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| **School Library**  **Collaboration Planning** |

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| **Teacher(s):** Carol Wellen & 3rd grade team **Unit**: Weather & Climate  **Grade Level**: 3rd **Plan Date**: 9/26/16 **Time Frame**: 10-11 days  **Unit Overview and Description:**  In this unit, students will learn about weather, climate, and natural weather hazards. Students will view pictures and watch a simulation of what happens to farmers’ fields after heavy rain from a natural weather event. After learning about what an engineer does, students will assume the role of environmental engineers to design a way to previous damage to farmers’ fields caused by natural weather hazards.  **Culminating Learning Product:**  Students will use a variety of resources to create a design which farmers could use to prevent soil loss in their fields due to heavy wind and rain from natural hazards. | |
| **AASL Standard(s) and/or County or State Library Standards:** FCPS LM Standard 3: Students will be able to follow an inquiry process to find, evaluate, generate, record, and organize information. (AASL 21st Century Standard 1)FCPS LM Standard 4: Students will follow an inquiry process to interpret recorded data/information to create new understandings and knowledge. (AASL 21st Century Standard 2)FCPS LM Standard 5:  Students will follow an inquiry process to share findings/conclusions in an appropriate format in an ethical manner. (AASL 21st Century Standard 3) | **Content Standards:** Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1)Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3) |
| **Objectives/Learning Outcomes:**  Students will be able to:   * Explain the difference between weather and climate. * Describe five different natural hazards. * Describe how to prepare for severe weather. * Explain the difference between science and engineering. * Create a design that could prevent soil erosion from heaving wind and rain. | Unit Essential Question: How can we prevent soil loss and damage to farmers’ fields caused by natural hazards?   1. What is the difference between weather and climate? 2. What are some examples of natural hazards? 3. What damage can be caused by natural hazards? 4. How can we prevent damage caused by natural hazards? How can we reduce the impact of natural hazards? 5. How can natural hazards be problematic for farmers? 6. What strategies can farmers and environmental engineers use to prevent damage to fields? |

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| **Teacher will:**   * Gather the science materials from the school math/science kits. * Complete the pre-assessment with students. * Divide up the students into mixed ability groups. * Lead the initial lesson on erosion and demonstrate how erosion works, with assistance from the LMS. * Teach lessons on the difference between weather and climate, and natural hazards. * Provide time and space for students to work on their designs. | **Librarian will:**   * Provide the unit resources and digital tools. * Teach students how to use the various digital tools and databases. * Prepare all digital resources – Padlets, Kahoots, etc. * Teach the lesson on preparing for severe weather. * Teach the lesson about engineering and introduce the project. * Work with students on creating digital presentations of their designs. |
| **Materials:**    aluminum pan popsicle sticks  water gravel  50 lb bag of sand mulch  plastic gutter (cut in 3 ft lengths) plastic 1 oz glass  small container felt  2 cup/16 oz measuring cup chart paper  large 500 mL measuring cup colored markers  sticky notes (2 colors)  **Resources:**  Chromebooks  Google Classroom, Padlet, Powerpoint, Kahoot, MindMup  Digital camera/ iPad | **Unit Assessments:**  **Pre-assessment:**   * Weather pre-assessment in Padlet or MindMup   **Formative assessments:**   * Weather vs climate exit ticket * Natural hazards sort * Natural hazards Kahoot quiz * Engineering WordSplash * Engineering Plan Organizer/Reflection  Summative  * Engineering Design Presentation Rubric |

### Project Calendar

### Outline of Learning Actions

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|  | T-Teacher and L-Librarian |
| Day 1 | Erosion Event Baseline (T will lead in classroom, L will assist)  T will simulate a heavy rain event on a farmer’s field. T will have one of the rain gutter pieces filled with sand, elevated over a container, representing the field. T will pour 2 cups water into the rain gutter and students will observe what happens to the “field”. The sand runoff in the container can be measured and used as an erosion baseline for future experiments. L will assist as needed with the simulation, measuring runoff, and/or cleanup. L will also have a list/wiki/symbaloo of resources for students on erosion for students who want to learn more. |
| Day 2 | Lesson 1 Weather vs Climate (T in classroom)  Students will brainstorm their ideas about the difference between weather and climate for the pre-assessment.. T will show a video about weather versus climate. Students will then compare their perceptions (and misperceptions) with what was learned in the video. T will share the official definitions of weather and climate. Students will then use computer resources to look up the weather and climate for their location. |
| Day 3-4 | Lesson 2 Natural Disasters & Being Prepared (Day 3 – T in classroom, Day 4 – L in media center)  T will divide students into groups to view pictures of damage caused by various severe weather events. Students will rotate and view how others have sorted their pictures.  L will divide students into groups to each be an expert on a certain natural hazard. They will research their hazard on computers/Chromebooks using ready.gov to learn facts and how to prepare for their event. Students will present their findings to the class. |
| Day 5 | Lesson 3 Natural Hazards & Predicting Weather (T in classroom)  Students will use Accuweather or other website to view the weather for the day, week, and month. Students will also look at severe weather and warnings around the country. T will guide students in discussing if natural hazards can be eliminated or how we can prepare for them. |
| Day 6 | Lesson 4 What is Engineering? (L in media center)  Students will review the natural hazards sort with pictures of damage from hazards. L will explain what engineers do and how engineering is different from science/meteorology. L will introduce the design project and explain the objectives, process, and rubric to students. L will review the different options for their presentations and go over the digital tools they can use. |
| Day 7-9 | Lesson 5 Engineering Project (T in classroom)  T will introduce the variety of materials available for students to experiment with to find what works best at preventing erosion. Students will have 1 day to map out and plan their engineering design, and 2 days to test their designs. Students should test various options and see what works best. Once they have their best design, T will take picture of the final design with a camera or iPad. |
| Day 10-11 | Lesson 6 Design Presentations (Day 10 - L prep in media center, Day 11 – T in classroom)  L will work with students will prepare to present their finalized designs to an audience. On the last day student groups will present their designs. The audience may be the class, another class, or parents/community members. |

**Reflection of Collaborative Process and Planning:**

Once I chose the subject and grade level for collaboration, the planning process went smoothly. We knew we wanted to focus on a project that was more than just a straight research project. One of the third grade teachers remembered that there were project based learning ideas for science units on Frederick County’s curriculum website. One of the ideas for a third grade unit involved weather and climate, and presented the question about how severe weather can impact farmers. We all really liked this topic because our school is in a rural area, so this project would be very relevant for our students. After the topic was chosen, we went through the project plan and divided up the lessons and tasks. It made sense to do the erosion demonstration and the design experiments in the classroom, where there is access to a sink with water and where it would be easier to clean up ay messes. Similarly, any activities that involved students using Chromebooks would be in the media center.

The two stumbling blocks for this collaborative unit both occurred early in the planning. The first stumbling block was me trying to figure out what grade level I wanted to focus on and which teacher to approach. Being new in my position and at a new school meant that there are not any teachers who I feel comfortable approaching and interrupting their planning time to meet with me. At my last school this would have been easy, because there is at least one teacher in each grade level with whom I felt very comfortable and had developed a good rapport. Once I focused on third grade, then the only other stumbling block was finding common time to meet and plan.

I utilized UDL principles in planning my collaborative unit. The Universal Design for Learning is a great framework for planning units, because it is all about options. Having multiple means of representation, engagement, and expression are the key to reaching all students. The information about weather and natural hazards for this unit will be presented in several ways - fact sheets, pictures, video, and a demonstration. Students will be engaged in several ways - by having student inquiry as a component of the unit, and by making the project relevant to them. The one element I wanted to include in my unit plan was student inquiry. After observing two different media center lessons, I learned that students who get to wonder, explore their own ideas, and construct their own learning are more engaged. The two “Anatomy of a Project” videos also showed me that making learning relevant to students is a great way to get them interested in a topic and keep them engaged. Planning a project that focused on helping farmers in a farming community was a great way to make this unit relevant to the students. Finally, students will have multiple options for expressing what they have learned. Ultimately they will show it in the form of their engineering project, but the presentation of their design can be through a variety of options, some of which may be a poster, PowerPoint, or Voicethread.

**Engineering Design Summative Assessment**

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| **STUDENT FRIENDLY RUBRIC** | **YES!** | **ON OUR WAY!** | **NOT YET!** |
| **Content:** |  |  |  |
| 1. We understood the problem to be solved. |  |  |  |
| 2. We designed a reasonable solution based on knowledge gained during this unit. |  |  |  |
| 3. We made changes to our design based on results of experiment trials to reach the best possible solution. |  |  |  |
| **Teamwork**: |  |  |  |
| 4. We share ideas and listen to the ideas of others. |  |  |  |
| 5. We work to solve problems, manage conflicts, and stay focused. |  |  |  |
| 6. We treat others with respect. |  |  |  |
| 7. We complete our work on time. |  |  |  |
| **Presentation**: |  |  |  |
| 8. Wekeep eye contact with our audience. |  |  |  |
| 9. We speak loudly and clearly. |  |  |  |
| 10. We answer questions from the audience. |  |  |  |
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