

Swamped! –Part 2: Capturing Precipitation**Introduction:**

Now that we have the idea that the types of surfaces found in an area can increase or decrease the amount of storm water runoff going into our local bodies of water, we will investigate how well the surfaces in our area retain storm water runoff. We will use a model that will allow us to test different types of surfaces other than those in the Part 1 for their ability to retain water. Next we'll look more closely at our school and community to see what happens to water around here after a precipitation event.

Phenomenon under investigation: What difference does land cover and land cover have on where the water goes in Chatham?

Initial thoughts:

What do you think happens to all the water from a precipitation event in Chatham?

Your question:

Use this space to craft a question to use to test your initial ideas.

Our backyard:

The map below is 1 sq km area surrounding our school. Identify areas where you expect runoff (R), and areas where you expect water to infiltrate (I).



Figure 1: 1 sq km area surrounding Chatham High School, Chatham, NJ

Investigating Land Cover and Land-use:

1. Land-use and land cover refer to what is taking place on the land in a given area. When considering what happens to water after a rain storm, land use and land cover can play an important role in keeping the water in one place instead of allowing it into areas where it could puddle and cause minor to severe flooding. For example, think about the areas you labeled in the map above and list what you think are areas that would absorb precipitation and areas that would not. Use the space below to list types of land cover and land use where water would be absorbed (infiltrate) or water would runoff:

Infiltrate:

Runoff:

Let's run some models:

1. Now you are going to test your ideas with a model. Go to Model My Watershed – Micro Site Storm Model at <https://micro.app.wikiwatershed.org/>

2. Notice that the model platform shows three sections on the right precipitation rate, land cover, and hydrologic soil group. Before starting your investigation, familiarize yourself with the platform by manipulating the variables provided to produce various outcomes.

3. Running the model: Make sure the precipitation bar is set to 8.0 cm of rain and the hydrologic soil group is set to loam (B-Moderate Infiltration). Hover over each of the land cover choices to read brief descriptions. Click on the Developed – High (Intensity) icon as a land cover and see what happens to the amount of evapotranspiration, runoff and infiltration. Record your data in the table below. Change the land use type and collect the data for each type and record it in the table. Create a bar-graph of the data and submit it with your completed activity.

Land cover	Evapotranspiration	Runoff	Infiltration
Water			
Developed, Open Space			
Developed-Low			
Developed-Med			
Developed-High			
Barren Land			
Forest			
Shrub/Scrub			
Grassland			
Pasture/Hay			
Crops			
Wetlands			

In the space below, analyze your data. Recall that you only used one soil type while running this model.

4. Now we run the model for the different soil types. Keep in mind that soil is more than the brown-stuff! It includes organic matter, air spaces, and water too. The soil constituents (sand, silt, clay) may cause water to drain slow or fast depending on the combination of the three. The more clay there is in the soil, the lower the ability of the water to infiltrate the soil. Hover over each soil type to learn more about them.

Leave the precipitation value at 8 cm. Select a land cover that most closely resembles our area, and use that for each trial in this model run. As you did in the previous step test each soil type, and place your data in the table below. Once you've collected all of your data, create a bar-graph of the data and submit it with your completed activity.

Soil Type	Evapotranspiration	Runoff	Infiltration
A - High Infiltration			
B - Moderate Infiltration			
C - Slow Infiltration			
D - Very Slow Infiltration			

In the space below, analyze your data. Recall that you only used one land use type while running this model.

5. The final step is to reflect back at your thoughts and question from beginning of this activity, and to develop and investigation to answer your question, or a new question you may have since you started this activity. Use the space below to outline your steps, gather and analyze your data, and draw conclusions based on evidence from your investigation.

Question & initial thoughts:

Methods:

Data:

Data Analysis:

Conclusion:

Application:

Based on your investigations in this activity, if you were a zoning officer in your community, which type of land cover and soil would you prefer to have in your community to limit runoff, and increase infiltration? Explain your answer using data from this investigation.