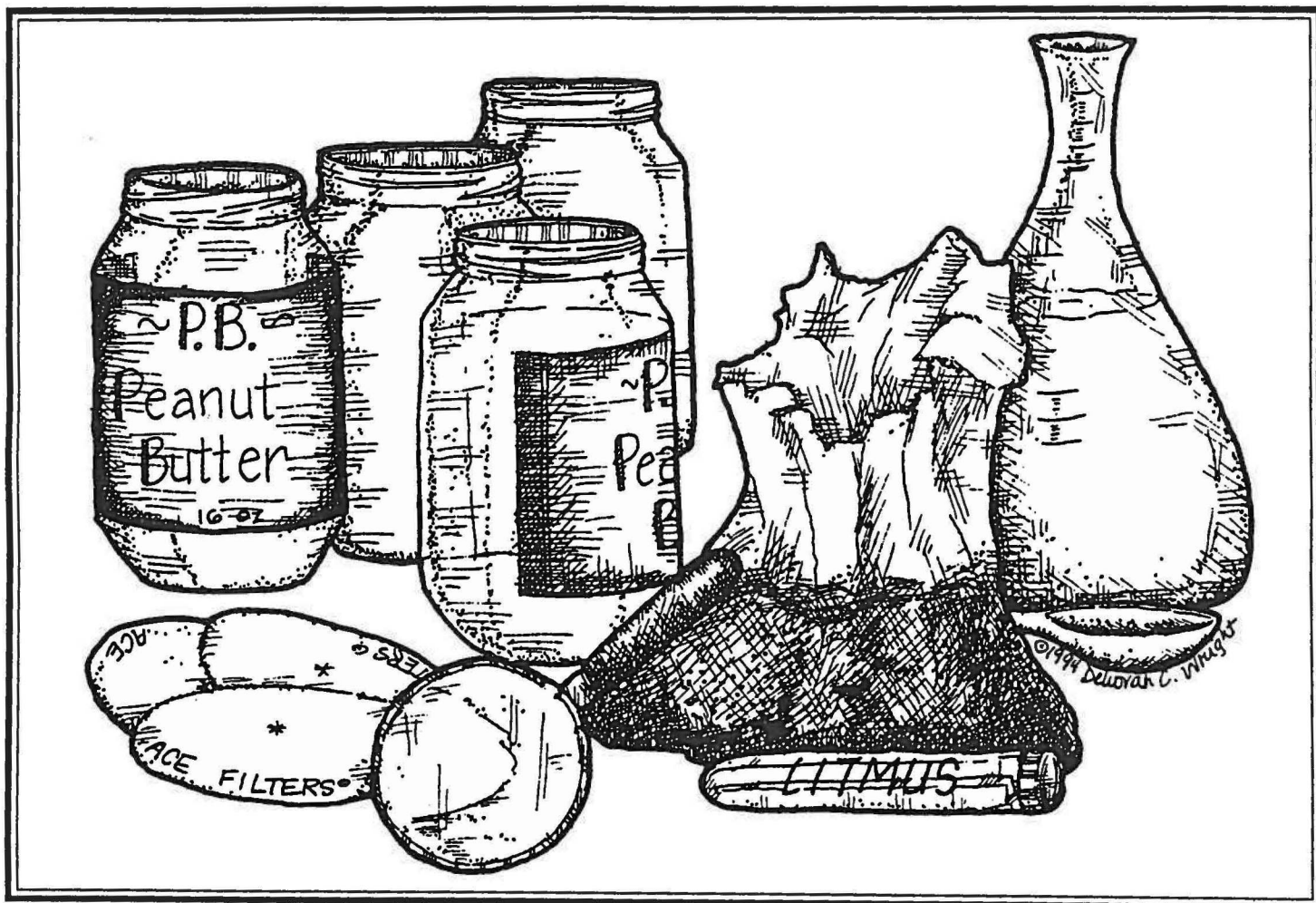


#7 - Soils, Solutions, and Conclusions



Focus Question:

Are all soils alike?

Objective:

The students will perform an experiment to determine characteristics of a soil solution.

Suggested Grade Level:

Grades 6-8

Materials Needed:

- 4-8 clear plastic peanut butter jars, same size
- a supply of white coffee filters
- supply of rubber bands
- a source of water
- a supply of blue and red litmus paper
- samples of soils from students, minimum of four
- a tablespoon measure
- a liquid measuring cup/container

Procedure:

- 1) Introductory discussion: Most students have had the experience of digging a hole and trying to fill it with water. If the students cannot relate to this, then describe the event. Better yet, if possible, go outside of the classroom, dig a small hole, fill it full of water and observe. Pose the questions: Where did the water go? If we fill up the hole again would the water be absorbed at the same rate? This observation is critical for the students to make the necessary associations with the classroom experiment.
- 2) Discuss with class the reasons why perk tests are conducted.
- 3) Discuss the fact that soil is different and why.
- 4) Have the student bring in baggies of soil from their homes. Obtain permission from parents, explaining why you need the sample. Emphasize the method of obtaining sample: scrape away leaves or debris to obtain a "clean" example of the soil at the student's home.
- 5) Divide the class into teams of investigators.
- 6) Clean and dry peanut butter jars; all jars are to be of the same size.
- 7) Drill 6 holes in the same pattern around the bottom of the peanut butter jars; hole pattern and distance from the container opening are to be the same for all containers. (The instructor may wish to do the drilling prior to the experiment.)
- 8) Place a white coffee filter inside the mouth of each of the peanut butter jars, allowing the majority of the filter to sag to the center of the jar. Secure with a rubber band.
- 9) Carefully cut all of milk jug away except three inches from bottom.
- 10) Place containers with coffee filters bottom-down inside the base of the milk containers.
- 11) Place 4 tablespoons of soil into filter. (The same amount of soil and water in the following steps should be used for all tests.)
- 12) Slowly pour one cup of water over the soil. After a while water will have absorbed and passed through the soil sample.
- 13) Empty water from base of milk containers.
- 14) Fill each peanut butter container a second time with one cup of water.
- 15) At this point, obtain a clock or stop watch to time the next step.
- 16) Record the amount of time it takes for the water to pass through each soil sample and drain into the milk container.

Conclusion:

The rate of absorption of different soils can be predicted by examining the types of soils, (i.e. sand will not absorb water as fast as clay.) Perk tests are used by soil scientists to determine the rate of absorption of soils for septic fields.

Further Investigations:

Use a straw to represent a well and insert the straw into the gravel layer. Following the first addition of water, use food dyes with the second application. Trace the dyes' progress through the soil sample. Time this progress. Using a culinary syringe, draw liquid up the straw. This simulation represents the pollution of ground water.