

Lesson Planning Tool for Climate Change Unit

Title of Lesson: Reduce Stormwater Run-off

Grade Level: 2

Subject: This lesson will focus on pollutants that can enter the ecosystem through storm water. Students will brainstorm and implement ways that we can reduce stormwater runoff.

Source(s) of the lesson:(

Dwayne the Storm Drain: <http://www.mwra.state.ma.us/publications/dwayne/dwaynebook.pdf>

Google maps

Engineering Design Process: <http://www.eie.org/overview/engineering-design-process>

Visuals from the Charles River Watershed association: <http://www.crrwa.org/blue-cities>

*optional

<http://www.mwra.state.ma.us/02org/html/edpresentations.htm>

Essential Question(s):

Where does our water go after it falls in the storm drain?

Where are the storm drains near our school?

How can we prevent a lot of stormwater from flowing into the storm drains?

Massachusetts Curriculum Frameworks Science Standards:

2-ESS2-1

Content Objectives	Practice Objectives	Language Objectives
Students will test out solutions they have designed to reduce stormwater runoff	Planning and Carrying out investigations	CCSS.ELA-LITERACY.SL.2.1 Participate in collaborative conversations with diverse partners about <i>grade 2 topics and texts</i> with peers and adults in small and larger groups.
Students will describe why excessive storm water can be a problem for a community and/or watershed system. They will then design ways to reduce stormwater runoff around their school.	Constructing explanations and designing solutions	CCSS.ELA-LITERACY.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

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Important Vocabulary:

Storm runoff, pollutants, absorption, impervious, drainage, grate

Materials Needed:

A large collection of recycled materials

Soil

Seeds/ Plants (the following are suggestions)

- *Grasses*
- - Virginia Wild Rye (*Elymus virginicus*)
 -
 - Little Bluestem (*Schizachyrium scoparium*)
 -
 - Creeping Red Fescue (*Festuca rubra*)
 -
 - Big Bluestem (*Andropogon gerardii*)
 -
 - Indian Grass (*Sorghastrum nutans*)
 -
 - Switch Grass (*Panicum virgatum*)
 -
- *Wildflowers*
- - Partridge Pea (*Chamaecrista fasciculata*)
 -
 - Butterfly Milkweed (*Asclepias tuberosa*),
 -
 - Golden Alexanders (*Zizia aurea*)
 -
 - Smooth Blue Aster (*Aster laevis*)
 -
 - Bush Clover (*Lespedeza capitata*)
 -
 - Purple Joe Pye Weed (*Eupatorium purpureum*)
 -
 - Wild Bergamot (*Monarda fistulosa*)
 -
 - Green Headed Coneflower (*Rudbeckia laciniata*)
 -
 - Grass Leaved Goldenrod (*Euthamia graminifolia*)
 -
 - Early Goldenrod (*Solidago juncea*)

<http://wildflowers.org/>

pots?

Other Resources: (websites, videos, books, etc.)

<http://forestsforwatersheds.org/reduce-stormwater/>

<http://www.wikihow.com/Reduce-Stormwater-Runoff-at-Your-Home>

<http://www.mass.gov/eea/docs/czm/stormsmart/ssc/ssc6-landscaping.pdf>

<http://www.mass.gov/eea/docs/czm/stormsmart/properties/ssp-factsheet-3-vegetation.pdf>

Background Information for Teacher: Provide the necessary information for effective instruction.

Stormwater runoff can cause a lot of damage to our watershed system. As rains get more severe (or storm drains get clogged up with trash) the water runoff system get overwhelmed. This causes flooding. There are a number of ways that stormwater can be absorbed before it enters the drainage system. In this lesson, students will be designing ways they can help solve the problem of stormwater runoff by reducing impervious surfaces around their school.

Background Information the Student Needs to Access the Lesson: What prerequisite knowledge should the students have?

If the unit has been carried out as written, students should have prior knowledge of watershed systems and extreme weather.

Lesson Structure

Lesson Launch (Do Now)	Ask and response: What happens to the water when it rains? Students should be able to answer that water goes through storm drains/ enters our watershed system and ends up in Boston Harbor. If not, please refer to the map in the Boston Harbor lesson http://www.crwa.org/charles-river-watershed#map
Background Instruction (pre-activity)	By now, students have already learned about the watershed system and how water moves. Students have also learned about severe weather systems. Now it is time to look deeper into the urban ecosystem and determine where water goes when it rains (too much?). To help introduce this concept, please download and read (or have students read) <i>Dwayne the Storm Drain</i> . To ensure that students understand the text, you might have them answer the following questions: Where does our storm water go when it rains? What else can get stuck in a storm drain when it rains?

<p>Activity</p>	<p>Day 1: On a smart board, use google earth to create a map of all the storm drains surrounding their school. (see attachment for example). *This part will require the class to go outside and actually find all the drains surrounding the school.</p> <p>Day 2: As a whole group, students will brainstorm ways they can help reduce stormwater runoff (hint: There should be discussion about planting). Once students have 2-3 good ideas (plans of where to plant), separate them into groups (of 2-3 students) to make a design. Students may design where in the Earth more plants could be added. They might design a container to hold a plant. Or... They might have a totally different idea altogether. (Please have students use the planning sheet attached to this lesson). Maybe assign each group a storm drain from the map you have created to design for.</p> <p>Days 3-6: Students implement their plan. Please use the Engineering Design Process to guide students. Students may need to run a test more than one time.</p>
<p>Discussion/ Debrief</p>	<p>After designs have been explained, try to bring the class back to thinking about watershed systems. Have a brief discussion about how their designs could impact the whole system.</p> <p><i>Will this design help keep Boston Harbor clean?</i></p>
<p>Formative Assessment</p>	<p>Student will answer a number of questions (attached to this document) about their design.</p>

Notes:

While students are in the design process here are a list of some guiding questions that might help...

- Is this a permanent or temporary solution?
- Do you think this solution will require a lot of materials? (maybe consider limiting the amount of materials students will be able to use?)
- Do you think this solution could pose any other problems? (safety?)
- How will you be able to test this solution?
- Will this work throughout the year?
- Is this solution helpful in any other ways?

Student planning sheet

We will plan to reduce storm runoff by...

Here's what that might look like



Draw a diagram of what you will use to reduce storm runoff. Make sure you include all group members in the diagram.

Here is a list of the materials we will need for our design:

Here are the steps we will need to follow to complete our design... (feel free to add more steps).

Step 1: _____

Step 2: _____

Step 3: _____

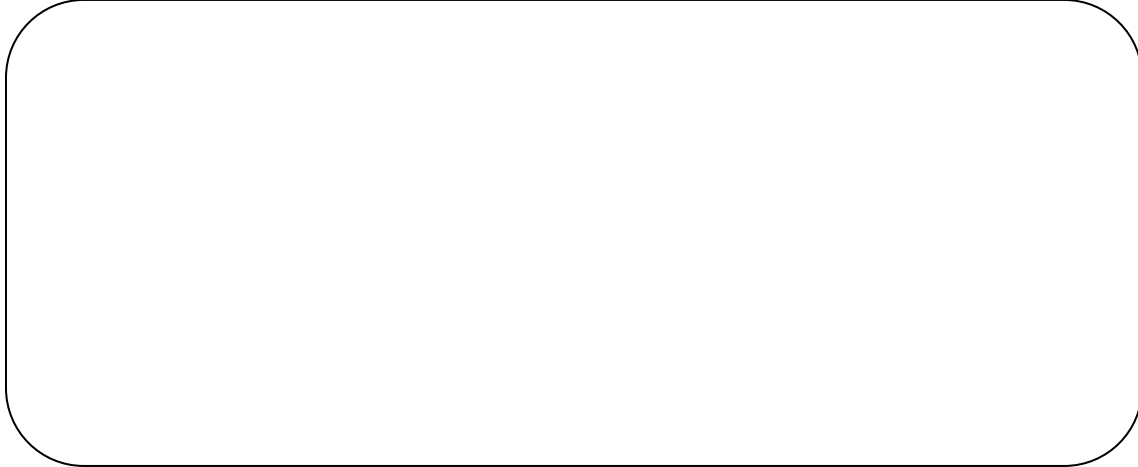
Step 4: _____

Step 5: _____

How will you know if your design works?

Student Assessment

1. Please draw and label a detailed diagram of your final design.



2. On a scale of 1-10, how well do you think your design works?

1 2 3 4 5 6 7 8 9 10

3. What worked well with your design?

3. What would you like to change about your design?

4. How has this project made you change the way you think about our watershed system?

(Please use the back if you need to write more.)