HISI - Lesson Outline

Module Title_Stormwater Diversion and Management_____   **LS Team_Arcata/SR_____**

Grade level(s): __9-12_____

Lesson # 1 Title: Introduction and Pre-Test	Number of Minutes: 50
Mathematical purpose: To define and indentify variables involved in the effects and management of storm water runoff, and make water volume predictions.	Scientific Purpose: To understand what storm water runoff is, its effects, and possible ways to reduce it.
Materials needed: ● Pre-Test as a handout ● Presentation hardware to display video ● Graphic Organizer (YouTube video) ● Fermin Problem Explanation (YouTube video) ● Article for annotation "Stormwater Management" handout ● Highlighter pens	Academic vocabulary: emerging throughout the module Annotation Low Impact Development (LID) Hydrology Green Infrastructure Environmental Site Design (ESD) Sustainability Bioretension Permeable Pavement Cistern Soil Amendments Compaction
Common Core Standards (copy and paste): • Make sense of problems and persevere in solving them. • Construct viable arguments and critique the reasoning of others. • Use appropriate tools strategically.	Next Generation Science Standards (copy and paste): • Constructing explanations (for science) and designing solutions (for engineering) • Obtaining, evaluating, and communicating information

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When students are finished they will understand: ● The environmental impact of storm-water and Low Impact Development (LID) strategies ● How to annotate in a math class ● How to synthesize information to develop a solution ● Cooperative interaction within learning groups	What are teacher questions or prompts? ● In your own words, describe stormwater runoff. ● How does rain water affect the environment? ● What are some ways to manage runoff? ● How might you summarize your thoughts by writing notes on the reading?
What are questions you anticipate students will have? ● How does the water get contaminated? ● How do I annotate my reading? ● Why are storm drains built this way? ● Are their other LID techniques that haven't been considered? ● How is rainwater managed currently on campus? ● What does (this vocabulary word) mean? ● How do I approximate large volumes of water accumulated from rain?	What are misconceptions students might have? ● This isn't math. ● We don't read in a math class. ● Uncomfortable with estimating. ● Uncomfortable with open ended solutions. ● Rain water is clean

General outline of the lesson:

HISI Storm Water Diversion: Lesson Design Template

Subject(s):   Pre-Calculus; Geometry   Grade(s): 9-12
Teacher(s):   Koczera, Zamboni, Wozniak, Bagnall, Zapper   School: AHS; SRCHS

Lesson Elements

Background Knowledge: What do the students already know/what have they studied, that has prepared them for this lesson?

Pre-Test. Annotation of text, estimation, computation of area and volume, cooperative group interaction and norms, some knowledge and experience with rainfall volume and environmental issues.

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Learning Target: **What will students know and/or be able to do as a result of this lesson?** *(Student-friendly language)*
● **Students can annotate and derive meaning from an informational text.**
● **Students can define storm water runoff in their own words**
● **Students can list some techniques used to manage stormwater runoff.**
● **Students can synthesize information from multiple sources.**
● **Students can discuss and make predictions pertaining to runoff in a familiar location.**

Standards: **What CCSS Subject or Anchor Standards are addressed in this lesson?**

Make sense of problems and persevere in solving them.
Reason abstractly and quantitatively.
Construct viable arguments and critique the reasoning of others.
Model with mathematics.
Use appropriate tools strategically.
Attend to precision.

Assessment: **What evidence of student learning will you collect that demonstrates what students will know and be able to do at the end of this lesson? Formative? Summative?**
(If possible, please link any links to rubrics, exams, assignment sheets, exit cards etc. that might be helpful to a teacher trying to trying to recreate this lesson.)

Students produce:
● Graphic Organizer summarizing their reading
● Fermi Predictions
● Annotated text
● Students also complete the module pre-test

Teacher Actions *What is my "air time" during this lesson?*	Student Actions *How do I provide time and space for students to construct their own meaning?*
Reading and Annotation Process: ● Establish Purpose: To read and critique a professional plan for stormwater diversion and	Reading and Annotation: ● Students observe video ● Students read articles and annotate with given instructions.

provide ideas to approach a management plan.
- Circle information that would be useful in helping to determine the particulars of stormwater management
- Cross out extraneous information.
- Place question marks next to information that is confusing to you, that you disagree with, or that you question the validity of.
- Comment on sections with your thoughts.

Provide students with a graphic organizer to organize their thoughts after reading the text. Students should find 3 information items to share.

Prompt students to begin answering the Research Question and to create their presentation.

- Students note 3 informational items on the graphic organizer.
- Student groups share out and present the 3 informational items to the class (Jigsaw all 6 readings)
- Groups have opportunities to question the presenting group.

Students begin creating solution to the research question, "How do you manage stormwater run-off?"

Students work to address all requirements:
- How much water falls on campus each year?
- How much water goes into storm drains? (What percentage is this?)
- How much water could be diverted? (What percentage is this?)

Students begin creating their presentation using Google Slides.

Supplemental Resources

Pre-Test

Graphic Organizer
http://youtu.be/kyH02NiyPA
http://youtu.be/6xmH2xxvyJ0

Annotation

Fermi Problem