Collaborating to Create Field Investigation Kits for Virtual Learning

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Developing MWEE capacity through systemic, vertically aligned, integrated curricula, grades K-12

Clarke County Public Schools, Virginia

1960 students; 4 schools

MWEE Project Partner:
UVA's Blandy Experimental Farm

https://www.noaa.gov/sites/default/files/legacy/document/2021/Mar/PDF-2020bwetfactsheet-032621-BWET.pdf

This session is highlighting some of the outcomes from a NOAA BWET grant for a project systemic through the school division K-12

University of Virginia's Blandy Experimental Farm & the State Arboretum of Virginia

Clarke County Public Schools






Our Mission: *"To advance understanding of the natural world through* ***education***, ***outreach***, *and* ***research****."*

700 acres: wetlands, meadows, woodlands, succession fields, tree collections, gardens, open spaces
CCPS- 4 schools, rural, agricultural county. Had the ability to be very localized in our MWEE approach

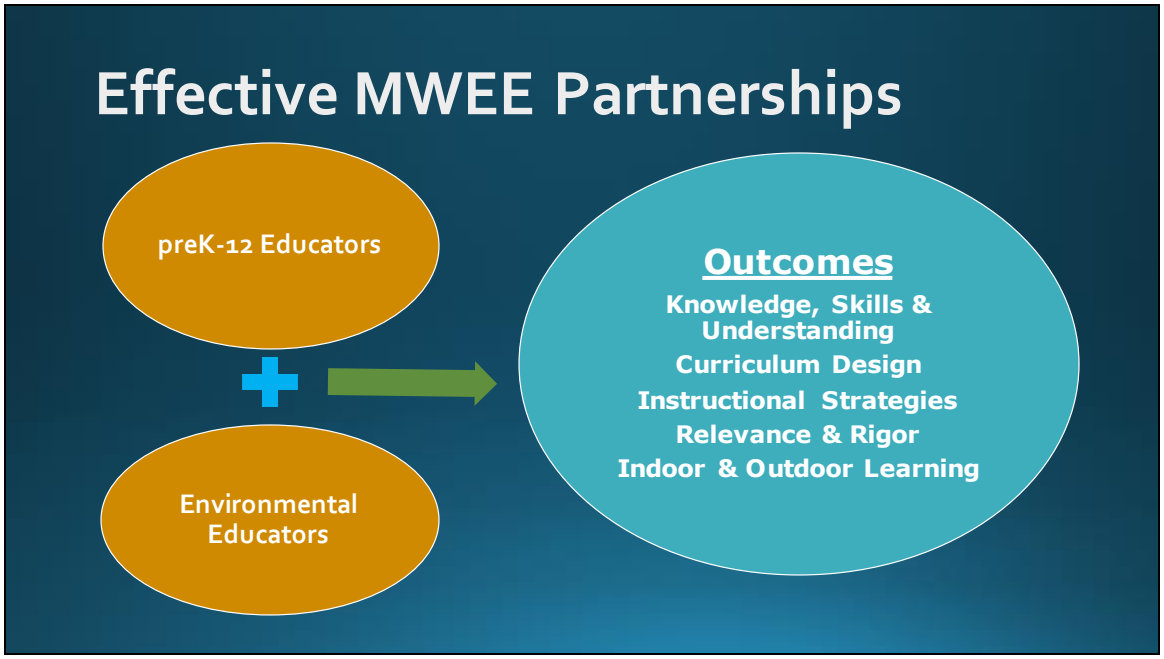
Project Background

- Funded by a NOAA B-WET grant, a program that promotes MWEE (Meaningful Watershed Education Experiences)
- Creating interdisciplinary environmental literacy curricula that spans grades kindergarten through 12.
- Teachers incorporate locally-relevant environmental issues and outdoor-based teaching into their instructional strategies.
- Students engage in field-based investigations focused on local land use and land management, water quality, and how this affects organism health and human use of our waterways and organisms native to our watershed system.
- Students investigate environmental and watershed systems in an interdisciplinary format using knowledge and skills from the four main content areas as they assess and synthesize environmental and watershed system components, processes, and human impacts.

Students engage in activities designed to develop environmental literacy (ELIT) knowledge, skills, and attitudes (KSA); these ELIT KSA's will scaffold in complexity as students move through the grade levels.

What is a MWEE?

- **M**eaningful
- **W**atershed
- **E**ducational
- **E**xperience


Effective MWEE Partnerships
preK-12 Educators
Environmental Educators
Outcomes
Knowledge, Skills & Understanding
Curriculum Design
Instructional Strategies
Relevance & Rigor
Indoor & Outdoor Learning

CCPS Strengths

- Long-term relationships with students
- Deep grade-level content knowledge
- Passion & Enthusiasm

- Collaborative attitude and growth mindset
- Formal educational experience
- Department level infrastructure, resources, and support

1 thing that CCPS brings is an advocacy for their students as individuals and learners

During time of virtual learning - CCPS teachers also provide information and some help with the digital resources they use (eg. Nearpod, edpuzzle, jamboard?)
Even with distancing, still creating relationships with students

Blandy's Strengths

- Knowledgeable / flexible educators
- Deep environmental field science knowledge
- Broad understanding of VA Standards of Learning

- Site with cross-curricular possibilities
- Outdoor teaching expertise
- Support to implement new technology and leveled activities

When building relationships, it's important to consider what each member brings to the table. What strengths and intellectual resources do we have to buttress the other?

Especially with this multi-year project, some perspective of "another Blandy trip", but this "year after year" familiarity builds a relationship = triggers learning responses = realization that a resource such as UVA / the VA State Arboretum in our backyard! VALUE!! Shift to multigenerational learning

To share in chat:

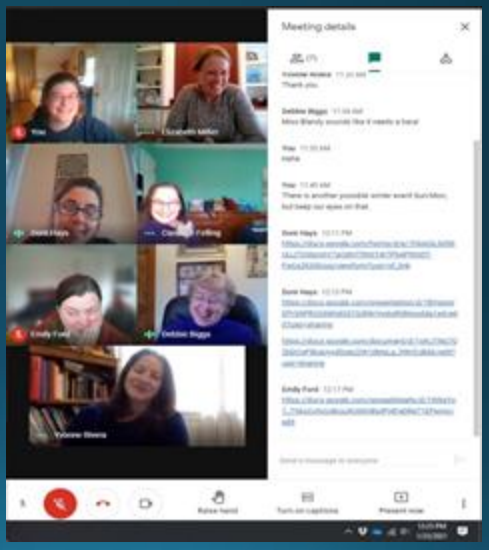
- note that the Blandy website will be updated by the new year
- Links associated with the project
  - https://blandy.virginia.edu/content/ed-programs-clarke-county-watershed-project

We were into year 3 of our project and had built relationships, partnerships, had a groove going and …. March 2020 happened.

How could we fulfill the commitments we had made to the grant project (NOAA), our partners, and our students?!

Blandy educators and CCPS teachers meeting to discuss

- how to bring field investigations to students
- teaching logistics
- technology logistics
- learning goals
- student needs…



Blandy and CCPS did what most of us did last year… adapt. It was a fairly involved process… The project leaders met to discuss broad ideas, then the teachers and EE met to devise plans for adapting the existing field and classroom experiences.

Making science investigation kits.... materials, materials, materials!

For each grade level/course we taught virtually, we devised the alterations to our existing lesson, revised the lessons' materials (sometimes several times for on-site in person, on-site distanced, off-site at school and off-site at home learning), ordered materials, created kits and "what's in the bag", macro collection, and field investigation virtual tours and videos. These videos were used to help bring the field to the students. Very place-based, locally centered

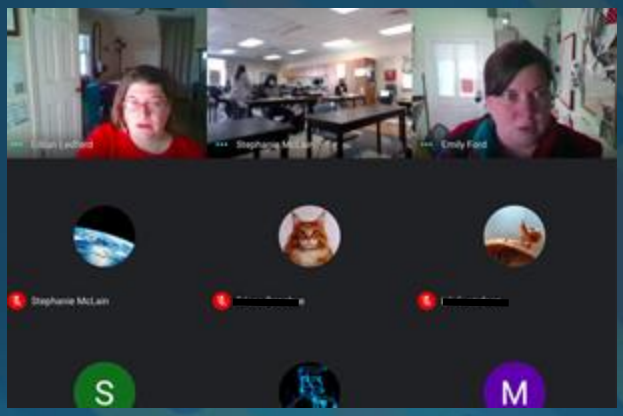
Developed video content based on these meetings and teacher-defined learning needs

How to Collect Macroinvertebrates

Virtual Tour videos

Sorting Macroinvertebrate

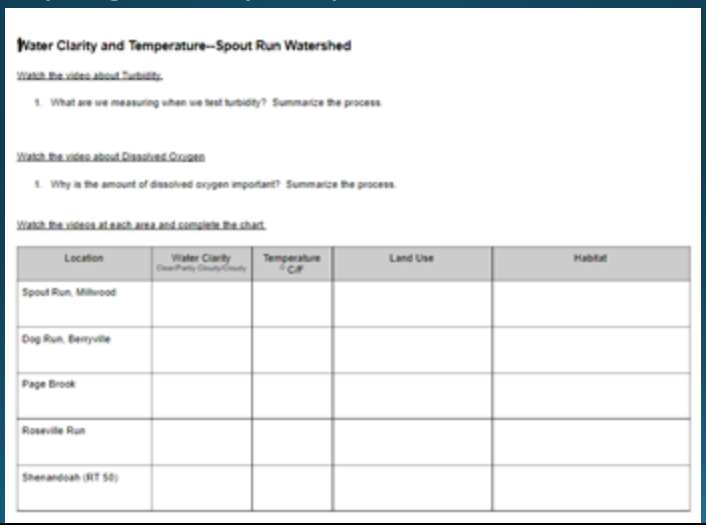
Developed videos for teachers and students. From How we collect macroinvertebrates to a macro ID and sort for the students to meld with the water chemistry data they would conduct virtually or at school.
Teacher perspective--provided a great resource for educators to connect freshwater topics to local streams.



Collaborating during virtual field investigations

THE INTERNET!
multiple screens (home computers, school computers, cell phones), technology, connectivity issues.
CCPS teachers handled logistics of setting up meetings, and connecting to content for student understanding
We still were able to conduct water chemistry tests successfully with all those hiccups!

Student analysis after the virtual field investigation. Analyzing water quality of our local streams.



Water Clarity and Temperature--Spout Run Watershed

Watch the video about Turbidity.

1. What are we measuring when we test turbidity? Summarize the process.

Watch the video about Dissolved Oxygen

1. Why is the amount of dissolved oxygen important? Summarize the process.

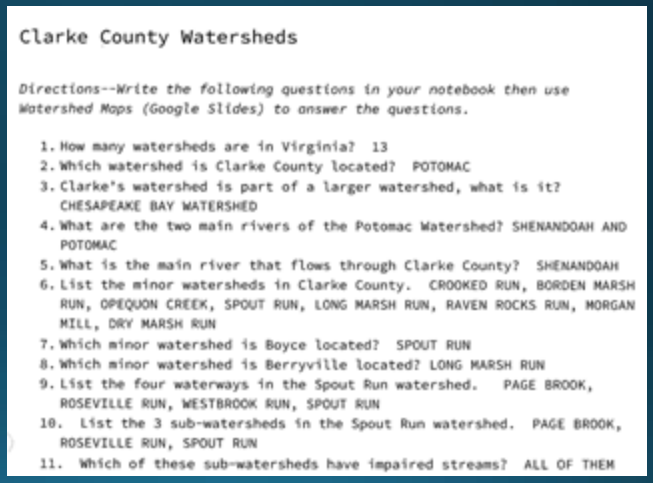
Watch the videos at each area and complete the chart.

Location	Water Clarity (Clear/Partly Cloudy/Cloudy)	Temperature °C/F	Land Use	Habitat
Spout Run, Millwood				
Dog Run, Berryville				
Page Brook				
Roseville Run				
Shenandoah (RT 50)				

Student analysis after the field investigation. Used in conjunction with water quality tests (DO, P, N, pH) and macroinvertebrate study

What is the driving question? Students will look at various abiotic water quality indicators and explore how they along with land use, habitat, and the riparian zone impact water quality and aquatic ecosystem health.

Clarke County Watersheds Student Journal



Clarke County Watersheds

Directions--Write the following questions in your notebook then use Watershed Maps (Google Slides) to answer the questions.

1. How many watersheds are in Virginia? 13
2. Which watershed is Clarke County located? POTOMAC
3. Clarke's watershed is part of a larger watershed, what is it? CHESAPEAKE BAY WATERSHED
4. What are the two main rivers of the Potomac Watershed? SHENANDOAH AND POTOMAC
5. What is the main river that flows through Clarke County? SHENANDOAH
6. List the minor watersheds in Clarke County. CROOKED RUN, BORDEN MARSH RUN, OPEQUON CREEK, SPOUT RUN, LONG MARSH RUN, RAVEN ROCKS RUN, MORGAN MILL, DRY MARSH RUN
7. Which minor watershed is Boyce located? SPOUT RUN
8. Which minor watershed is Berryville located? LONG MARSH RUN
9. List the four waterways in the Spout Run watershed. PAGE BROOK, ROSEVILLE RUN, WESTBROOK RUN, SPOUT RUN
10. List the 3 sub-watersheds in the Spout Run watershed. PAGE BROOK, ROSEVILLE RUN, SPOUT RUN
11. Which of these sub-watersheds have impaired streams? ALL OF THEM

Example of journal and answers

MWEE Projects from other grades

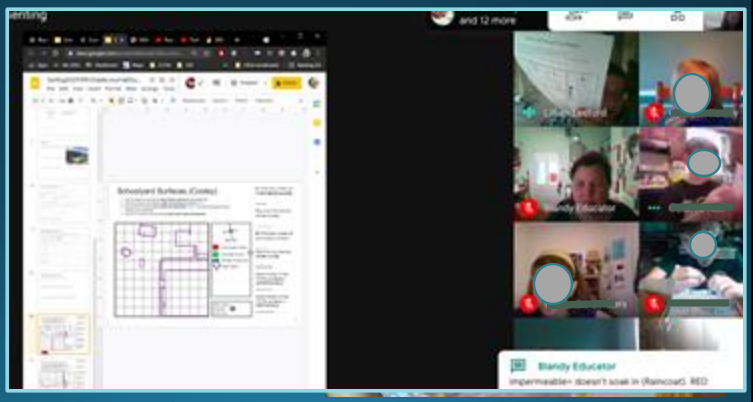
4th grade- What stream habitat in Clarke County meets our brook trout's life needs?

4th grade Trout in the Classroom was action project
Jam board, virtual learning kits that the resource teacher brought to some students with the meal bus!!

5th - How can I, along with my community, positively affect my watershed?

Explore: What are some causes of erosion & sedimentation?

Design & test:
How can we reduce sedimentation?



5th grade MWEE example—
Action project- develop a plan for how to clean up the waterway behind our school. Planting a riparian buffer.

Discussion

What are ways we can use these virtual resources now that we are back to in person learning?

For independent studies

For at-home students or those unable to attend a field trip

Field Investigations due to weather

As an assessment tool

Stephanie is using the water quality kits for her IB students this year!
Independent studies.
More uses?
Ask participants how they see use of these resources? Homebound students, kids who are absent/unable to go on the trips, cancellations due to weather, what other ways? can they be used as an assessment?

Thank you!

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