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| Stormwater Curriculum **Grade 5** | | **Lesson Focus**  **⌧ Content Knowledge:**  Gray Infrastructure  Green Infrastructure  Site Plan/Campus Plan  **⌧ Content Skill(s):**  Observing  Analysis  **⌧ Thinking Skill(s):**  Observing  Analysis  **⌧ Habit(s) of Mind:**  Gathering Data through the Senses  Applying Past Knowledge to New Situations  Striving for Accuracy and Precision |
| **Lesson Title:** Researching the Problem: Mapping Our Campus for Stormwater Solutions  **Implementation Time:** Two60-minute class periods  **Resource(s):** Digital Cameras; Home-School Connections  **Materials Needed:** PowerPoint slide: green and gray engineering solutions, Campus Maps, Engineering Map Symbols, Cognitive Content Dictionaries; Protocol for Outdoor Learning | |
| **Learning Goal:**  *I can identify the application of stormwater engineering solutions (gray and green infrastructure) on my campus, recognize problem areas, and use symbols to create an accurate map of my school yard.* | **Assessment:**  Completed stormwater maps identifying current stormwater solutions and runoff issues. | |
| **Common Core Standards:** | | |
| **Procedure:**   1. Share today’s learning goal:   *I can identify the application of stormwater engineering solutions (gray and green infrastructure) on my campus, recognize problem areas, and use symbols to create an accurate map of my school yard.*  Ask students: What will they need to know or do to accomplish this learning goal (Applying Past Knowledge)  Tell the students that they are researching the problem of stormwater runoff. Today they are doing that by mapping the school campus. Engineers often start by gathering data to better understand a complex problem like stormwater runoff and pollution. This is an important step in the process of engineering solutions.   1. Ask students to apply their past knowledge from Grade 3, when they identified needed solutions to stormwater runoff. If possible, share actual maps from grade 3 that show problem areas on the campus. Today, students will look at steps that have been taken to improve runoff and consider additional site improvements. 2. Review with the students “gray and green infrastructure” engineering solutions for stormwater management that they researched. Both types of infrastructure refer to site modifications that improve stormwater runoff and pollution. Remind students: Green infrastructures use nature and natural materials. Green infrastructure solutions include installing rain gardens, planting trees, constructing green walls or roofs, bioswales, and retention ponds. Gray infrastructures use manmade materials to manage stormwater. Gray infrastructures include storm drains, rain barrels, curb cuts, filters in storm drains, pervious concrete, and pavers.   *Continued on next page…* | | |

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| Stormwater Curriculum ***Researching the Problem: Mapping Our Campus, page 2*** |
| **Procedure:**   1. Show the power point slide presentation that depicts each of these solutions. Share that students will look for evidence of these engineering solutions first on their school campus and then in their local neighborhood. 2. Invite the students to talk with each other about what stormwater engineering solutions they expect to find on their school campuses and where they think they will find them. For example, a rain garden is an example of a “green infrastructure” stormwater engineering solution. Ask students to record their predictions so that they can see how closely their predictions match what they actually discover. 3. Distribute the maps that the students will use and discuss the surveying activity that will follow. As in third grade, students will use special symbols on their maps to record what they find on their school campuses. Distribute the engineering symbols and review what each means. Students will mark existing stormwater solutions and note places where additional improvements would benefit stormwater runoff. 4. Remind the students that they are working like engineers when they evaluate the current state of the schoolyard. The students will want to use the Habits of Mind of Gathering Data through the Senses and Striving for Accuracy and Precision as they map the schoolyard. 5. Review the protocol for outdoor learning. Take the students out to the campus and ask them to proceed with the mapping. They should take photos of each practice as well as recording the practices on their maps. 6. Upon return to class, debrief with the students:  * Were their predictions accurate? * Were they surprised by anything they saw? * What did they notice that needs improvement on the campus? (Refer to 3rd grade maps and proposed site improvements)   Share that the next step in this engineering process is to evaluate the options for site improvement and their potential impact on stakeholders. Engineers first must identify the problem, review the current state, and then begin to think about the best options for improvement.  **Home-School Connection:** Tell students to go on a scavenger hunt in their neighborhood. Which stormwater solutions can they identify? Ask the students to take pictures of the stormwater solutions they find and to incorporate these into a document that shows stormwater solutions in their neighborhood. The document can be in the form of labeled photos, a labeled street map or other way to show neighborhood efforts to manage stormwater runoff and pollution. Create a bulletin board display to show the various neighborhoods and the stormwater solutions.  **Additional Extension:** Provide students with copies of the storm drain map for Maple Valley. The map shows the infrastructure for moving stormwater into detention ponds and local rivers and lakes like the Cedar River and Lake Wilderness. Ask the students to find their neighborhood on the map. What are they learning about how stormwater runoff is directed to surface water and to detention ponds in their neighborhood? |
| **Closure/Assessment:**  Collect the student maps to check for accuracy, completeness and clarity. |

**Protocol for Outdoor Learning**

**Applying Habits of Mind**

1. **Gather Data Through Your Senses**: Watch, Listen, Smell, Touch
2. **Strive for Accuracy and Precision**: Use your journals, maps, or other documents to carefully record what you observe.
3. **Think Interdependently**: Work with your partner as an equal member of a team by discussing what you observe.
4. **Question and Problem Pose**: Be curious and inquisitive as you make your observations. Capture questions for follow up in the classroom.
5. **Manage Your Impulsivity**: Stay focused on the purpose for the outdoor learning
6. **Demonstrate Empathy**: Leave the observation site the same or better than prior to your visit

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### Map Legend Green and Gray Infrastructures

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|  | Detention pond |
|  | Flowers and shrubs |
|  | Trees |
| C:\Users\tashley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GO5IV0A2\MC900446108[1].wmf | Grassy lawn |
|  | Drains |
|  | Pipe |
|  | Pervious surface |
|  | Impervious surface |
| C:\Users\tashley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\4WA5I1HO\MC900014759[1].wmf | Rain barrel |
| C:\Users\tashley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\ESKJ1VCM\MC900237936[1].wmf  C:\Users\tashley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\4WA5I1HO\MC900437459[1].wmf | Rain garden |
|  | Green wall |
| C:\Users\tashley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\0F9JOVOV\MC910216993[1].png | Green roof |
|  | Bioswale/curbcut |









