**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 |
| 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?** |
| 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** |
| 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**  **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.** | | | **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 computers  Provide 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** | | |