**Module Title\_Stormwater Diversion and Management LS Team\_Arcata/SR Grade level(s): \_\_9-12\_\_\_\_\_\_\_**

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| **Lesson # 4. Title: Checking areas with technology** | **Number of Minutes: 50** |
| Mathematical purpose:**To use technology and Google Earth to check area calculations.**  | Scientific Purpose:**To use technology and Google Earth to better understand the importance and necessity of water conservation.**  |
| Materials needed:* Computers with Access to Google Earth
 | Academic Vocabulary:* Area
* Dimensions
* Meters
* Mathematical conversions
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| Common Core Standards :**Make sense of problems and persevere in solving them.****Attend to precision****Use appropriate tools strategically.** | Next Generation Science Standards :**Constructing explanations (for science) and designing solutions (for engineering)****Obtaining, evaluating, and communicating information****Planning and carrying out investigations** |
| When students are finished they will understand* **How to use technology to estimate areas on the planet**
* **How to compare and critique various methods of area calculation**
* **How to synthesize information to develop a solution**
 | What are teacher questions:* **What are various methods to calculate area?**
* **How do you ‘zoom in’ in Google Earth?**
* **How do you use the help menu?**
* **How do you convert the default meters settings to feet?**
* **How did your area calculations on the computer compare with your original calculations?**
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| What are questions you anticipate students will have?* **Is the computer or our calculations more accurate?**
* **How do we convert meters to feet?**
 | What are misconceptions students might have?* **Using google map is superior to doing these calculations by hand**
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| 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**

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| **Lesson Elements****Day 4** |
| **Background Knowledge: What do the students already know. What have they studied, that has prepared them for this lesson?****Area and Volume (PC) formulation, unit conversions, data collection, Right triangle trigonometry, google earth navigation, area of campus, area of non-permeable surfaces versus permeable surfaces, water maps, volume of rainfall on campus,**  |
| **Learning Target: What will students know and/or be able to do as a result of this lesson?** *(Student-friendly language)** **Calculate areas using Google Earth to estimate the volume of water that falls on the campus.**
* **Compare these estimates to those taken by hand.**
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| **Standards: What CCSS Subject or Anchor Standards are addressed in this lesson?****Constructing explanations (for science) and designing solutions (for engineering)****Obtaining, evaluating, and communicating information****Planning and carrying out investigations****Make sense of problems and persevere in solving them.****Reason abstractly and quantitatively.****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 recreate this lesson.)***Completion of the area calculation worksheet.****Exit card question: How did today’s area calculations compare to the ones you did yesterday?** |
| **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?* |
| Students will need access to computersProvide the students with the area calculation worksheet and school map.**Google earth tutorial*** **Go to Google Maps and click on Earth View.**
* **Zoom into Arcata High School.**
* **Double click mouse pad and use “measure distance” to determine the area of composite figures.**
* **The closer you zoom in the more accurate the calculation.**
* **Circulate asking questions**

Prompt students to compare their calculations with the ones taken by hand and to begin answering the Research Question and to create their presentation.  | Google Maps area calculation* **Working in groups students will use Google Maps to calculate area of all buildings and parking lots on campus.**
* **After a group discussion work should be divided amongst the members possibly with some overlap so calculations can be checked for accuracy.**
* **When all calculations are done groups will discuss how the calculations by hand compared to those done using Google Maps**
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