Deep Water

Objectives:
    Students will manipulate laboratory equipment.
    Students will predict the thickness of a film of water.
    Students will describe the behavior of water molecules.
    Students will describe the interactions of water with the environment.
    Students will calculate the thickness of a film of water.

Materials:
    Graduated cylinder, ruler (15 cm), water supply, 1 cm grid on transparency film and a flat, level surface.

Procedures and Results:
1. Measure ten milliliters of water into the graduated cylinder.
2. Pour this slowly onto the grid on a flat, level surface (such as a table top).
3. Using your ruler, spread the water out into a rectangular shaped area, as large as you can make it without leaving holes in the water.
4. How does the water behave as you try to spread it?

5. How thick do you think the film of water is? Guess.

6. Measure and record the dimensions of your rectangle below.

    Length _____   Width _____

7. Calculate the area (Length x Width) _____. Check yourself by counting the number of squares on your grid the water covers.

8. How can you measure the thickness of the water? Remember, a milliliter is equal to 1 cubic centimeter.

9. Is there an indirect method of measuring this film's thickness? (Hint: $V = L \times W \times H$) Justify your answer.

10. From your experiment, how do you think the environment is affected by the way water behaves and by how thick the water molecules are?

11. How might we measure the thickness of a single sheet of notebook paper?

12. The present budget for the U.S. Government is more than two trillion dollars ($2,000,000,000,000). How many $1000 bills would this be?

13. If each bill were 0.004 cm thick, how high would this stack of bills be? How did you determine this?