Properties of Water

Summary

Students visit a series of stations to learn about water's properties of heat capacity, pH, capillary action, cohesion, adhesion, surface area/evaporation, surface tension and as a solvent.

Time Frame

1 class periods of 90 minutes each

Group Size

Small Groups

Materials

- student page
  (attached)
- station signs
  (attached)
  for Station 1: Heat capacity
  two glass beakers (label A and B)
  two thermometers
  water
  hot plate
  stopwatch or clock with seconds hand
  for Station 2: pH
  pH paper (any type that measures both acids and bases)
  weak acid
  weak base
  beaker
  water
  stirring rods or wooden splints
  for Station 3: Capillary action
  capillary tubes
  small beakers with different liquids (water, vinegar, salt water, sugar water)
  metric rulers
  for Station 4: Cohesion, adhesion, surface tension
  penny
  dropper or pipette
  water
  pepper or paper dots from hole punch
  for Station 5: Surface area and evaporation
  paper towel
  drinking straws
  3 graduated cylinders
  for Station 6: Water as a solvent
  small beakers or dilution trays
  various chemical substances (such as salt, sugar, baking soda, potassium nitrate)
  rubbing alcohol
  water

Instructional Procedures

Set up the stations before class and label them clearly. A description of each station is below. Two of each station will prevent students having to wait long for a new station. Another option is to do each station as stand alone experiment over a series of days. Each takes about 10-15 minutes.

Have the students start in groups of 3-4 at different stations and move when they are done with each. The student directions for each station are also below.

Discuss the results after students finish and before they begin the analysis questions.

Station 1: Heat Capacity

Students will add 50 mL of tap water to beaker "A" and nothing to "B". They will heat both to 30 degrees C and then time how long it takes them to cool to 25 degrees C.

Station 2: pH

Students will add a few drops of acid to the water, test it and then try and get it back to neutral.

Station 3: Capillary action

Students will test each substance for its ability to travel up the capillary tube.

Station 4: Cohesion, adhesion, surface tension

Students follow instructions on station sign.

Station 5: Surface area and Evaporation

Prepare the "leaves" the night before. The paper towels are twisted into the straws. The leaf with the large surface area needs to have a longer piece of paper towel than the medium. The medium needs to be longer than the small. The water will evaporate much more rapidly off the large leaf, emptying the graduated cylinder more rapidly.

Station 6: Water as a Solvent

Students follow instructions on station sign.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans