# Assignment Summary

For this assignment, you will determine where major erosion and deposition occur during and after precipitation on your school campus. Using your observations, you will develop a plan to improve drainage and/or reduce the impacts of runoff and flooding. You will then test several possible solutions by building a model of the area. Based on the results of your tests, you will write a recommendation that describes the most effective solution to the problem.

# Background Information

The Earth’s surface is irregular and constantly evolving. All areas, from small gardens to large mountains, continually change due to erosion and deposition. During our lifetimes, we often notice only sudden or extreme changes in the landscape due to events such as earthquakes, volcanic eruptions, or major floods.

Civil engineers and urban planners work with architects and builders to create urban landscapes for living, working, and recreation. Most designed environments take into consideration the local geology and climate. For example, buildings in Japan and California must be designed to withstand earthquakes, whereas buildings near the ocean must be built to survive storms and heavy waves.

Like natural landscapes, designed environments change with time and use. You have experienced this if you have ever used a sidewalk that contains cracks from the freezing and thawing of water throughout the winter. Changes in designed environments need to be fixed to prevent worse damage. In this activity, you will seek answers to questions such as these: What are the effects of weather and climate on school grounds? Which locations on campus need repair or redesign? What are some potential solutions to the problem(s)? How can we model the problem and test different solutions to find the most effective fix?

Materials

* Access to school campus
* Drawing paper, pencil, and clipboard
* Digital camera
* Internet access
* Model-making materials, such as sand, soil, and water

# Assignment Instructions

For this project, you are expected to submit the following items:

1. A brief description of the problem you intend to address, including a description of your observations, their location, and their impact, along with photographs of the area
2. A brainstormed list of possible solutions designed to fix the problem
3. A brief plan that describes how you intend to model and test your solutions
4. The data you collected during your tests
5. A summary of your test results and the solution you recommend to fix the problem

**Step 1: Prepare for the project.**

1. Read through the guide before you begin so you know the expectations for this project.
2. If anything is not clear to you, ask your teacher for assistance.

**Step 2: Identify and describe the problem.**

1. Write a paragraph describing the topography of an area where you have seen rain cause erosion, deposition, drainage, or flooding issues.
2. After a rain or snow storm:
	1. Take notes and photographs of the areas on campus that are affected.
	2. Record weather data for the days you make your observations.
3. Write a summary of your observations. Include images as references.
4. Select one of the problems you observed while studying the area you described above.

**Step 3: Brainstorm solutions.**

1. Brainstorm at least three methods to fix the problem. Consider solutions such as changing the slope of the area.

**Step 4: Test solutions and record results.**

1. Build a model of the area you observed. Use common materials provided by your teacher.
2. Design a series of experiments to test solutions you brainstormed. Test several ways to redesign the location to address the issues you observed earlier.
3. Record the test results. Depending on your problem and solutions, collecting data may include recording data on a table, taking a photograph, making a video, or using some other method best suited to your model and test methods. Different solutions require different data-collection methods.

**Step 5: Evaluate the results and recommend a solution.**

1. Organize your data and review your results.
2. Use the data to select the most effective method for solving the problem.
3. Based on the results, write a brief paragraph stating your recommendation for fixing the problem. Explain why your solution is the most effective. Use data to support your conclusions.

**Step 6: Evaluate your project using this checklist.**

If you can check each box below, you are ready to submit your project.

* Did you make and record observations of an erosion or deposition problem on campus?
* Did you brainstorm a list of possible solutions?
* Did you test each solution to identify the most effective approach to solving the problem?
* Did you record data as you performed your tests?
* Did you evaluate the data to identify the most effective solution?
* Did you type a paragraph recommending a solution?

**Step 7: Revise and submit your project.**

1. If you were unable to check off all of the requirements on the checklist, go back and make sure that your project is complete. Save your project before submitting it.
2. Submit your research documents, including your data table, to your teacher.
3. Submit your typed summary detailing your solution through the Virtual Classroom.
4. Congratulations! You have completed your project.