Stormwater - Engineering Design Curriculum

Explore and Compare Possible Solutions
Engineering Design - Stormwater

- Describe the Ecosystem
- Define the Problem
- Research the Problem
- Understand the Stakeholders
- **Explore and Compare Possible Solutions**
- Develop a Plan
- Implement and Test the Plan
- Summarize, Evaluate and Reflect
Lesson 9. Explore and Compare Possible Solutions

<table>
<thead>
<tr>
<th>Pollution Prevention Outreach</th>
<th>Schoolyard Solutions</th>
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<tbody>
<tr>
<td>• Yard</td>
<td>• Planting trees and/or native plants</td>
</tr>
<tr>
<td>• Car</td>
<td>• Improving soils</td>
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<tr>
<td>• Pet</td>
<td>• Rain gardens</td>
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<td></td>
<td>• Removing downspouts</td>
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<td>• Rain barrel or cistern</td>
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<td>• Porous pavement</td>
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Pollution Prevention-changing personal actions such as using less fertilizer and cleaning up after your dog can stop pollution at its source

Schoolyard solutions in the schoolyard to have stormwater runoff soak into the ground to filter out pollutants before they reach creeks, streams, lakes, and Puget Sound
Pollution Prevention Outreach Solutions
changing personal actions such as using less fertilizer and cleaning up after your dog can stop stormwater pollution at its source.
Pollution Prevention Possible
Stormwater Solutions

Yard

- Limit fertilizer
- Use herbicides or pesticides sparingly if at all
- Plant native plants that require less care
Pollution Prevention Possible
Stormwater Solutions

Car

• Fix car leaks

• Use a commercial car wash

• Carpool and combine errands for fewer car trips
Pollution Prevention Possible
Stormwater Solutions

• Scoop the Poop
Schoolyard solutions in the schoolyard to have stormwater runoff soak into the ground to filter out pollutants before they reach creeks, streams, lakes, and Puget Sound.
Explore and Compare Possible Solutions

- Planting trees and/or native plants
- Improving soils
- Rain gardens
- Remove downspouts
- Rain barrel or cistern
- Porous pavement
Planting Trees and Native Plants
Soil Improvements - Add compost to soils
Rain Gardens
Disconnect Downspouts
Rain Barrels and Cisterns
Pervious pavement and Pavers
Lesson 9. Explore and Compare Possible Solutions

<table>
<thead>
<tr>
<th>Polluted Stormwater Runoff Solution-</th>
<th>Description of Solution</th>
<th>How does this solution reduce pollution in stormwater runoff?</th>
<th>What resources do you need to complete this solution (time, money, materials, other people, etc.)?</th>
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<tbody>
<tr>
<td>Pollution Prevention: Informing people to influence behavior choices</td>
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<tr>
<td>Schoolyard Solution</td>
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<td>Other</td>
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### Student Journal Page: Evaluating Possible Solutions Table

<table>
<thead>
<tr>
<th>What Is the Solution?</th>
<th>Benefits - How will this solution reduce pollution in stormwater runoff?</th>
<th>Drawbacks (high maintenance, high cost, difficult to install, needs school district OK, etc.)</th>
<th>What would the stakeholders (students, city, teachers, neighbors, etc.) like or not like about this project?</th>
<th>What is the cost and difficulty level of this project?</th>
<th>Can you really do this project? (circle one)</th>
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3. Research the Problem
4. Understand the Stakeholders
5. Determine Possible Solutions
6. **Develop a Plan**
7. **Implement and Test the Plan**
8. Summarize, Evaluate and Reflect
Lesson 10 A and B. Develop, Implement and Test Plan

Develop a step by step plan

10A – Pollution Prevention Outreach

10B – Schoolyard Solutions
Lesson 10A. Develop, Implement, and Test the Plan: Pollution Prevention Outreach

- Posters
- Brochures
- Postcards
- Websites
- Skits and Presentations

Stormwater Pollution Prevention Educational Outreach Campaign
Pollution Prevention Outreach - Possible Tests of Solution

- Action Cards
- Pledges
- Looking Back Surveys
Lesson 10B. Develop, Implement, and Test the Plan: Schoolyard Solutions

- Planting trees and/or native plants
- Improving soils
- Rain gardens
- Swales
- Rock filled trenches
- Rain barrel or cistern
- Downspout splash block
- Pervious pavement or pavers
- Reducing pavement
- Filter for storm drain

Stormwater Pollution – improving the school grounds for stormwater to soak in and pollution to be filtered out by soils and plants
Lesson 10B. Develop, Implement, and Test the Plan:

Drained: Urban Stormwater Pollution
Lesson 10B. Develop, Implement, and Test the Plan:
Schoolyard Solutions-Examples

Schoolyard Investigations
• Compare slopes w/wo plantings
• Measure puddles
• Compare absorption rates

Schoolyard models of solutions
• Soil Columns
• Stream Tables
• Trees and Erosion
Engineering Design - Stormwater

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- Evaluate and Communicate
Lesson 10. Evaluate the Solutions and Communicate

Analyze results by evaluating from surveys, investigations and/or models.

Discuss ways to improve their Stormwater Pollution Solution Project.

Reflect on their accomplishment.

Communicate project in some way or put their project on a website.