
The critical zone at Ankeny Field

The “critical zone” includes the land surface, vegetation, and water bodies, and extends through the pedosphere, unsaturated vadose zone, and saturated groundwater zone. Your task is to draw a detailed cross-sectional diagram of the critical zone in the area around Ankeny Field, going down to the basalt bedrock. Draw your cross-section on a sheet of 11 x 17 inch paper oriented in landscape mode (the long axis goes right-to-left). The left side of the paper will contain your drawing of the cross section through the critical zone. Reserve the right half of the page for your descriptions of the units you draw on the cross section. Your drawing doesn’t need to be artistic, but it needs to be clear and understandable. It does not need to be to scale, in fact you will probably want to draw your cross section with more resolution at the top of the section.

Your diagram should include all of the following elements, with their boundaries clearly drawn, and each clearly labeled by a description on the right half of the page:

1. The location of all the elements in the above critical zone definition
2. The uppermost part of your diagram should include both the land surface in a grassy area of campus and an appropriate water body such as College Creek or Lakum Duckum
3. Clearly indicate the water table with a dashed line, and label where sediments are saturated and unsaturated
4. Include the soil horizons as you would expect to find them in Ankeny field, with brief horizon descriptions and expected thicknesses based on published soil surveys
5. Include in your diagram all appropriate geologic units you would expect to find in the critical zone of Ankeny Field, including a brief lithologic description, estimated age, and thickness of each unit in this area
6. Indicate the approximate elevation above sea level of each unit and of the ground surface.

This exam is open-book and open-note, but you must work on your own. You may use whatever resources you can find to complete the assignment, as long as you acknowledge them in your writeup. You have 24 hours to complete the exam.
