Down the Drain…. but Where?

Grade(s): 4-5; 6-8	**Topic:** Ecosystems	**Time Frame: 2** days

Lesson Description:
This lesson explores how the sewer and storm drains are related or integrated into the water cycle

Specific Learning Outcomes:

- TSW examine the differences between sewer drains and storm drains.
- TSW evaluate the ecological damages that occur from storm drain dumping.
- TSW be able to create a pamphlet informing the community of the importance of safe practice of proper disposal of chemical waste such as motor oil, pesticides and lawn fertilizers.

Resources Needed:
1. Computer for internet access and Word app
2. Printed Copies of attached reading documents
3. Printed Coloring Page - Our Community
4. Construction Paper 1- sheet
5. Venn diagram
6. Poster board
7. Copy paper

Activity Standards

TN Science Standards	Next Generation Science Standard Practices	Common Core Standards
GLE 08 & 0707.T/E.1 Explore how technology responds to social, political, and economic needs.	**Practice 6**: Constructing explanations (for science) and designing solutions (for engineering)	**CCSS.ELA-Literacy.WHST.6-8.9** Write informative/ explanatory text to examine a topic and convey ideas, concepts and information through selection, organization and analysis of relevant content.
GLE 08 & 607.T/E.3 Compare the intended benefits with the unintended consequences of a new technology		**CCSS.ELA-Literacy.RST.6-8.2** Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GLE 0807.Inq.5 Communicate scientific understanding using descriptions, explanations, and models		**CCSS.ELA-Literacy.RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts.

Guiding Questions
Also known as your essential questions. What do you want the students to be able to answer by the end of this lesson

1. Using what you already know about the water cycle, how does storm water or sewer water become apart of the water cycle again?
2. Why do some cities have a joined sewer pipeline and others have separate sewer/ storm drains?
3. What pre-cautions can you implement in your home to help reduce the amount of pollutants into your water resource?

Possible Preconceptions/Misconceptions

1. All water is treated before it is dumped into a freshwater source. (i.e. rivers, streams)
2. Big companies pollute the water resources more than residential communities.
3. Potable water has low-cost or is free.

Activities/Task

What learning experiences will students engage in?

Day One

The Hook: Journey thru the Storm Drain video http://www.youtube.com/watch?v=ytq7DP9ENhU

Activity #1a: What does the inside of a **sewer drain** look like? Students will use various images to create their own poster and line the poster with contaminants that could possible be found inside a sewer drain. Then student will discuss how each item was added into the sewer and its possible side-effects on the environment. (i.e. paper products, fecal waste, dead pets, shampoo residue, laundry detergents and cleaning agents (Drain-O) etc.)

Activity #1b: What does the inside of a **storm drain** look like? Students will use various images to create their own poster and line the poster with contaminants that could possible be found inside a sewer drain. Then, the student will discuss how each item was added into the storm drain and its possible side-effects on the environment. (i.e. animal feces, oil, fertilizer, etc.)
After the students have completed their posters in class. Have the students discuss the results and determine ways they can immediately eliminate the amount of inappropriate misuse of drains. What have local companies done to help reduce the amount of contaminants in these drains?

Activity #2- Reading Websites: RESEARCH- read the following article and complete the attached worksheets
(1) When It Rains It Pours
(2) Impact of Urban Storm Drain Runoff
(3) Venn Diagram- Pros and Cons chart on car washing

Day Two
Activity #3
Explanatory Poster, Pamphlet or Flyer- See Writing Task

Activity #4 Vocabulary
impervious, precipitation, runoff, pesticides, agricultural, contaminates, groundwater, hydrologic cycle, sediments, fecal coliform and ecosystem

Reading Task	**Writing Task**
One of the literacy shifts in common core is for students to focus on more complex, non-fiction literature.	In science, students are responsible for writing either an explanatory or argumentative piece. Simply type the writing prompt below in which students will dive into.
Activity: When It Rains It Drains & Impact of Urban Storm Drain Runoff Have student read the pamphlet/ articles and complete the attached worksheet to aid in their research	After completing all the required reading, students are to create a pamphlet or flyer alerting the community of the hazards that occurs in their own community by washing cars in the driveway. Students must be able to clearly provide alternative ways for residents by pointing out its benefits.

Assessment

How will your students be assessed? How will you use the above learning experiences as formative assessment opportunities? (If activity is several days long, please specify the day with the activity/reading task)

There are several ways you as a teacher can assess your students progress in understanding this information:

(1) Writing Rubric- Develop your own rubric based on the skills the student should already know and are currently learning. Also, include a rubric for clarity of writer to relay relevant information. Illustrations used in the pamphlets or flyers are creative and accurate. The student should be able to apply the information and explain to the reader the pros and cons of washing vehicle on lawns.

(2) Formal Assessment Questions: See Attached

Modification/Accommodations:

What curriculum modifications and/or classroom accommodations can be made for students with disabilities in a class

For student(s) that can't identify main ideas or important points.

- Highlight important points of the text to draw attention. Tell the student to read these points first.
- Give the student a list of important vocabulary terms.
- Have the student read the summary or objectives first.
- Have the student read the review questions first, then look for the answers.
- Give the student a worksheet or study guide to follow when he or she must do independent reading.
- Use hands-on activities, pictures, or diagrams to support understanding of abstract concepts or complex information.
- Let the student use sticky notes or an erasable highlighter to mark key points in the textbook.
- Let the student use a book written at a lower grade level. This can help the student pay more attention to the main ideas.
- Additional time to complete work and reading assignments