10. Compare your calculations in question 9 to your observations in question 8, what can you conclude about changes in elevation of the ground water surface and ground water flow velocity? Write a conceptual equation that relates water surface elevation change to ground water flow velocity.

Station 2 Activities.

Visit Station 2 and examine the display. There are four types of porosity that can be found in rock and sediments. These include (1) intergranular porosity (open pore spaces between grains, primarily the result of deposition), (2) solution porosity (open pore spaces result from chemical dissolution of salt and limestone deposits by ground water), (3) fracture porosity (open pore spaces result from fracturing of rocks by tectonic forces, the fractures form opening through which fluids can migrate), and (4) vesicular porosity (open pore spaces associated with vesicular volcanic rocks). Fractures are typically arranged in geometric patterns (rectangular shapes, etc.), depending on the orientation of tectonic forces at the time of fracture.

There are five earth materials samples at Station 2 with examples of different types and degrees of porosity and permeability. Use the water bottle and make observations for each sample with regards to its ability to store and transmit water. Use terms like Low, Medium, High for degree of porosity and permeability. For porosity type, your choices include intergranular, fracture, solution, and vesicular. Fill in the data table below.

Sample I.D.	Degree of Porosity	Degree of Permeability	Porosity Type
A	________________	________________	________________
B	________________	________________	________________
C	________________	________________	________________
D	________________	________________	________________
E	________________	________________	________________
F	________________	________________	________________

Station 3 – Models and Air Photos

Station 3 A (new photo atlas stereopair – p. 3 western OK)

Describe the drainage pattern evident in the air photo. Does the underlying bedrock likely consist of limestone? Why or why not, explain your answer.

Station 3 B (new photo atlas stereopair – p. 40 Myakka River SP Fla)

Compare the air photos to the 3D plastic model at the station. Identify topographic features labeled A and B. How do they form? What bedrock type likely underlies this part of Florida? Is the drainage pattern dendritic, rectangular, radial, trellis, or none of the above? Explain your answer

Station 3C (old photo atlas, p. 5, Puerto Rico)

The topography displayed in this photo pair is termed “tower karst”, describe the landscape elements that comprise tower karst including the configuration of the hills and the nature of the drainage pattern. What type of bedrock underlies this region?

Station 4: Groundwater Simulation Model

Visit the groundwater simulation model and answer the following questions.

4-1. Identify the earth materials comprising the following units, include a description of relative porosity, relative permeability, and whether the material is acting as an aquifer or aquitard.

	Material Type	Relative Porosity (High, Medium, Low)	Relative Permeability (High, Medium Low)	Aquifer or Aquitard?
Unit 1	_______	__________	________	_____________
Unit 2	_______	__________	________	_____________
Unit 3	_______	__________	________	_____________
Unit 4	_______	__________	________	_____________

4-2. Examine units 3A and 3B. Describe their composition, their potential as aquifers, and their lateral continuity with respect to other portions of unit 3 (i.e. are they laterally continuous or discontinuous?). Describe a depositional process that might result in the lateral geometry of units 3A and 3B illustrated in the model.

4-3. Is unit 1 acting as a confined or unconfined aquifer? Explain your answer.

4-4. Is unit 3 acting as a confined or unconfined aquifer? Explain your answer.

4-5. Is unit 4 in direct hydraulic communication with unit 3? (i.e. are the units readily exchanging fluids?) Explain your answer.

4-6. Is unit 4 in direct hydraulic communication with unit 1? Explain your answer.

4-7. If gasoline leaked from the storage tank, would it contaminate unit 1? Why or why not?

4-8. Examine the set of wells on the groundwater simulation model. Note that the top of the wells are all located at the same elevation. Assume the the groundwater model has a scale of 1:500 (i.e. 1 inch depth on the model = 500 inches depth relative to the Earth), and that the elevation of the top of the wells is 1500 ft above sea level (relative to the actual Earth's surface). Using a ruler and the scale, fill in the well data chart below.

Well ID	Depth to water (model inches)	Depth to Water (actual ground feet)	Elevation of Water Surface (ft elev.)	Is well in confined or unconfined aquifer?
A	_______________	_____________	______________	_________________
B	_______________	_____________	______________	_________________
C	_______________	_____________	______________	_________________
D	_______________	_____________	______________	_________________
E	_______________	_____________	______________	_________________
F	_______________	_____________	______________	_________________
G	_______________	_____________	______________	_________________
H	_______________	_____________	______________	_________________
I	_______________	_____________	______________	_________________
J	_______________	_____________	______________	_________________
K	_______________	_____________	______________	_________________

4-9. True or False: groundwater flows from high elevation to low elevation, under the influence of gravity?

4-10. What is the elevation of water in the unconfined aquifer in well A? What is the elevation of water table in the unconfined aquifer in Well J? Using the model scale of 1:500, determine the actual ground-distance of the gradient of the water table between well A and well J (remember from the river lab: gradient = change in elevation / change in horizontal distance or rise / run). Calculate the gradient in ft/mi, show all of your work.

4-11. Which direction is groundwater flowing in the unconfined aquifer? Which direction is groundwater flowing in the confined aquifer?

4-12. Is well B in the confined or unconfined aquifer? Is well C in the confined or unconfined aquifer? How does the water level in well B compare that that in well C (answer in model elevation units)? Is the water level in well B above or below the top of the aquifer? Is the water level in well C above or below the top of the aquifer? Are the water levels in wells B and C measuring the same hydraulic pressure? Explain your answer.

4-13. Which aquifer is contributing water to Lake Bonneville? Which aquifer is contributing water to Smith Lake?