MNLA Curriculum Unit C, Lesson 3

UNIT TITLE: Water in the Landscape

LESSON 1: Rain Gardens; 30-40 minutes

MINNESOTA ACADEMIC STANDARDS IN SCIENCE:

3.1.1.2.4 Scientific inquiry is a set of interrelated processes incorporating multiple approaches that are used to pose questions about the natural world and investigate phenomena.

3.1.3.2.2 Men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.

4.3.2.3.1 Water circulates through the Earth's crust, oceans and atmosphere in what is known as the water cycle.

4.3.4.1.1 In order to improve their existence, humans interact with and influence Earth systems.

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GRADE LEVEL/SUBJECT: 3-4 Science

OVERVIEW: This lesson will expand and/or reinforce third and fourth grade students' knowledge of the water cycle and introduce the use of rain gardens as a strategy to help minimize water pollution.

OBJECTIVE: Students will be able to:

- describe the water cycle
- describe what a rain garden is and how it helps to improve water quality
- describe how soils and plants help to filter pollutants from the water

MATERIALS:

- 3 - 5.5" plastic growing pots
- sand and potting medium
- disc of coir hanging basket liner material
- red or blue food coloring
- 3 - aluminum pie pans
- pictures of rain gardens
- one piece of notebook paper for each student

ACTIVITIES AND PROCEDURES:

1. Introduce yourself and briefly tell what you do. Use the titles of your position and those of your colleagues to provide students with a vision of career opportunities.

2. Ask the students to describe the Water Cycle (hydrologic cycle). Draw a diagram on the board to review if needed.

3. Ask students to raise their hands if they have heard of a rain garden, seen a rain garden in their community, at school, at home, in parks or in other locations in the landscape. If there are positive responses, have the students describe the rain garden they know about. If there are no responses, ask students to describe what they think a rain garden might look like.

4. Explain that a rain garden is a depression or bowl in the landscape that is made to hold water when it rains. Show several pictures of rain gardens. Describe the path of a rain drop that lands on a roof, rolls across the lawn, down the driveway, into the street and then into a river or lake. Ask students to name pollutants that the rain drop might pick up as it travels from the roof to the river. Hints may be necessary to get them to think about vehicle exhaust residues, melted popsicles or spilt pop on the sidewalk, leaves in the street gutters, chemicals in smoke emissions from manufactures, etc.

   The goal of putting in a rain garden is to prevent the rain water that runs off of roofs, sidewalks, driveways and yards, that is carrying pollutants, from ending up in the lakes and rivers. Rain gardens are made by digging an 8-12 inch deep depression or bowl in the yard and planting it with a variety of plants. When it rains the water runs into the depression or bowl and slowly seeps into the ground. The soil and plants in the water garden will pull out many of the pollutants from the water. The clean water will trickle down to the aquifers below. The springs from the aquifers can put the cleaned water back into the lakes and rivers.

5. Draw a diagram on the board of a house with a depression in the lawn to represent the rain garden; OR show pictures of rain gardens from landscape installations or printed pictures from internet sites; OR go out to the school's rain garden. Using the diagram, explain how rain falls onto the roof, rolls off and ends up in the rain garden rather than in the nearby lake.

6. The following demonstration will help students visualize how soil and plants in the rain garden help to filter and clean up the water.

   Fill one 5.5" growing pot with sand, another with potting medium and a third with potting medium and a disc of coir hanging basket liner on top of the medium to represent the presence of plants. Place each pot in a separate aluminum pie pan.

   Ask one or more students to assist with the demonstration. Put 4 drops of blue or red food coloring (represents pollution) into one cup of water. Have a student pour the

colored (polluted) water over the sand. Ask students to observe and describe the original color of the water to the color of the water that comes out the bottom of each of the pots. Explain that soil particles and plants can pull some pollutants from the water, but it is still important not to pollute because some pollutants can still get through.

Repeat the colored water application with the other two pots of soils.
Ask students observe and describe the original color of the water and the drained water from the three pots. Discuss with students how the soil and plants can hold onto some of the pollutants and help clean the water. Emphasize how the soils and plants in our yards and throughout the landscape help to clean up water. Explain that swamps and wetlands are also important areas where nature is filtering water through soil and plants.

7. Remind students that only 3% of the water on the Earth is fresh water that people can use. It is important not to pollute the water. Nature has a natural way to help clean up water and that is to let the water run through the soil. Soil, and the plants growing in it, will pull some pollutants out of the water. Therefore, soil and plants are important in maintaining a clean water supply and a healthy environment. Explain how your role as a Green Industry professional supports a healthy relationship between soil, plants and water.

ASSESSMENT:

Students will complete the following questions on a piece of notebook paper:

1. Draw a diagram of the water cycle or list the phases of the water cycle.
2. Describe a rain garden and how it helps to clean our water.

HANDOUTS AND WORKSHEETS: NA