



Blue Swallow Farm Foundation

LESSON PLAN

Title: Rainwater Collection

Author: Liz Marquette

Grade: 5

Subject: Environmental Science

Time: 50 min.

Background Information and Student's Prior Knowledge

This lesson has been created to supplement student learning regarding the water cycle and the processes of erosion, and can be adapted to meet the needs of many learners, but has originally been designed for a fifth grade class. The standards chosen are in accordance with Next Generation Science Standards.

A 10-minute portion of this lesson is intended to occur outside. Students will need access to an area (no more than 1 sq. ft.) of bare soil as well as an area (no more than 1 sq. ft.) of vegetation.

In order to fully engage with the lesson, students will need to be familiar with the concepts of natural resources and the environment.

Standards

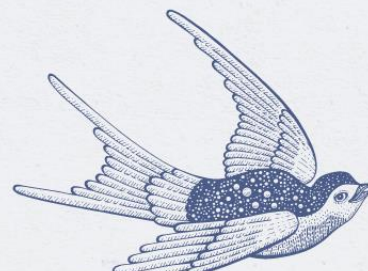
Next Generation Science Standards (NGSS)

5-ESS3-1 Earth and Human Activity: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Essential Questions

How does the water cycle and weather impact humans?

How do humans impact water and weather?





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Learning Objectives

Students will conduct a demonstration re-enacting the impacts of soil on water runoff.

Students will observe the rainwater runoff process.

Students will identify main ideas, and conduct a close reading of an article that outlines the runoff process and mitigation strategies.

Students will research runoff management strategies and present an argument to the class regarding their strategy.

Supporting Materials and Resources

Plastic tote lids (two for each student group)

Watering cans (one for each student group)

Water

[National Geographic Runoff Resource](#)

Student's Interactive Science Notebooks

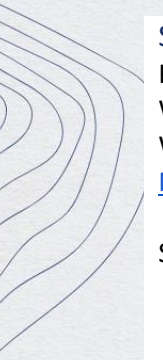
Vocabulary

Runoff

Water Cycle

Safety Considerations

To aid in student safety, the teacher should first check with administration to secure permission to complete this lesson as a portion of the lesson must occur outside. There are no additional safety concerns.





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THE TEACHER WILL . . .

THE STUDENTS WILL . . .

Lesson delivery
(5Es model)

- ENGAGEMENT
- EXPLORATION
- EXPLANATION
- ELABORATION
- EVALUATION

Engage (15 min.): To begin this lesson, students should be placed in groups of 4-6, depending on the class size. Before the lesson begins, the teacher will provide each group with two plastic tote lids and a watering can full of water. This should be done in advance of the lesson. During the Engage portion of the lesson, the teacher will give each student group two pieces of white plastic (tote lids work well for this), and a watering can. Students will be taken to an area outside where there is both bare soil, and growing vegetation. If the area permits, all student groups can work simultaneously.

By modeling the interaction, the teacher will instruct the students to hold one tote against the bare soil perpendicular to the soil. Then, the teacher will imitate the impact of rain by pouring the water from the watering can onto the ground in front of the tote. After pouring out the water for about 30 seconds, the students should lift the tote lid to see if any of the soil has splashed onto the white plastic. If the demonstration has been done correctly, dirt and debris should have splashed up onto the lid. The teacher will ask students to talk amongst themselves about what they are observing. Next, the teacher will instruct the students to do the same activity with the other tote lid. This time, however, the students will hold the lid perpendicular against the ground that is covered with vegetation. Once the demonstration is complete, the teacher will instruct the students to discuss if this tote is dirty. If the demonstration is successful, the tote should not have any debris as the water is absorbed by the vegetation.

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After observing the teacher model, students will hold one tote against the bare soil perpendicular to the soil. Then, the students will imitate the impact of rain by pouring the water from the watering can onto the ground in front of the tote. After pouring out the water for about 30 seconds, the students will lift the tote lid to see if any of the soil has splashed onto the white plastic. If the demonstration has been done correctly, dirt and debris should have splashed up onto the lid. Students will talk amongst themselves about what they are observing. Next, the students will do the same activity with the other tote lid. This time, however, the students will hold the lid perpendicular against the ground that is covered with vegetation. Once the demonstration is complete, the students will discuss if this tote is dirty. If the demonstration is successful, the tote should not have any debris as the water is absorbed by the vegetation.





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Explore (25 min.): During the explore portion of the lesson, the teacher will return to the classroom. The teacher will introduce the students to the National Geographic article, "Runoff," linked in the materials section of the lesson plan. The teacher will instruct the students to conduct a close reading of the article. As needed, the teacher will explicitly teach the vocabulary unfamiliar to the students in the article.

Explain (10 min.): The teacher will instruct the students to annotate the article. If students have an interactive science notebook, the notes should be recorded in it. Following the students' independent work with the article, the teacher will lead a class discussion to informally assess student understanding of the main ideas of the article.

Elaborate (30 min. +): For the elaborate portion of the lesson, the teacher will allow each group of students to choose one of the photographs in the article, "Runoff" to serve as a basis for a research project. The photograph choices are entitled: Runoff Ice, Industrial Runoff, Pipeline Runoff, Agricultural Runoff, and Geyser Runoff. The teacher should ensure that at least one group chooses each photograph. The teacher will provide the students with the research project rubric and instruction handout. Students will be permitted to present their research in the format of their choice: slideshow, diorama, or poster. The teacher will provide each student group with materials as needed. Depending on student need, this portion of the activity may require additional class time.

Explore (25 min.): During the explore portion of the lesson, the students will return to the classroom. Following the teacher introduction, the students will perform a close reading of the National Geographic article, "Runoff," linked in the materials section of the lesson plan. During the close reading, the students will ensure that they are familiar with all of the vocabulary utilized in the article. The students should also be reviewing all of the photographs and captions included in the article.

Explain (10 min.): During the explain portion of the lesson, students will be given the opportunity to annotate the article and enter this information in their interactive science notebook. Upon completion of this section, the students will actively participate in a class discussion to demonstrate their understanding of the concepts and main ideas in the article. This will serve as an informal assessment.

Elaborate (30 min. +): For the elaborate portion of the lesson, the students will choose one of the photographs in the article, "Runoff" to serve as a basis for a research project. The photograph choices are entitled: Runoff Ice, Industrial Runoff, Pipeline Runoff, Agricultural Runoff, and Geyser Runoff. The students will conduct a research project in alignment with the rubric and instruction handout provided by the teacher. Students will be permitted to present their research in the format of their choice: slideshow, diorama, or poster.





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Evaluate (45 min.): The evaluate section of the lesson will be conducted once all the groups have completed their research projects. In alignment with the rubric that the teacher has provided, the teacher will schedule each student group to present their research to the class. This presentation should be between five and eight minutes. During the student presentations, the teacher will score the students in accordance with the rubric. This will serve as the formal assessment for the lesson (see attachment for rubric).

Evaluate (45 min.): The evaluate section of the lesson will be conducted once all the student groups have completed their research projects. In alignment with the rubric that the teacher has provided, the teacher will schedule each student group to present their research to the class. This presentation should be between five and eight minutes. During the student presentations, the students will inform their classmates about their topic in alignment with the rubric. This will serve as the formal assessment for the lesson (see attachment for rubric).

References

Riggs, D. (n.d.). *Rainwater harvesting*. Department of Biological & Agricultural Engineering.

<https://baen.tamu.edu/extension/publications/rainwater-harvesting/>

Runoff. National Geographic Society. (n.d.). <https://education.nationalgeographic.org/resource/runoff>

