Eagle Springs 5TH Grade Year-Long Project

Student Identified Problem

How can we use trees to improve our school ground and the community?

Standards

S5E1: Obtain, evaluate, and communicate information to identify surface features on the Earth caused by constructive and/or destructive processes.

S5L1 Obtain, evaluate, and communicate information to group organisms using scientific classification procedures.

MGSE5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths.

MGSE5.NF.2 Solve problems involving addition and subtraction of fractions.

MGSE5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

MGSE5.MD.4 Measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.

ELAGSE5RI9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

ELAGSE5W2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Logistics

August – Allowed students to come up with a community problem they would like to address. In our case, the previous years' students have designed erosion solutions, repaired one erosion area, and conducted a tree adoption. They had also worked with our partner Amerc Foster Wheeler (now called Wood) to get a grant for purchasing trees, soil, grass, and materials. As a result, they worked with Amec Foster Wheeler to raise funds for correcting the areas. Now that we are three years into our study, the students are identifying the problem of there not being enough trees on the grounds.

September – Had erosion class with Keep Warner Robins Beautiful. Learned about erosion, erosion control, and issues when areas are not controlled. Designed erosion plans building from the work of the previous year's students.

October - Wrote questions for Amec Foster Wheeler environmental engineer regarding our plans and what would or would not work. Skyped to discuss our ideas. In year three of our program, we are working with their water specialists to learn about microorganisms that live in water and that may impact trees. We are also adding the USDA Fruit and Nut Research Center as a partner to learn about the use of nematodes as a natural pesticide for our trees.

November – Integrated ideas, measured area, slope, estimated amount of fill dirt, seed, etc. needed. Used understanding of decimals to create a budget for both correcting an erosion area and for purchasing trees for grounds and for our tree adoption. In our current year for the project, we are working with Keep Warner Robins Beautiful to add a tree nursery to the school. The students are using engineering and math skills to design, budget, and create the tree nursery. Additionally, they will research the types of trees for the nursery.

December/January- Researched trees, the best for our area, size, and suggestions for where they would go in a yard. Based on research, selected one tree for adoption. Designed an informational sheet to persuade students and parents to adopt a tree. Researched and designed an informational sheet to send home with adopted trees. We are in our fourth year of conducting the tree adoption. Our partner is the Georgia Forestry Association. In past years, we have also worked with the National Arbor Day Foundation.

February – Followed engineering design process to create a way to get trees home.
Georgia Arbor Day – We've adopted out nearly 1,000 trees over the past four years.

March - Designed ideas for staking trees, tested and shared. This year, we are adding our understanding of testing the soil for nematodes. We'll add this information to the materials that we give to our community. We will also use this information to test the soil in our tree nursery and on our school grounds.

April – Designed step-by-step process for placing new trees on both our grounds and our tree nursery. In past years, the students designed erosion control solutions.

May – Presented our project to next year's fifth grade class. Shared ideas for next steps!

<u>Integration of Subjects</u>

Science: Since our study of erosion came at the beginning of the year, the students were able to build their project from that basis. In science, the students learned about the causes and impacts of erosion and they learned the steps that can be taken to prevent erosion. This understanding was supported by our lessons with our community partners (see below). During our tree adoption, the students researched different types of trees available and classified them based on reproduction and leaf shape/size. They used characteristics of the trees to select the best tree type for our adoption. Now, in our fourth year of the project, the students are adding the studying of the microorganisms in the soil so that they can understand how their populations can be increased as a way to produce a healthier tree.

Math: To identify the impact on our areas of erosion, the students integrated their understanding of measurement and volume. We measured the slope and area of our erosion area. Then we used our understanding of volume to estimate the amount of top soil and grass seed needed for the area. Since some of our measurements included fractions, we also integrated operations with mixed numbers. Finally, the budget we designed required the students to problem solve with decimal numbers. Students will continue to use math this year for their budget for the tree adoption and for measuring the amount of materials and cost for materials for the tree nursery. They will determine size, volume, number of trees that can fit, and the budget.

English Language Arts: Throughout this project, students were required to collect information from several texts and the experts we talked with and interviewed. They wrote interview questions, summarized their learning, and wrote and designed a tree adoption form and a direction sheet for those who adopted a tree. In past years and again this year, the students will use their writing to communicate to our partner, Wood, the reasons for the grant we are asking for and how that money will be spent.

Technology: Students published their tree information form and tree adoption directions. They used a CAD program to design their plan for the erosion area, and they e-mailed and Skyped with environmental engineers to get ideas about their projects. This year, they will add the use of technology to their marketing plans for the tree adoption. They will also create a video to be shared with the employees of Wood as they raise funds for our grant. Our grant will be used to purchase microscopes that connect to our computers. These are used to view the nematodes we are studying in the soil.

Engineering: The students had to design and test a way for the tree saplings to get home with each adoptee. Parameters were to find an inexpensive way to keep the roots wet but to ensure that students did not track water through the school and to their bus or car. They also designed ways to stake the tree samplings for support during early years of growth. Additionally, this year, students are designing the tree nursery. They are determining where it will be placed, how all trees will be supported, and how water will get to the trees. Additionally, they are engineering ways to protect the trees.

Community Partner Connections

Wood (formerly Amec Foster Wheeler) – Held a Dogs for a Cause fund raiser which raised $669 dollars. That was matched by the corporate office so that we had a total of $1,338 for our erosion improvements.

Skyped with environmental engineer and biologist located in Colorado. Used their input to improve projects.

Met in person with landscape architect from Amec Foster Wheeler – He evaluated our ideas, suggested changes, and gave us guidance on ways to improve other parts of the playground.

Company representatives came out to help deliver our adopted trees.

This year, the company is currently working on a new grant for us. The funds will be used to purchase microscopes for each classroom. Additionally, the students will Skype with the water control engineers to learn more about the impacts of microorganisms on plants.

Keep Warner Robins Beautiful – They visited the students and taught them a lesson about the local impacts of erosion and the ways in which erosion on our grounds could negatively impact the environment. Specifically, the students learned about the role of the storm drains in our area and marked our storm drains to let students know they go directly to the river. Additionally, this year's partnership includes their assistance as the students select a variety of trees for the tree nursery.

Georgia Forestry Commission – Received information regarding types of trees available for adoption, e-mailed questions, and purchased trees for adoption.

National Arbor Day Foundation – Purchased trees and used educational materials.

USDA Fruit and Tree Nut Research Unit – Sharing student questions with entomologists to learn about impacts of nematodes on trees. Some students are partnering to complete science fair projects. Students are learning how to test of the presence of nematodes in the soil.

Impacts

Improved erosion area on playground, planted trees on grounds, and adopted out hundreds of trees to our community. This year, we are adding a tree nursery to our school grounds. Students are able to watch and study these trees as they grow and eventually, they will be mature trees that can be added to our grounds.