

### Filtering and using indicators

- **How can the starch be separated from a starch/water mixture?** [observational experiment]  
3 test tubes (20 X 150 mm)                      funnel  
test tube holder                                      filter paper (#6 coffee filters cut into 7cm radius circles)  
tincture of iodine
  1. Hypothetical separations: big rocks/little rocks, salt/sand, iron filings/wood shavings
  2. Define "indicator": A chemical that changes color to tell you something (show iodine on a piece of bread or potato).
  3. Mix up starch and water (2 c. water, ¼ t. starch), stir before use.
  4. Pour mixture into test tubes #1 and #2.
  5. Test for presence of starch in #1 with a few drops of iodine.
  6. Pour test tube #2 mixture through filter paper (in funnel) into test tube # 3.
  7. Test filtered liquid with iodine.
  8. Conclusion: We can separate a simple mixture with filtration.
- Can sugar be separated easily from a sugar/water solution? [observational experiment]  
Tes-tape (indicator)  
sugar solution - must be glucose (corn syrup). Can use Karo syrup or pancake syrup ½ t. + 1 qt. water
  1. Perform experiment as above using sugar water and Tes-tape.
  2. Conclusion: Sugar goes through filter paper. It is very small and somehow attached to water particles (a solution is a special type of mixture). To separate this special mixture, we must resort to distillation.
- **Compounds:** [lesson]
  1. Sugar (C,H and O - C&H Sugar box as memory aid)
    - a. Cane or beet sugar (sucrose):  $C_{12}H_{22}O_{11}$
    - b. Grape sugar or blood sugar (glucose):  $C_6H_{12}O_6$  - a simple sugar
    - c. Other sugars: milk sugar (lactose), fruit sugar (fructose) the sweetest sugar of all
  2. Compounds are grouped according to their chemical formulas. Examples: carbohydrates (C,H,O compounds), alcohols, salts, acids, bases

### Model for combing atoms

- **How elements combine to make compounds** (this is a very important lesson)!  
Different paper cutouts representing "ions"
  1. Atoms can gain or lose electrons (they are then called "ions" not atoms).  
Example: 8 protons and 8 electrons = no charge (atom)  
          8 protons and 9 electrons = -1 (ion)  
          8 protons and 7 electrons = + 1 (ion)