Hydrogeology Concepts and Exercise Slide Talk

1. Title Slide
2. A description of what students will learn by viewing the presentation and completing the exercise.
3. Drawing of the hydrologic cycle for discussion.
4. Definition of hydrology and distinction of what hydrogeologists study.
5. Photos of hydrologists and hydrogeologists.
6. Hydrogeologists must know what is under Michigan to know more about groundwater.
7. Michigan's glacial history and examples of glacial landscapes.
8. Rock thicknesses, those exposed in the Grand Canyon vs. what is under Michigan.
9. Bedrock outcrop map (under glacial sediments) with time periods given for different geologic ages of rock and a cross-section depicting the basin structure of Michigan bedrock.
10. Hydrogeologists must know rock types and their associated properties.
11. Photo examples of unconsolidated sediments.
12. Photo of alternating sandstone and siltstone lithified sediments in Pennsylvanian age core from Ingham Co. MI.
13. Definition of porosity and pore space.
14. Grain shape analysis description and image.
15. Fluid flow and permeability definition.
16. Sediment and permeability and sorting diagram.
17. Water table definition and shallow aquifers.
18. Water table zones diagram and definitions.
19. Unconfined vs. confined aquifer definitions.
20. Glacial sediments map and bedrock aquifer maps of Michigan.
21. Cone of depression and artesian well diagrams.
22. Understandings of geologic setting and rock type lead to understanding environments of deposition and the resulting effects on water quality.
23. Deltaic depositional environment example diagram.
24. Human groundwater contamination diagram.
25. Salt water encroachment diagram.
26. Exercise title page.
27. Exercise adaptation.
28. Exercise steps.
29. Picking a geographic area of interest
30. How to find a topographic map online.
31. Finding a topographic map, quadrangle location.
32. Pdf map files and zooming the image.
33. Finding water well data using DEQ website.
34. The Scanned Water Well Record Retrieval System
35. Retrieving pdf's of driller's reports or logs.
36. Interpreting the driller's logs, header information.
37. Interpreting the driller's logs, lithology information and well total depth.
38. Interpreting the driller's logs, driller's information and static water level.

39. Creating lithologic columns using driller's lithology descriptions.
40. Example of a blank lithologic chart.
41. Putting driller's lithogies into the form and marking the static water level.
42. Calculating well elevation from a topographic map.
43. Interpolation of contour lines to find well elevation.
44. Calculating the well elevation of the differing lithologies.
45. Repeat the steps to create more lithologic/stratigraphic columns.
46. Mark well locations on the topographic map.
47. Pick a depth datum, an elevation common to all the stratigraphic columns.
48. Drawing cross-sectional lines on the topographic map.
49. Line up columns on the datum elevation to compare stratigraphically.
50. Note map distances between wells when comparing lithologies.
51. Interpretation of the spatial variability of the geologic materials encountered between wells and results of the example cross-sections.
52. More interpretation of example well sediments and variability.
53. Static water level variability and bedrock elevation variability.
54. Summary of usefulness of example data and availability.
55. End of show.