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Just Passing Through

The purpose of this experimentation was to model the flow of groundwater and calculate the flow rates and permeability of various types of soil through the use of Darcy's Law. The experiment measured the flow rates of sand, clay, aquarium rock, and pea gravel. Each of these soils was placed in two-liter bottles that had an inlet hole in the top and an outlet hole drilled into the bottom. A prearranged amount of water was then poured into the bottle. It filtered through the soil, passed out the outlet hole, and collected in a measuring cup. The measuring time was one minute. These flow rates were then calculated to liters/second and were placed into Darcy's Law equation to be solved for permeability. The results from the experiment concluded that pea gravel had the fastest flow rate and highest permeability with an average flow rate of .00379 l/s and a permeability rate of .03501 cm/s. Aquarium rock produced an average flow rate of .0035 l/s and a permeability rate of .03241 cm/s. Sand averaged a flow rate of .0024 l/s and a permeability rate of .0222 cm/s. The clay averaged a flow rate of .00159 l/s and a permeability rate of .01471 cm/s. The test results indicate that aquarium rock and pea gravel have faster flow rates and greater permeability levels than sand and clay. Also, the results prove that Darcy's Law can be manipulated to solve for permeability which could be useful knowledge in replenishing underground aquifers.