Science Today

1. Check out your crystals – make observation and fill in the chart below.

Days	Epson	Salt	Sugar
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			

Interesting Properties of Water

In most solutions, the SOLVENT is water. In fact water is called the universal solvent because, given enough time, there are only a few substances it can't dissolve. These stubborn, water resistant substances include oils and greases.

New Terms – Surface tension, Cohesion

Detergent also has a unique effect on water. It weakens the "Skin" that forms at the boundary between water and air. Look at a drop of water on a penny. It appears as thought the water is contained within an invisible sack. This is due to surface tension.

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Materials like detergents, when added to water can't bead into drops, so it doesn't leave ugly spots on dishes when they dry.

Cohesion and Water Tension

Do all liquids form beads?

Drops of water are shaped like balloons (rounded and 3 - dimensional). The film that forms on the surface of a liquid is called **surface tension**. Surface tension is due to cohesion. **Cohesion** is the force of attraction between the particles (molecules) of a substance. Water is extremely cohesive and has strong surface tension.

How much can a liquid hold?

The surface of water is rounded and is able to hold the water above the rim of the cup. Instead of overflowing, the water seems to be held together by an invisible skin. Although there is not a skin (such as the kind you would find on boiled milk), there is still surface tension (cohesion of molecules).

"FULL" GLASS

Even if a glass of water looks "full", you'll be surprised at what you can add to it: one paper clip, two paper clips, three paper clips, . . .

Dew and rain stand in round drops on a leaf rather than spreading out. The water molecules pull in toward the centre of the drop. The waxy surface of a leaf also repels the water.

MATERIALS: Glass of water; paper clips; dishwashing liquid. Optional -- milk, vinegar, oil, pop.

DOING IT:

1. Fill a glass to the rim with water.

2. Slowly drop paper clips into the water, one at a time. Be careful not to drop the paper clips from high above the water.

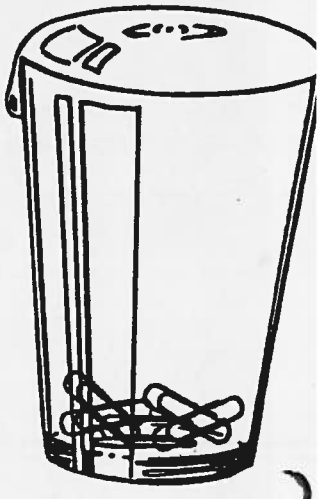
3. How many paper clips can you get into the "full" glass before the water spills? Five? Ten? Twenty? Thirty?

4. What happens if you add a few drops of dishwashing liquid to the water? Can you get more or less paper clips into the glass?

5. *Extension:* Try liquids other than water (e.g. milk, vinegar, oil, pop). The more paper clips you can get into the glass, the stronger the surface tension.

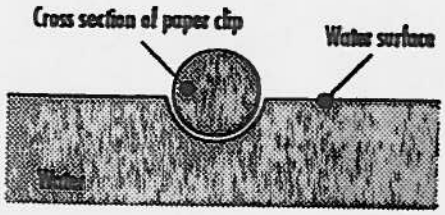
The force that attracts molecules of the same substance to each other is called "cohesion". Water molecules have a cohesive force -- they are strongly attracted to one another. Water molecules that are surrounded by other water molecules are attracted in all directions. However, water molecules at the surface of a glass of water have no water molecules above them. They are all pulled strongly in the same direction -- downward to the water molecules underneath them. The attraction between molecules on a liquid's surface is called "surface tension". The surface of the water acts as if it has a thin skin over it. The surface tension is strong enough to prevent a "full" glass of water from spilling as paper clips are added. As more and more paper clips are added, the surface of the water begins to look curved -- like a lens -- until the water finally spills over the rim of the glass.

Topics: Atoms; Forces.



Cohesion and Water Tension

The weight of the object will depress the skin of the water much like a person depresses a trampoline when lying on it. When viewed from the side, the attractive forces would look like the picture below.



Detergent molecules have one end that likes water and binds to it. And the other end that does not like water and thus repels it. Therefore, when added to water, detergent molecules will readily mix with water, but in the process they interfere with the cohesive forces among water molecules, wakening the surface tension.

When a drop of detergent is placed on the surface, the paperclip presses into the water (the soap breaks the tension). When the tension breaks, the clip sinks to the bottom of the cup.