

HOME SCIENCE TOOLS[®]

CLASSIC CHEMISTRY KIT STUDY GUIDE

KT-CLACHEM

ACTIVITY #4 – JUMPING PEPPER

FROM THE KIT: 150-mL beaker

YOU PROVIDE: Water, pepper, and dish soap.

1. Pour 140 mL of water into the beaker.
2. Sprinkle a small amount of pepper on the surface of the water.
3. Observe the surface of the water.

Does the pepper float?

4. Add a drop of dish soap to the beaker.
5. Observe the pepper when the dish soap is added to the beaker.

What happened to the pepper when the dish soap touched the water in the beaker?

What happened?

The surface of water is almost like a bubble. This bubble on water's surface separates it from air and other liquids. This is due to **surface tension**. Surface tension is the increased attraction between molecules of a liquid at the surface compared to the body of the liquid.

When you added the pepper, it was lighter than the same amount of water, so it floated. If you look carefully, you can see water's surface tension bend slightly under the weight of the pepper specks. Surface tension allows objects to rest on the surface of water because the tightening of the surface water molecules makes it harder for objects to move downward through the top layer of water.

When you added the soap, something strange happened. The soap mixed with the water, making a new liquid with different properties. Some of the water at the top of the beaker kept its surface tension, but in other areas the soap broke the surface tension, which made the pepper specks move or jump over quickly, staying with the water instead of the soap.

ACTIVITY #7 – SALTY LAYERS

FROM THE KIT: 150-mL beaker, 250-mL beaker, stir rod, funnel, spatula, cardstock, universal indicator, gloves, goggles, and lab apron.

YOU PROVIDE: Salt and water.

SAFETY NOTE: Are you wearing your personal protective equipment (PPE)? If not, stop what you're doing and put on your goggles, gloves, and apron now.

SAFETY NOTE: Universal indicator is flammable and can be hazardous if not used correctly. Keep it away from open flames or extreme heat.

NOTE: Diffusion is affected by temperature. The hotter the liquid, the faster the molecules move. You can try the activity multiple times with water and salt water that is either cooler or warmer.

1. Measure 10 heaping scoops of salt into the 150-mL beaker.
2. Measure 100 mL of water using the 250-mL beaker and pour it into the 150-mL beaker.
3. Stir the salt and water using the stir rod until the salt is dissolved. There may be some left at the bottom of the flask; this is fine.
4. Add 10 drops of universal indicator to the salt water and stir to mix.
5. Measure 150 mL of water using the 250-mL beaker.
6. Put the 150-mL beaker inside the 250-mL beaker, making sure the bottom of the 150-mL beaker is at the bottom of the 250-mL beaker, with the spout pointed toward one of the sides.
7. Slowly, pour the salt solution from the 150-mL beaker into the funnel, until the water level in the 250-mL beaker is around the 200-mL line.
8. Carefully remove the funnel.
9. Look at the side of the beaker and notice the two layers – clear water and tinted salt water.
10. Cut a piece of cardstock about 3"x3." It should be big enough to cover the beaker.
11. Put the cardstock over the top of the beaker, and leave it in a safe place for two days.
12. Observe it every 8 hours over the next 48 hours. Write or draw what you see in the beaker in the table.

Time	Observation
Initial Observation (0 Hours)	
8 Hours	
16 Hours	
24 Hours	
32 Hours	
40 Hours	
Final Observation (48 Hours)	

SAMPLE

GLOSSARY

Atom: The smallest unit of a chemical element that is still the element.

Chemical reaction: A change resulting in different chemicals (for example, hydrogen peroxide reacting to produce water and oxygen).

Condensation: The change in state from gas to liquid, such as water vapor becoming liquid water when cooled.

Density: An object's mass compared to its volume.

Diffusion: The movement of molecules from an area of high concentration to an area of low concentration.

Element: The simplest substances found anywhere in nature, which cannot be broken down further through chemical means.

Endothermic: A chemical reaction that uses heat energy, decreasing the temperature of the system.

Evaporation: The process in which molecules of a liquid move more freely and eventually become a gas.

Filtration: The process of using a filter and filter paper to separate a solid from a liquid.

Fermentation: The chemical breakdown of glucose by yeast or bacteria, producing carbon dioxide gas.

Matter: Everything that takes up space and has mass.

Molecule: A group of atoms bonded together.

Nucleation: A physical change that occurs when a liquid comes in contact with a solid substance, often resulting in gas bubbles or crystallization.

Osmosis: The process of moving through a semi-permeable membrane.

Physical change: A change in which an object or substance becomes different in appearance only, such as a change in size, shape, or state.

Polarity: The quality of having two oppositely charged poles in a chemical bond or molecule.

Solute: Any solid substance dissolved in a liquid solvent to form a solution.

Solution: A mixture in which two substances (such as two liquids or a solid and a liquid) are evenly mixed.

Solvent: A liquid capable of dissolving a solid substance (called a solute) to make a solution.

Surface tension: The increased attraction between molecules of a liquid at the surface compared to the body of the liquid.

SAMPLE

