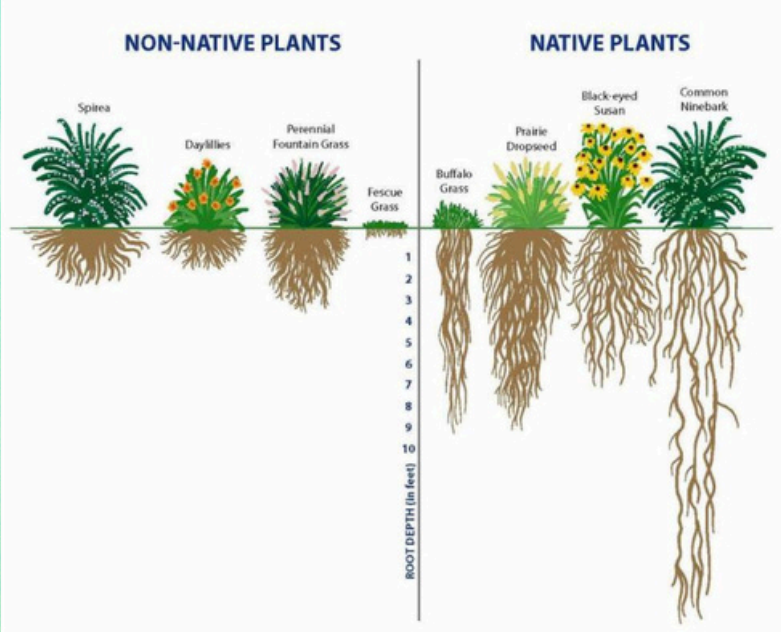
Stormwater is filtered in several layers:

1. On top, surface plants slow down the water and trap large particles like sediment.
2. In the middle, the mulch layer can absorb heavy metals and support microbial activity.
3. On the bottom, plant roots absorb excess nutrients like nitrogen and phosphorus, which can be harmful in large quantities.

Native vs. Non-native Root Systems

Native plants generally have deeper and more extensive root systems than non-native plants because they have evolved to thrive in their local environment. This difference in root structure provides several ecological advantages, including:

- improved water absorption
- enhanced soil stability
- increased drought resistance.
- nutrient cycling
- biodiversity
- ecosystem health
- stormwater management
- reduced maintenance



Conversely, non-native plants, often with shallower root systems, may struggle with water uptake during dry periods and contribute to soil erosion.

Function Meets Beauty

Not only do rain gardens serve a practical environmental purpose; they're also beautiful! Plants are selected for their ability to tolerate both dry and wet conditions, but also for seasonal interest, color variety, and texture. Many native species bloom from spring through fall, supporting pollinators in all seasons and adding visual appeal to homes, schools, and public spaces.

By understanding how specific plant traits affect how a rain garden works, students can make informed decisions about plant selection, garden design, and how to manage water in their own environment.

Activity A - Plant Match-Up Game

The Plant Match-Up game is designed to be played as a class or in small groups. Its purpose is to introduce students to different types of plants and root systems, explore their features, and decide whether they are good choices for a rain garden. Each Match-Up card includes a front side with an image (of a plant or root system) and a back side that explains its rain garden compatibility and highlights what makes the plant helpful or harmful in that environment.

Activity Time:	**Grade Level**
45 Minutes	K - 12

Objectives:

By the end of this activity, students will be able to:

- Identify appropriate plants and features for a rain garden
- Practice observational skills, plant classification, and botany vocabulary

Materials Needed:

- PowerPoint OR photocards of plants, root systems, plant adaptations, and rain garden elements
- “Empty Garden” on large paper
- Real plant specimens or tactile models, if provided
- Worksheet

Setup & Prep:

- If not using PowerPoint, print photocards and handouts
- For repeated usage, laminating the photocards is recommended
- If doing as a class or group activity, prepare to show and discuss each card with the class, and why/why not the plant is appropriate for a rain garden
    - Otherwise, set up stations or zones in the classroom or outdoor space (label as needed) for small group discussions
- For the build-your-own-rain-garden game, use the “empty rain garden” large paper. This can be used as a class, or in small groups.

Instructions:

The Match-Up exercise can be played differently, with the entire class or small groups. It can be played as a flashcard game, a build-your-own-rain-garden game, group discussion, or however the teacher wishes to use it within a class.

- For teacher-led exercises:
    - Hold up each photocard for the class to identify. Ask the class to vote and explain why or why not it would be appropriate for a rain garden. Explain or confirm the reasoning for each one before moving on.
    - For the build-your-own-rain-garden game, students can decide as a class whether or not the plant is appropriate for the garden, and where to place it.
- For small-group exercises:
    - Have a mix of different photocards at multiple stations, depending on your class size. Each group is to decide and discuss amongst themselves which elements are appropriate for a rain garden or not.
    - For the build-your-own-rain-garden game, have students place the appropriate plants on the empty rain garden paper.
    - Once decided, they should present their findings to the class and the teacher will explain why or why not each element would be appropriate.

1 - Frontside - cut along dotted line, attach to backside

Cardinal Flower

Little Bluestem

Marsh Milkweed

Purple Coneflower

1 - Backside - cut along dotted line, attach to frontside

Cardinal Flower
Good for Rain Gardens!

Soaks up water in wet zones, attracts pollinators.
Loves water!

Shallow root system

Little Bluestem
Good for Rain Gardens!

Holds soil on dry slopes and absorbs runoff. *Has the deepest root system!*

Deep and fibrous root systems

Marsh Milkweed
Good for Rain Gardens!

Good for wet areas, monarch food source

Deep root system

Purple Coneflower
Good for Rain Gardens!

Helps stop erosion and attracts butterflies

Fibrous root system

Spicebush

Fox Sedge

Firewheel

Aromatic Aster

2 - Frontside - cut along dotted line,

attach to backside

Spicebush

Good for Rain Gardens!

Works in shaded wet spots, supports wildlife

Shallow root system

Fox Sedge

Good for Rain Gardens!

Slows water and filters pollutants in basin

Fibrous root system

Firewheel

Good for Rain Gardens!

Covers sunny dry areas, prevents erosion. *Loves sun!*

Deep root system

Aromatic Aster

Good for Rain Gardens!

Grows in drier zones and feeds bees late in the year

Fibrous root system

2 - Backside - cut along dotted line,

attach or to frontside

Petunias

Hosta

Kentucky Bluegrass

Daylily

3 - Frontside - cut along dotted line,

attach to backside

Petunias

Bad for Rain Gardens!

Not perennial, too fragile, needs lots of care

Shallow and fibrous root systems

Hosta

Bad for Rain Gardens!

Doesn’t tolerate flooding or dry spells; poor for erosion control

Fibrous root system

Kentucky Bluegrass

Bad for Rain Gardens!

Grows in lawns but can’t soak up much water

Shallow and deep root systems

Daylily

Bad for Rain Gardens!

Can be invasive, doesn't filter water well

Tuberous root system

3 - Backside - cut along dotted line,

attach to frontside

4 - Frontside - cut along dotted line, attach to backside

Cactus

Hydrangea

Annual Marigold

Boxwood Shrub

Annual Marigold

Bad for Rain Gardens!

Only lives one season and doesn't absorb much water

Fibrous root system

Cactus

Bad for Rain Gardens!

Loves dry zones but not suitable for Indiana's climate or rain gardens

Shallow root system

Boxwood Shrub

Bad for Rain Gardens!

Very compact roots, prefers dry soil, doesn't support pollinators

Shallow root system

Hydrangea

Bad for Rain Gardens!

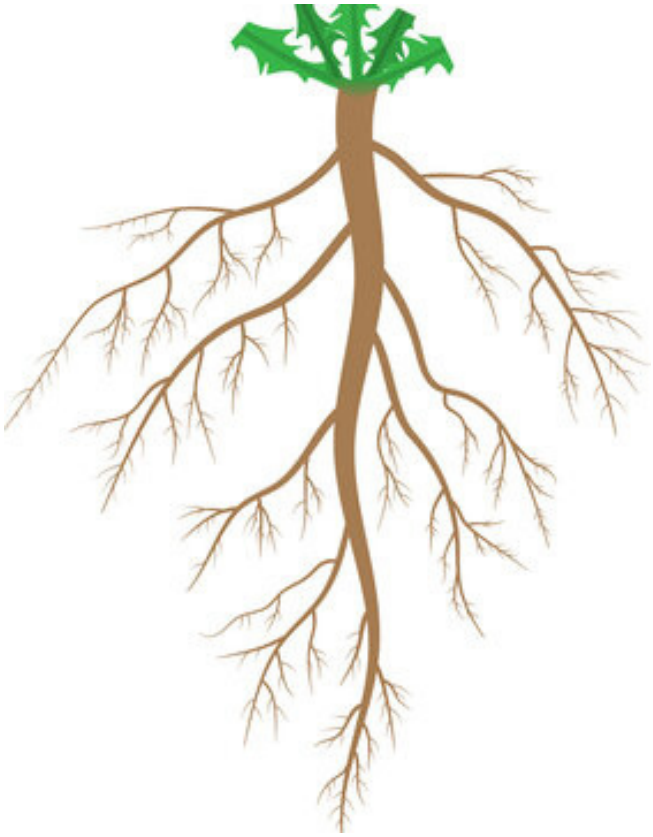
Needs regular watering, not great at filtering runoff

Fibrous root system

4 - Frontside - cut along dotted line,

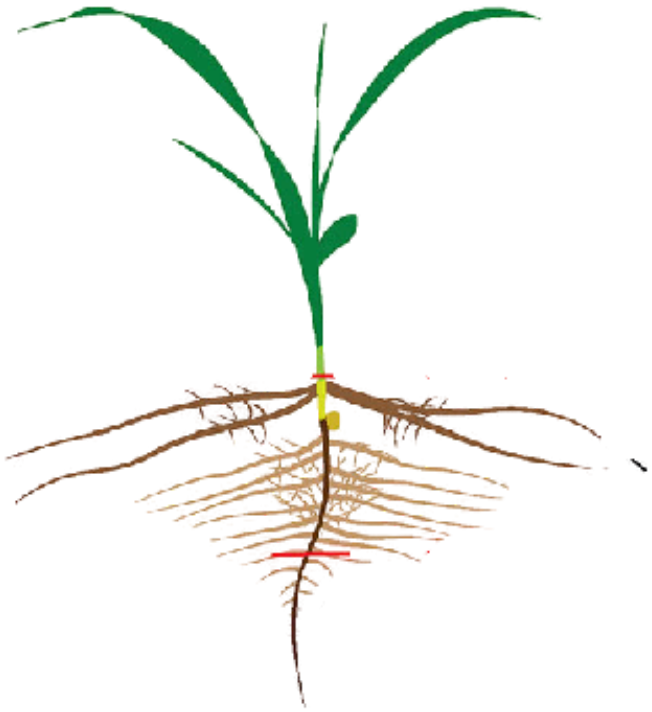
attach to backside

5 - Frontside - cut along dotted line, attach to backside

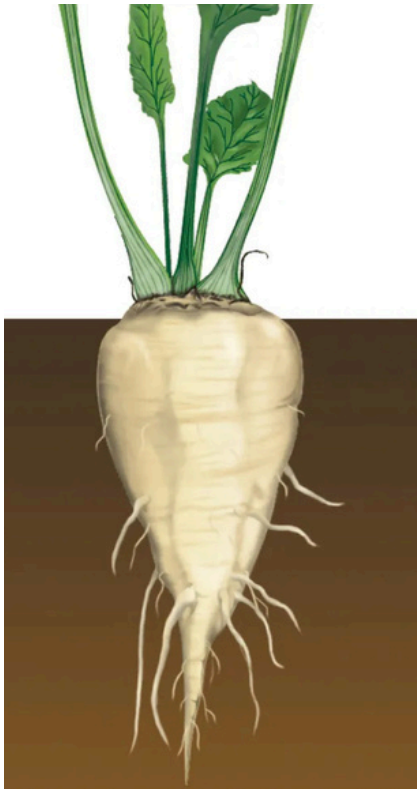


Deep Taproot

Fibrous Roots



Shallow Roots



Tuberous Roots

5 - Backside - cut along dotted line, attach to frontside

Deep Taproot

Good for Rain Gardens!

Goes straight down deep into the soil by breaking up compacted soil, absorbs water deep below surface

Fibrous Roots

Good for Rain Gardens!

Spread out in a web near the surface, traps sediment, holds soil together

Shallow Roots

Bad for Rain Gardens!

Short, weak roots just below the surface don’t prevent erosion or soak up water well

Tuberous Roots

Sometimes OK for Rain Gardens!

Bulb-like roots that store water, but don’t help with drainage or erosion

Activity A - Plant Match-Up Worksheet

1. What is one plant we saw today that loves water?

_____

2. Which plant had the biggest or deepest roots?

_____

3. Can you name a plant that likes lots of sun?

_____

4. Which plant would you put in the middle of a rain garden where it's really wet?

_____

5. What plant would NOT be good in a rain garden?

_____

6. Which plant do you think helps bees or butterflies the most?

_____

Answer Key - Plant Match-Up Worksheet

1. Cardinal Flower

2. Little Bluestem

3. Firewheel

4. Marsh Milkweed

5. Hosta, Petunia, Daylily, Kentucky Bluegrass, Cactus, Hydrangea, Annual Marigold, Boxwood Shrub

6. Purple Coneflower

Activity B - Runoff Soil Race

The Runoff Soil Race is intended as a class demonstration. It introduces students to how stormwater runoff interacts with different soil types and root systems. Using trays filled with various soil/root combinations, the class observes how fast water runs off or soaks in when "rain" is applied. Students then compare outcomes to determine which soil textures and root structures are best for reducing runoff in rain gardens.

Activity Time:
45 Minutes

Grade Level
K - 12

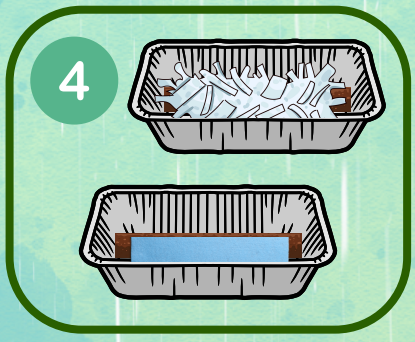
Objectives:
Students will observe how different combinations of soil types and plant coverage impact water runoff and retention, and how to:

- Model how different plant root structures and soil types affect runoff and soil retention.
- Predict which types of vegetation provide the best erosion control.
- Make observations and collect data to compare conditions.

Materials Needed:

- Scissors
- Coffee filter
- Tape
- Measuring cup
- Cups
- Ruler
- Water
- Food coloring
- Collection tray OR towel
- Books, blocks, or something to incline the tray
- Different soil types, choose at least 2
  - Clay soil, Sandy soil, Silty soil, Loamy soil
- 4 aluminum trays for 2 types of soil;
  - If doing more soil types, 6 trays for 3 types, 8 trays for all 4 types
- Watering can OR plastic bottle/apparatus with holes to “rain” down
- Root models (get enough to cover the soil on trays)
  - Felt sheets, for shallow/fibrous roots (approx. 9" x 12" each)
  - Shredded paper, for fibrous or widespread roots
  - Sphagnum/preserved Moss, for deep/fibrous systems

Setup & Prep:



1. In each tray, on the shorter side, cut a hole roughly the size of a quarter in the center of the bottom edge
2. Cut a small section of the coffee filter and place it over the hole to prevent soil from leaking out. Tape it to the tray.
3. Preload each type of soil into two trays each; line with ½ - 1 inch of soil. (ex: if you have 2 types of soil, 4 trays will be needed)
4. Incline each tray roughly 10 degrees using whatever materials are available
5. To start the “race”, place your first root model (felt sheet, shredded paper, or moss) over the first soil type.
6. Have students make a hypothesis over how they think the root type will interact with the soil. Then, rain the water over and have students write down their observations.
7. Remove the root model, and repeat the process with each root model before moving on to the next soil type.

- Make sure to keep variables consistent, such as water amount, slope, tray size, etc.
- Each setup may look different; use materials as needed to achieve the desired setup

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Instructions:

- Introduce briefly and review how rain gardens rely on deep-rooted plants to slow and absorb water.
  - Explain the difference between the provided soils and root models
- Ask students to predict which root model will best reduce runoff.
  - Felt sheets: not very effective
  - Shredded paper: more effective
  - Sphagnum/preserved moss: most effective
- Ask students to predict which soil type will drain, and discuss how each promotes the growth of different plants
  - Clay soil: poor drainage, supports plants with strong roots
  - Silt soil: okay drainage, supports plants with roots that spread
  - Sandy soil: good drainage, supports drought-resistant plants
- Slowly, “rain” 1 cup of water over each tray
  - The amount of water and time may vary depending on your rain apparatus. Adjust as needed, ensure it’s consistent
- Collect and measure the runoff from each tray using the measuring cup after each tray has been rained on
  - Go in order so each tray has roughly the same amount of time from when it rained vs. the time for runoff
- Record data as a class on how much water ran off and how much stayed.
- Observe whether any erosion occurred.
- Ask students:
  - Which surface had the least runoff? The most?
  - How do these results connect to rain garden plant selection?
  - What might happen during a real storm?

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Activity B - Soil Race Reflection

1. What soil types did you test?

- □ Clay
- □ Sand
- □ Loamy
- □ Silty
- □ Other: _____

2. What root models did you test?

- □ Felt
- □ Paper
- □ Moss
- □ Other: _____

3. Which soil soaked up the most water?

_____

4. Which root model slowed the water best?

_____

5. Compare: Which soil type and root model had the most runoff? The least?

- Most: _____

- Least: _____

6. What do you think is the best type of soil and root system for a rain garden? Are there multiple types that will work together?

_____

_____

_____

Activity C - Plant Superpower Scenarios

The Plant Superpower Scenarios can be done as a class or in small groups. This activity highlights Indiana-native plants and their "superpowers", which are special traits that make them ideal for specific rain garden challenges. After learning about the plants, students are presented with problem scenarios and must choose the best plant (or combination of plants) to "save the garden" based on water needs, root structure, habitat value, and other functional traits.

Activity Time:
45 Minutes

Grade Level
6 - 12

Objectives:

Students explore how specific plant traits help with rain garden functions like water absorption, erosion control, and pollutant filtration. They will explore native Indiana species in environmental challenges in a team-based game or gallery walk. By the end of this activity, students will be able to:

- Identify how traits like root depth, leaf shape, and plant size contribute to rain garden success.
- Compare native plant species for their suitability in specific problem areas
- Use deductive reasoning to select appropriate species based on the provided information.

Materials Needed:

- PowerPoint OR 8 plant profile cards of native Indiana plants and problem scenarios
- Worksheets

Setup & Prep:

- Print problem scenario worksheets
- If NOT using the PowerPoint, print the 8 plant profile cards
  - For repeated usage, laminating the photo cards is recommended
- If you are doing it as a class (using the PowerPoint or cards), prepare to show and discuss each plant and the features that make it suitable for rain gardens. Allow students time to fill out their worksheet as you discuss it as a class.
- If doing it in individual groups, set up the 8 cards at different stations; allow students to explore and discuss in small groups as they fill out their worksheets.
  - After a short period, have students rotate to visit each card.

Instructions:

1. Introduce the challenge to the class. Each plant has “superpowers” based on its traits; some soak up lots of water, others prevent erosion, and some attract pollinators, etc.
2. Talk through a few plant traits and eliminate ones that wouldn't survive (e.g., drought-loving species).
3. As a class or in groups (depending on your setup and prep), students should then proceed to discuss the native plant features.
4. After learning about each native plant and filling out the table, students will act as "rain garden designers" and match each challenge with the best plant or plant combination to solve the issue.
5. Students record their top 3 plant picks, cite which traits make the plant a good fit, and briefly justify their decision.
6. Highlight different traits and show how multiple plant combinations can work together in different zones of the rain garden (e.g., center vs. edge).

Cardinal Flower - Profile & Stats

Scientific Name: Lobelia Cardinalis
Rain Garden Role: The Pollinator Magnet & Soil Soaker

Soil Type:
- Loamy or silty

Sun/Shade Preference:
- Part shade to full sun

Moisture Tolerance:
- Moist to wet

Flower Color:
- Bright red

Bloom Time:
- Midsummer to early fall

Root Depth:
- Medium:
  - Soak up stormwater and help stabilize soggy soils.

Leaf Shape:
- Long, narrow, lance-like :
  - Reduce water loss through evaporation, letting rainfall reach the soil

Plant Size:
- 2-4 feet tall
  - Tall stems and flower spikes slow water at the base and add structure to central zones.
  - Helps create shade for shorter, moisture-loving plants below

Superpowers:
- Absorbs excess stormwater, filters pollutants, attracts hummingbirds and butterflies

Best Placement:
- The lowest/central zone where water collects

Firewheel - Profile & Stats

Scientific Name: Gaillardia pulchella
Rain Garden Role: The Drought Defender & Color Popper

Soil Type:
- Sandy or loamy

Sun/Shade Preference:
- Full sun

Moisture Tolerance:
- Dry

Flower Color:
- Red/yellow petals

Bloom Time:
- Summer to fall;

Root Depth:
- Shallow:
  - Stabilize loose, dry soils and prevent erosion.

Leaf Shape:
- Lobed and hairy
  - Reduce water loss and survive drought.

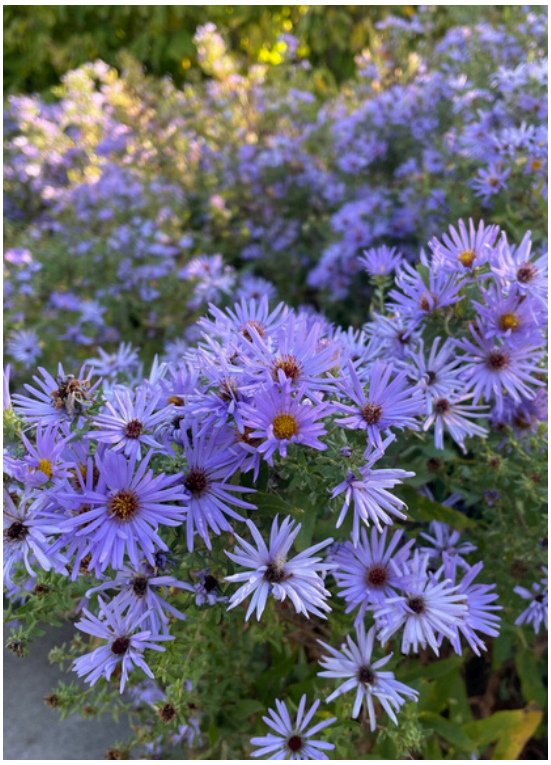
Plant Size:
- 1 - 2 feet tall
  - Compact size makes it ideal for upper berms or dry areas.
  - Fast-spreader that helps quickly cover bare ground and reduce erosion.

Superpowers:
- Drought-tolerant, erosion control, bright color for pollinators

Best Placement:
- Upper edges or sunny, dry slopes

Aromatic Aster – Profile & Stats

Scientific Name: Symphyotrichum oblongifolium
Rain Garden Role: The Fall Bloomer & Soil Stabilizer



Soil Type:
- Clay or loamy

Sun/Shade Preference:
- Full sun

Moisture Tolerance:
- Moist to dry

Flower Color:
- Purple flowers

Bloom Time:
- Fall
  - Late blooming period supports pollinators during fall.

Root Depth:
- Medium:
  - Help with soil stability in tough areas.

Leaf Shape:
- Oblong and slightly toothed
  - Dense foliage slows rain and shades soil.

Plant Size:
- 1 - 2 feet tall
  - Aromatic leaves deter some herbivores and pests, helping maintain plant health.

Superpowers:
- Supports fall pollinators, drought-resistant, stabilizes soil

Best Placement:
- Slopes and middle zones with mixed moisture

Marsh Milkweed - Profile & Stats

Scientific Name: Asclepias incarnata
Rain Garden Role: The Monarch Host & Wetland Warrior

Soil Type:
- Loamy or silty

Sun/Shade Preference:
- Full sun

Moisture Tolerance:
- Moist to wet

Flower Color:
- Pink flowers

Bloom Time:
- Summer

Root Depth:
- Medium:
  - Absorb water and anchor in soggy soil.

Leaf Shape:
- Narrow and lance-like
  - Provide food for monarch caterpillars.
  - Milky sap contains compounds that may help break down pollutants.

Plant Size:
- 3 - 5 feet tall
  - Tall height helps slow water in basin zones.

Superpowers:
- Monarch host, absorbs water, supports wetland biodiversity

Best Placement:
- Lowest part of the rain garden (wettest zone)

Fox Sedge - Profile & Stats

Scientific Name: Carex vulpinoidea
Rain Garden Role: The Sediment Trapper & Flow Manager

Soil Type:
- Clay or silty

Sun/Shade Preference:
- Part shade to full sun

Moisture Tolerance:
- Wet

Flower Color:
- Grassy green

Bloom Time:
- Spring

Root Depth:
- Medium:
  - Fibrous roots form a dense mat to trap sediment and slow flow.

Leaf Shape:
- Grass-like and slender
  - Blades help channel water without erosion.
  - Fast-growing shoots recover quickly after storms or heavy foot traffic.

Plant Size:
- 2 - 3 feet tall
  - Upright form resists wind and water pressure.

Superpowers:
- Filters runoff, stabilizes wet soils, early-season growth

Best Placement:
- Rain garden basin or inflow edge

Purple Coneflower - Profile & Stats

Scientific Name: Echinacea purpurea
Rain Garden Role: The Soil-Breaking Taproot & The Bee's Knees

Soil Type:
- Loamy

Sun/Shade Preference:
- Full sun

Moisture Tolerance:
- Moist to dry

Flower Color:
- Purple petals with cone center

Bloom Time:
- Summer

Root Depth:
- Deep:
  - Taproots breaks through compacted soil.

Leaf Shape:
- Broad and rough-edged
  - catch raindrops and slow water.

Plant Size:
- 3 - 4 feet tall
  - Tall, sturdy stems resist strong rain.
  - Cone-shaped flower heads funnel water to the plant's base.

Superpowers:
- Attracts pollinators, drought-tolerant, soil-busting taproot

Best Placement:
- Middle or upper zones with decent drainage

Spicebush - Profile & Stats

Scientific Name: Lindera benzoin
Rain Garden Role: The Wildlife Shrub & Shade Buffer

Soil Type:
- Clay or loamy

Sun/Shade Preference:
- Shade to part sun

Moisture Tolerance:
- Moist

Flower Color:
- Small yellow blooms

Bloom Time:
- Early spring

Root Depth:
- Shallow - Medium:
  - Hold soil in shaded, moist woodland areas.

Leaf Shape:
- Oval, smooth-edged, and aromatic
  - Aromatic leaves deter pests; foliage supports swallowtail caterpillars.
  - Acts as a critical food source for the spicebush swallowtail caterpillar.

Plant Size:
- 6 - 10 feet tall
  - Shrub form creates vertical diversity and habitat.

Superpowers:
Supports wildlife, shade-tolerant, pest-resistant

Best Placement:
- Shadier garden edges or understory zones

Little Bluestem - Profile & Stats

Scientific Name: Schizachyrium scoparium
Rain Garden Role: The Slope Supporter & Seasonal Showstopper

Soil Type:
- Sandy or loamy

Sun/Shade Preference:
- Full sun

Moisture Tolerance:
- Dry

Flower Color:
- Bluish-green to reddish fall tones

Bloom Time:
- Late Summer

Root Depth:
- Deep:
  - Deep roots penetrate dry soil and improve infiltration.

Leaf Shape:
- Narrow and rolled, grass-like blades
  - Upright clumps slow water on dry slopes.

Plant Size:
- 2 - 3 feet tall
  - Winter form adds seasonal structure and erosion resistance.
  - Stiff stems remain upright in winter, helping trap snow and slow water runoff.

Superpowers:
- Monarch host, absorbs water, supports wetland biodiversity

Best Placement:
- Lowest part of the rain garden (wettest zone)

Activity C - Plant Profile Worksheet

Plant	Soil	Moisture	Root	Function	Sun
Cardinal Flower					
Firewheel					
Aromatic Aster					
Marsh Milkweed					
Fox Sedge					
Purple Coneflower					
Spicebush					
Little Bluestem					

Please use the bank below to select your answers.
Unless specified, some answers may have multiple correct ones.

Soil 1 per plant	**Moisture Tolerance**	**Root Depth**	**Superpower/ Function**	**Sun Preference**
Clay Sandy Loamy Silty	Wet Moist Dry Variable	Shallow Medium Deep	Prevents erosion Filters pollutants Attracts pollinators Tolerates drought Absorbs heavy rains Wetland tolerance	Full sun Part Shade Full Shade

Answer Key - Plant Profile Worksheet

Plant	Soil	Moisture	Root	Function	Sun
Cardinal Flower	Loamy	Wet/Moist	Medium	Attracts pollinators, absorbs rainfall, wetland tolerance	Part shade
Firewheel	Sandy	Dry	Shallow	Drought tolerance, erosion prevention	Full sun
Aromatic Aster	Clay/Loamy	Dry/Moist	Medium	Pollinator-friendly, drought-resistant	Full sun
Marsh Milkweed	Loamy/Silty	Moist/Wet	Medium	Attracts butterflies, filters pollutants, wetland tolerance	Full sun
Fox Sedge	Clay/Silty	Wet	Medium	Stormwater absorption	Part shade
Purple Coneflower	Loamy	Moist/Dry	Deep	Pollinator magnet, erosion prevention	Full sun
Spicebush	Clay/Loamy	Moist	Shallow - Medium	Shade-loving, wildlife-friendly	Full shade
Little Bluestem	Sandy/Loamy	Dry	Deep	Erosion control, drought-resistant	Full sun

Activity - Challenge Scenario

Challenge 1: The Flood Zone
This area floods during storms and gets full sun. You need a plant that can absorb heavy rainfall and stabilize the soil.

What plants would work here?

1.

2.

3.

Challenge 2: A Slippery Slope
A slope near the sidewalk keeps washing out. Pick a grass that prevents erosion and handles dry spells.

What plants would work here?

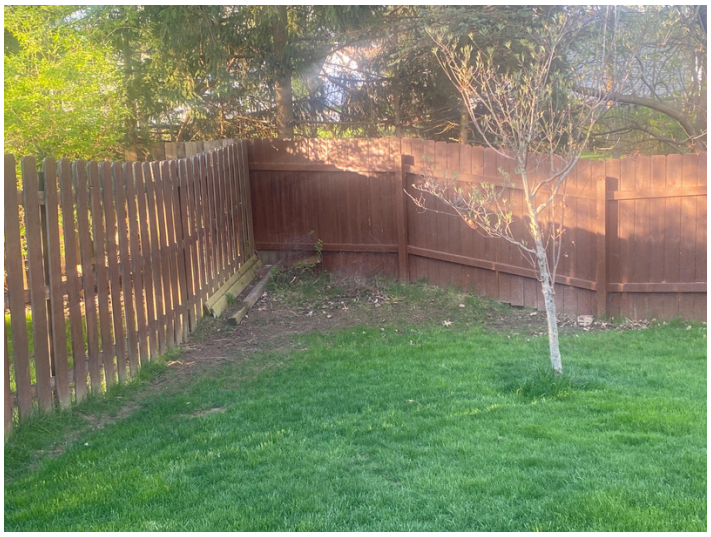
1.

2.

3.

Activity - Challenge Scenario

Challenge 3: Pollinator Pocket
This corner gets occasional rain but is important for pollinators.



What plants would work here?

1.

2.

3.

Challenge 4: Shady Problem Spot
This back corner stays shaded most of the day and holds moisture after rain. You need a plant that can thrive in shade and help hold the soil in place.

What plants would work here?

1.

2.

3.

Answer Key - Challenge Scenarios

Challenge 1: The Flood Zone

1. Cardinal Flower
2. Marsh Milkweed
3. Fox Sedge

Challenge 2: A Slippery Slope

1. Little Bluestem
2. Firewheel
3. Purple Coneflower

Challenge 3: Pollinator Pocket

1. Aromatic Aster
2. Purple Coneflower
3. Spicebush

Challenge 3: Shady Problem Spot

1. Spicebush
2. Fox Sedge
3. Cardinal Flower