APES   ASSIGNMENT #1   Water/Water Pollution   From the class website…

1. Under the Water & Water Pollution tab on the class website, put the GHS aerial photos in chronological order.

2. **List** any key observations over time, i.e. what are you seeing as the years progress?

3. Imagine it rains for a few days straight. **Describe** what happens to the water in the first photo, meaning, where does it go? Would you answer differently when looking at the last photo in the sequence?

4. Explain how surface coverage, and runoff, can affect you.

5. DO NOT USE A CALCULATOR, PHONE, COMPUTER ETC. to calculate the three values at the bottom.

Like many communities, Fremont has a combined sewer system that collects both sewage and storm water. When storm water runs into storm drains that connect to the city's sanitary sewer system, the storm water and sewage flow together to the Fremont Wastewater Treatment Plant (FWTP). During a major storm event, however, the combined volume of storm water and sewage may exceed the plant's capacity, and the overflow bypasses the FWTP. The untreated overflow is discharged into Fremont Creek along with the treated waste.

Recently parts of Fremont received 5 cm of rain in 60 minutes. The storm caused widespread flooding in the northeast section of town. Especially hard hit was the Shoppes at Fremont shopping center.

Use the data from the table below to answer the questions that follow. Show all calculations.

Fremont Water Data
The shopping center's parking lot is 200 meters long and 100 meters wide.
Fremont has an area of 10 km^2.
Impervious surfaces cover 20 percent of Fremont's area.
The FWTP typically treats 5,000 m^3 of domestic sewage per day.
The FWTP has the capacity to treat 10,000 m^3 of combined sewage and storm water per day.

Calculate the volume of water (in m^3) that runs off the Shoppes at Fremont parking lot after a 5 cm rainfall event. Assume that all the water that falls on the parking lot runs off.

Calculate the volume of storm-water runoff (in m^3) generated in all of Fremont by the 5 cm rainfall event. Assume that only the impervious surfaces generate runoff.

Assume that all the runoff that you calculated in part (c) is captured by the storm sewers in one day. **Calculate** the volume of untreated water (in m^3) that bypasses the plant as a result of the storm. (Note that the plant still receives 5,000 m^3 of domestic sewage per day.)

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3. Imagine it rains for a few days straight. **Describe** what happens to the water in the first photo, meaning, where does it go? Would you answer differently when looking at the last photo in the sequence?

4. Explain how surface coverage, and runoff, can affect you.

5. Let's say you need 30 gallons of water to have a decent bath. Assume you could collect all the rain that falls on the roof of your room at home, and assume that your room has its own roof. During a particular storm ½ inch of rain falls. **Calculate** whether or not the water you collect, just from the roof over your room, would be enough to take a bath. Estimations are fine, if they're justified. DO NOT USE A CALCULATOR, PHONE, COMPUTER ETC.