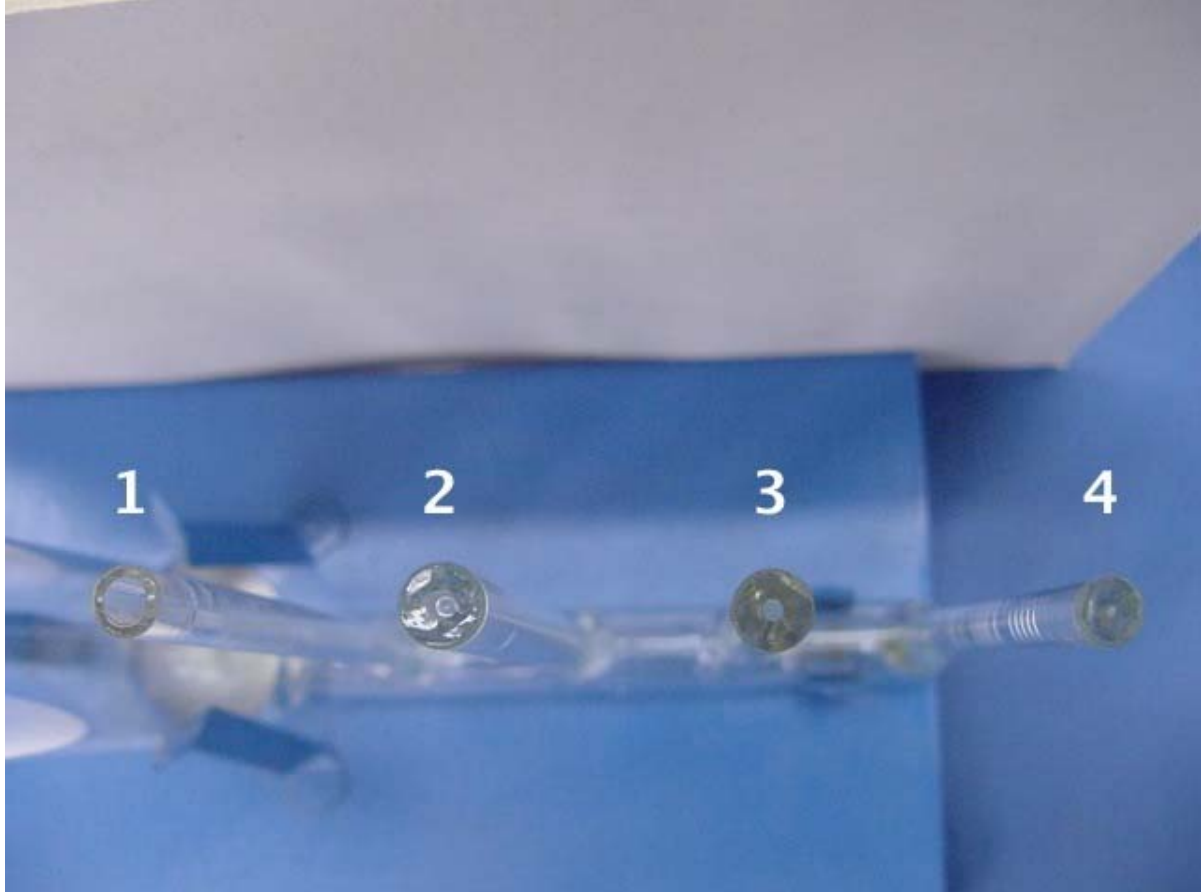


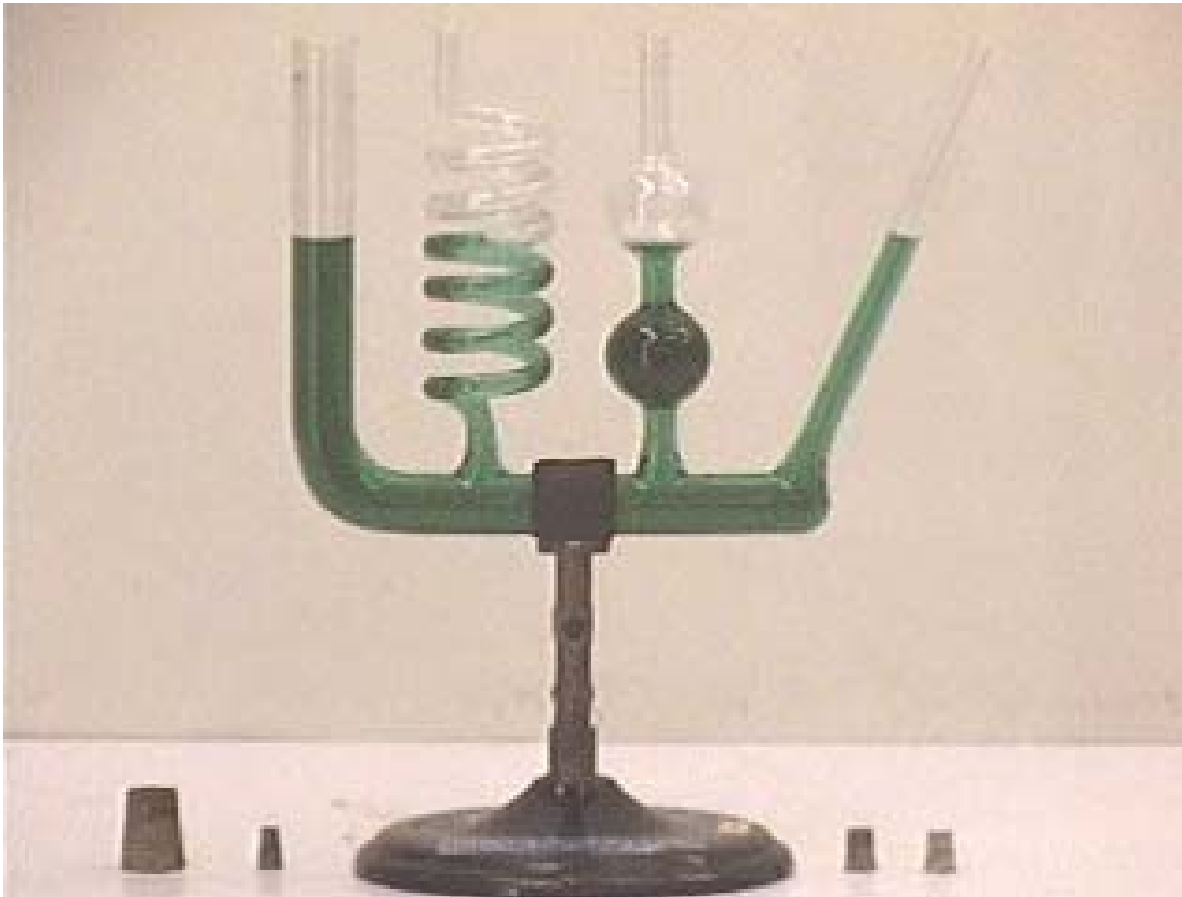
Question #359

This week, we return to ponder the mysteries of water, our most beloved resource. Pictured below is the apparatus, which consists primarily of four glass tubes of different inside diameter, connected together at the base.

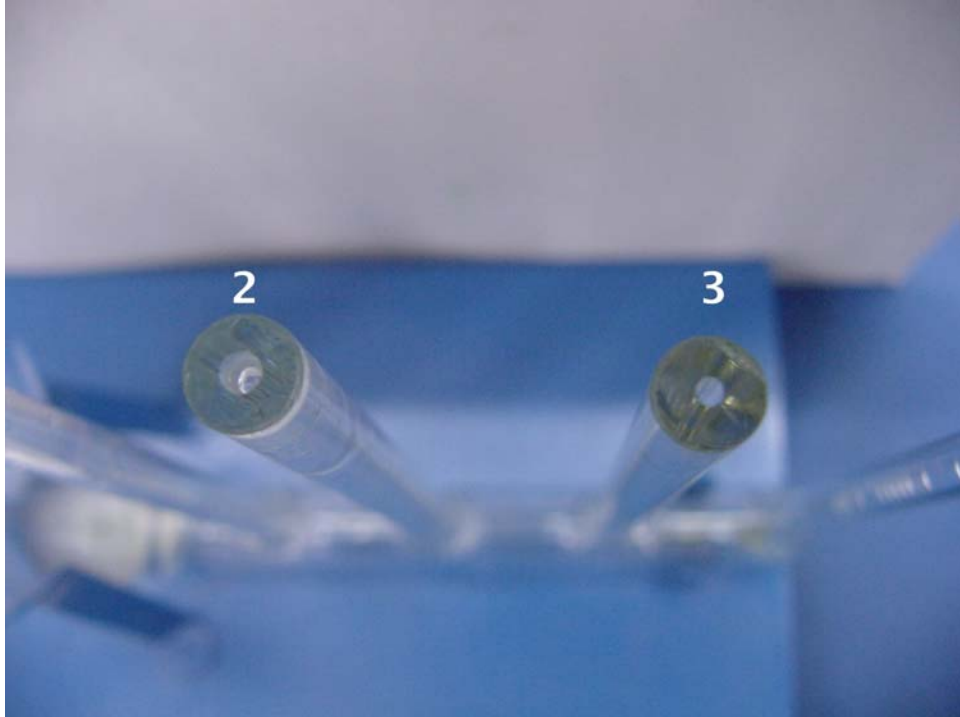
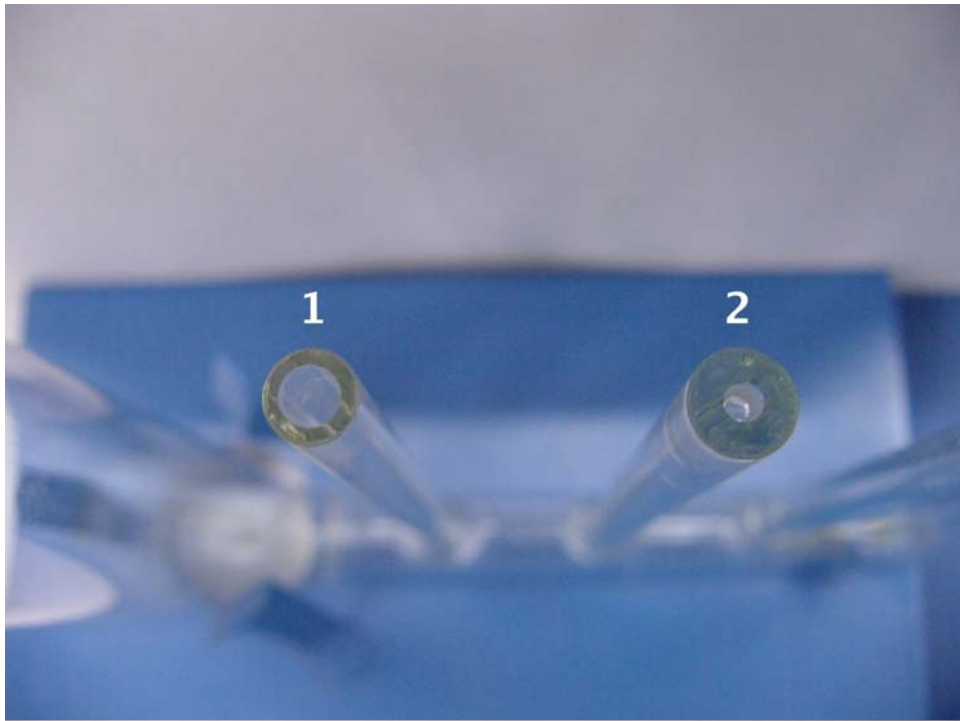


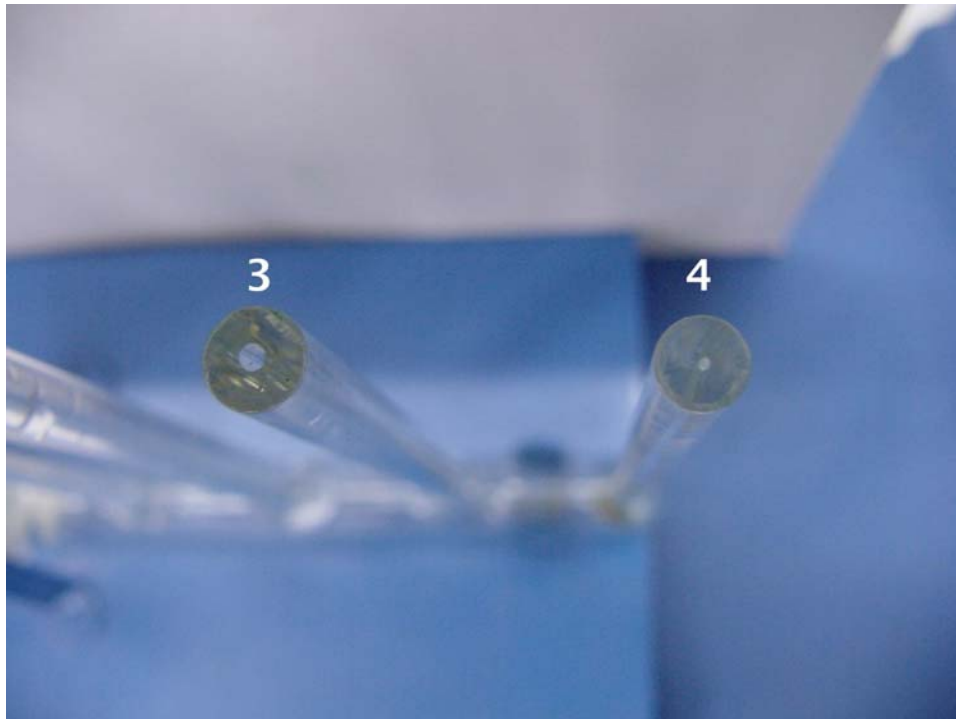
Water can be poured into the "fifth tube" (pictured far left) and will distribute across each tube until equilibrium is reached. The nature of this week's question is in predicting precisely *how* the water will distribute.

It is important to note that despite funny geometries, water pressure can be shown to "seek its own level", as can be shown in the picture below. When our atmosphere pushes on down on all of the tubes equally, equilibrium is reached; only when there is a difference is when water will flow. Since pressure is a function of height (e.g. less pressure in the mountains because there's less air pushing down on you) equal pressure is achieved when the *height* of the water is the same in all tubes.



Can this also be true here? To aid you in your reasoning, below are three closeups of the tubes which can be clicked on for further detail.





Though we may have tricked you in [Question #167](#), let us have no confusion as to what the liquid will be in this case: there will be only one liquid, and it will be water. Thus there is no possibility for the difference in densities to affect the answer.

Question: How will the water levels in each of the four tubes compare?

- (a) All the water levels will be the same, because water seeks its own level.
- (b) The water level will be highest in 1 and lowest in 4. Since 1 has the largest diameter it can accommodate more water; thus the level in 1 will be highest (and conversely for 4).
- (c) The water level will be lowest in 1 and highest in 4; all tubes will accommodate the same *volume* of water. Since a larger diameter will accommodate the same amount of water in less height, the water level in 1 will be lowest (and conversely for 4).
- (d) Other (you must explain).

Click here for [Answer #359](#) after December 7, 2009.

[Question of the Week](#)

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For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](#) by e-mail or using phone number or regular mail address

given on the [Lecture-Demonstration Home Page](#).

