Team Advisors

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Mission Folder: View Mission for 'Envo'

State	Arkansas
Grade	6th
Mission Challenge	Environment
Method	Scientific Inquiry using Scientific Practices
Students	BadWolfDWT
	hippo52404
	millsapps101

Team Collaboration

(1) Describe the plan your team used to complete your Mission Folder. Be sure to explain the role of each team member and how you shared and assigned responsibilities. Describe your team's process to ensure that assignments were completed on time and deadlines were met.

To complete our Mission folder, each person was assigned their own jobs. To get the supplies, one person was assigned to get soil, another person was assigned to get the heat lamp, then someone else got the seeds, and another person was responsible for the containers. We decided to meet up together so we could all participate when we plant the seeds. We assigned one person to take the seeds home and grow the seeds for the full experiment. Once the seeds were fulling grown, we met up again to make sure the experiment was done successfully.

Uploaded Files:

- [View] **Team Collaboration Graph** (By: BadWolfDWT, 02/16/2016, .xlsx)

  The graph includes how each person helped the experiment and when the experiment took place.

Scientific Inquiry

Problem Statement

(1) What problem in your community did your team try to solve? Why is this problem important to your community?

The problem in our community is that soil gets washed away during strong rain storms. This problem is important because soil that is washed away can also end up in our rivers and lakes. The soil that is washed into our lakes can include harmful chemicals that were previously added to the soil and harm animals and people. BadWolfDWT

(2) List at least 10 resources you used to complete your research (e.g., websites, professional journals, periodicals, subject matter experts).

1 http://homeguides.sfgate.com/soil-erosion-control-plant-list-68961.html
BadWolfDWT
2 http://www.scientificamerican.com/article/can-plants-help-slow-soil-erosion/
Millsapps101
3 http://www.waterencyclopedia.com/En-Ge/Erosion-and-Sedimentation.html
hippo52404
4 http://www.odec.ca/projects/2004/derk4d0/public_html/Erosionaffectstheenvironment.htm
FlabberShock18
5 http://pubs.ext.vt.edu/426/426-722/426-722_pdf.pdf
BadWolfDWT
6 https://www.qld.gov.au/environment/landmoil/erosion/impacts/
Millsapps101
7 http://www.omafra.gov.on.ca/english/engineer/facts/12-053.htm
FlabberShock18
8 http://link.springer.com/article/10.1007/s100219900035
Millapps101
9 http://www.eoearth.org/view/article/156352/
BadWolfDWT
10 https://www.shodor.org/master/environmental/water/runoff/RunoffApplication.html
Hippo52404

(3) Describe what you learned in your research.

Soil runoff happens when the soil is unable to absorb any more water. People have created ditches to decrease the amount of soil runoff but if it is too shallow, it will not work and the land will continue to flood .Grass and other plants are useful in this situation because their roots can hold down the soil, causing it to stay intact. Soil runoff can also carry soil into lakes and rivers and carry pesticides and harm animals and humans.

You might be asking what ground covers are. Ground covers are what cover the soil and help the soil stay intact. Examples are Shrubs, grass, bugle weed, and many other plants. The bad erosion that happens in our community can be improved by using these ground covers. Also Soil runoff is a word that explains when soil is washed away.

flabbershock18

What happens in soil runoff is when it rains, the rain carries away the particles in the soil. This causes soil erosion or runoff. What you can do to help prevent that from happening is planting plants or ground covers. The.The plants have roots that will bond together making something like a blanket that reduces the amount of soil runoff. millsapps101.

Hypothesis

(4) State your hypothesis. Describe how your hypothesis could help solve your problem.

Our hypothesis is, if we plant two different types of plants, Rye Grass and Winter Wheat, then the Rye grass will do a better job of reducing the amount of runoff when water is added to the containers. We think this because in our research we found that the Rye grass roots form a better blanket for the water to sit on the soil. Millsapps101

(5) Identify the independent variables and the dependent variables in your hypothesis.

The independent variables are the Ryegrass and Winter Wheat added. One container has winter wheat, one has Ryegrass, the other has nothing added. The dependent variables is the time is took for the water to travel through each plant. BadWolfDWT

(6) How did you measure the validity of your hypothesis? (In other words, how did you determine that your hypothesis measures what it is SUPPOSED to measure?)

Our hypothesis matched our experiment because it states what has happened correctly. The reason why is because our experiment was dealing with how long it took for the water to flow through each plant and our hypothesis explained this as well. Flabbershock18

Experimental Design

(7) List the materials you used in your experiment. Include technologies you used (e.g., scientific equipment, internet resources, computer programs, multimedia, etc.).

3 large containers
3 small containers
Rye Grass seeds
Winter Wheat seeds
Potted soil
Grow Light
Plywood
Millsapps101
BadWolfDWT
Flabbershock18
hippo52404

(8) Identify the control group and the constants in your experiment.

The constants in our experiment is the amount of soil in the containers, the type of container we use, the type of soil we use, the amount of water we put on the plants, and the way we water our plants. The control would be the container with only soil in it. Millsapps101

(9) What was your experimental process? Include each of the steps in your experiment.

First, each student was assigned to gather supplies for the experiment; Millsapps101- seeds, Hippo52404- grow light, BadwolfDWT- potting soil, and Flabbershock18 container, and wood. Next, we brought the supplies to one of our partners and they grew the plants needed. When planting the seeds we first we put the same amount of soil in each container. Then we spread the seeds out evenly in the containers. Then we gave the same amount of water (1 ½ cups) for four weeks. After the winter wheat and Rye grass were fully grown we did our experiment. In our experiment we first put the plywood up on its side then gathered all the plants in order. Rye grass first, then the Winter wheat second, then the plain soil. Then, we got a pitcher and filled it up with room temperature water. We saturated the plants before we started timing. Next, we assigned jobs. One person used a stopwatch to measure how fast the water traveled, another person poured water from the pitcher, and someone else recorded the data we gathered and calculated the speed.

Data Collection and Analysis

(10) Describe the data you collected and observed in your testing (use of data tables, charts, and/or graph is encouraged).

According to our graph, In Trial 1 it took seven seconds for the water to flow through the Rye grass, it took three seconds to flow through the winter wheat, and four seconds to flow through the the potting soil. Trial 2, It took nine seconds to flow through the rye grass, seven seconds to flow through the winter wheat, and two seconds to flow through the potting soil. Trial 3, It took five seconds to flow through the rye grass, four seconds to flow through the winter wheat, and two seconds to flow through the potting soil.
Hippo52404

(11) Analyze the data you collected and observed in your testing. Does your data support or refute your hypothesis? Do not answer with a yes or no. Explain your answer using one of the following prompts: 'Our data supports/refutes the hypothesis because...'

Our data supports our hypothesis because, in our hypothesis we said that the Rye Grass would do a better job reducing the amount of soil runoff, and when we finished our data, and experiment, it told us that we were right. Because out of the Winter Wheat, Rye Grass, and normal soil, the Rye Grass took the longest time for the water to flow through each stem.
Hippo52404

(12) Explain any sources of error and how these could have affected your results.

Some sources of error could be, how hard we poured, how fast we stopped the stopwatch, and how many seeds we planted in the winter wheat container. These errors could have affected our results by how fast the water flowed out of the container. Also it could have affected our results by the time could be affected.
Millsapps101

Drawing Conclusions

(13) Interpret and evaluate your results and write a conclusion statement that includes the following: Describe what you would do if you wanted to retest or further test your hypothesis. Evaluate the usefulness of the data your team collected. What changes would you make to your hypothesis and/or experimental design in the future, if any?

Our conclusion is that the Rye grass did a better job because the container with just potting soil had the most soil lost, out of all of them, the winter wheat didn't have a good enough blanket (roots) to hold back the water, and it lost more soil than the Rye grass. And it took 7 seconds for the water to flow through the Rye grass, 4.6 seconds for the water to flow through the Winter Wheat, and 2.6 seconds for the water to go through the plain soil. If we could do our experiment we would have put the same amount of

seeds in each container, because we put more seeds in the Rye grass on accident and it made the Rye grass thicker so the water took longer to flow through. We would also applied the same force of water to the plants when we were doing the experiment.

Uploaded Files:

- [**View**]   **Experimental Process**   (By: BadWolfDWT, 02/16/2016, .xlsx)

    In this data graph it shows what has happened during this experiment. On the Y axis it is labeled each name of the plants ad on the X

    axis it is labeled the seconds.

Community Benefit

(1) How could your experiments and data help solve your problem and benefit your community? Describe next steps for further research/experimentation and how you have or how you could implement your solution in the future.

Our data that we collected could help our community because where we live, there is mostly farmland which contain crops. To grow these crops, farmers use chicken manure and pesticides. When it rains, these fertilizers and chemicals get washed into our lakes and streams which could harm animals living in that area. Our data states that if we grow certain plants like Ryegrass and Winter Wheat, they could help decrease the amount of soil runoff entering our lakes. If we were to continue our experiment, we would probably add more types of plants to see if there are better plants to decrease soil runoff, not just Ryegrass and Winter Wheat.

Mission Verification

(1) Does your Mission Folder project involve vertebrate testing, defined as animals with backbones and spinal columns (which include humans)? If yes, team must complete and attach an IRB approval form.

No

(2) Did your team use a survey for any part of your project? If yes, team must complete and attach a survey approval form.

No

(3) You will need to include an abstract of 250 words or less. As part of the abstract you will need to describe your project and explain how you used STEM (Science, Technology, Engineering and Mathematics) to improve your community

In our experiment, we showed how growing plants such as Ryegrass and Winter Wheat can prevent soil run off accuring in our local lakes and streams. The science included in our experiment was our research . We had our containers on a incline to represent a hill, which is where most soil runoff problem take place. we then used a timer to measure how fast the water went down the incline and calculated the speed.

Team Members	Supplies	1st Meetup	2nd Meetup
Cate	Soil	Not Present	7th Feb
Haley	Seeds	22nd Jan	7th Feb
Lillian	Containers	22nd Jan	7th Feb
Noah	Grow Lamp	Not Present	Not Present

How long it took for the water to through each plants

Pottinng Soil — 2.6

Winter Wheat — 4.6

Rye Grass — 7

Seconds