

Adapted from the rain garden curriculum created by the University of Wisconsin, Madison, Arboretum's Earth Partnership for Schools

Grade level: Elementary (K – 6); Group size: 12 – 35; Time needed: 1 to 3 hours; Cost per group: Transportation

Summary: What is a green roof? How do they help protect the environment? In this fieldobservation activity, elementary students individually or working in teams will learn about green-roof design, energy conservation, and the types of plants and creatures that can live in the extreme environmental conditions found on rooftops. They will identify and describe key engineering features, such as water systems and paths; examine the different types of plants, insects, and animals that inhabit the rooftop ecosystem; and discuss and draw conclusions from their observations.

Learning Objectives:

Students will:

- Use their observational skills
- Learn how green roofs are built to save energy
- Describe and sketch different design features and types of plants
- Understand the impact of humans on the landscape
- Draw conclusions from observations

Standards:

National Science Education Standards:

- Science as Inquiry (K- 8) Develop the abilities necessary to understand scientific concepts; appreciate "how we know" what we know in science; and become independent inquirers about the natural world.
- Science in Personal and Social Perspective (K-8) Abilities of technological design; science and technology in society; populations, resources, and environments.
- Physical Science: Light, heat (K-4); Transfer of Energy (5-8)
- Life Sciences: Organisms and Environment (K-4) Structure and Function in Living Systems; Diversity and Adaptations of Living Systems (5-8)



Green Roof Fact Sheet

What's a green roof? Green roofs are basically plants and gardens on rooftops.

What are the advantages of green roofs?

- 1. Cooling
 - Green roofs can lower temperatures on a roof by 25-80 degrees
 (on a 90-degree day, a traditional black roof is 170 degrees; a green roof 94 degrees)
 - Reduces heating and cooling costs by up to 26%
 - Reduces urban heat island effect
- 2. Water conservation
 - Retains up to 75% of water that falls on it
 - Reduces storm water run-off, improving water quality
 - Filters pollution so it doesn't run into storm drains and waterways
- 3. Benefits of plants
 - Filter and absorb the pollution from air and water
 - Reduce carbon dioxide (CO₂) thus reducing greenhouse effect
 - Release oxygen, improving air quality
 - Reflect solar radiation, cooling surface
- 4. Wildlife benefits
 - Provides a habitat and stopping point for migratory birds
 - Attracts bees and butterflies
 - Increases biodiversity in urban areas

How are they made?

Top layer: plants, grasses, herbs 2nd layer: mulch or material to prevent erosion 3rd layer: soil 4th layer: drainage layer 5th layer: impervious layer 5th layer: roof structure

Now let's go on a field trip to see one. Divide the class into 3 groups. Each group will observe a different aspect of the green roof, sketch the roof, label design and plant features from their observations, and discuss and draw conclusions from their observations. Worksheets follow this page. The final worksheet is a more general field-observation guide with elements of all three, but more focused on plants and bugs.









Noting Notable Features Worksheet

WATER TEAM

Names:
Location:
Date:
Time:
Temperature:
Weather conditions

Sketch the green roof on the back of this sheet.

1. Locate or show the following on your drawing:

- Water source(s)
- Direction of water flow from high spots to low spots
- Standing water
- Drainage paths
- Areas that may dry out faster than others
- Hoses, sprinklers, or other irrigation systems
- 2. If the water seems to pool in a particular area, why is that so?

3. How does water get to the plants? Based on your observations, how would you improve the system to make watering easier?



Noting Notable Features Worksheet

TOPOGRAPHY TEAM

Names:
Location:
Date:
Time:
Temperature:
Weather conditions:

Sketch the green roof on the back of this sheet.

1. Locate or show the following on your drawing:

- High spots and the highest spot
- Low spots and the lowest spot
- Flat areas
- Steep Slopes
- Wind direction
- Types of soil
- Paths, terraces, ladders, rocks, fences or other design feature
- Soil types
- 2. What are the advantages and disadvantages of flat or sloped roofs?

3. How do humans get around on the green roof to maintain it? Based on your observations, how would you improve human access to the roof?



Noting Notable Features Worksheet

PLANT TEAM

Names:
_ocation:
Date:
Time:
Temperature:
Neather conditions:

Sketch the green roof on the back of this sheet.

- 1. Locate the following on your drawing:
 - Plants & insects
 - How many different types of vegetation do you see?
 - Paths, rocks or other garden features
 - Water source
 - What are the plants used for? (Shade, shelter, color/design, erosion control)
 - Why were these plants chosen for the green-roof garden?
- 2. Who cares for the plants? How do they get water?
- 3. Based on your observations, which plants grow best on a green-roof garden?



Green Roof Field Trip What's Up Here? Student Observations

Name:
Location:
Date:
Time:
Temperature:
Weather conditions:
What do you see on the roof?
1. Find at least three different types of leaf or plant and sketch one.
2. Do any of the plants provide food for humans? Which ones?
4. Find evidence that an animal has eaten a plant. Can you guess who it was?
5. Find three different types of insects or animals and sketch one.
6. Where does the water come from?
7. Are there paths for humans?
8. Is the roof flat?
9. What is the coolest feature about the roof, and why do you think that?

