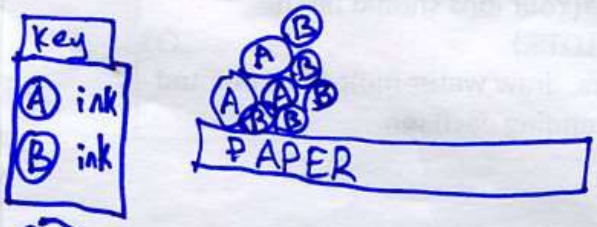
warmup ice cubes are NOT a substance

#1 Ice CUBE particle picture

#2 INK ON PAPER



#3 INK IN CHROMATOGRAPHY

WHERE ETHANOL OR OTHER SOLVENT PUSHES THE

will the separation work?

E.H.S. ©λ#M!$+ry

Mr. Genest

Name_____

Date_____

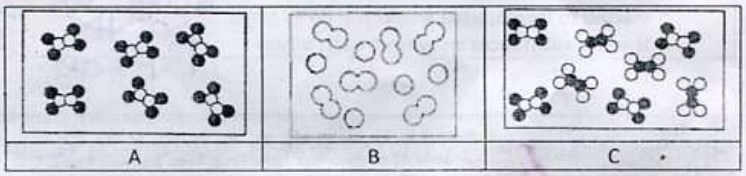
Tutors! Adults! Help this young chemist by visiting **http:genest.weebly.com** with any smart phone

1. Classify each mixture as heterogeneous or homogeneous

a. HOMOG. gasoline
b. HOMOG milk
c. HOMOG blood
d. HETERO chocolate chip ice cream
e. HOMOG brass (a blend of copper and zinc)
f. HOMOG black coffee

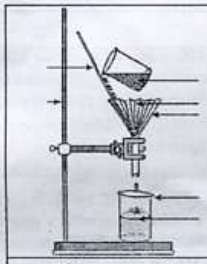
2. Which box would only give one substance if you distilled it?

a) Box A
b) Box B
c) Box C

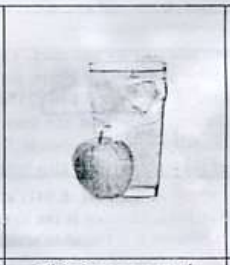


3. Under each image write a separation technique:

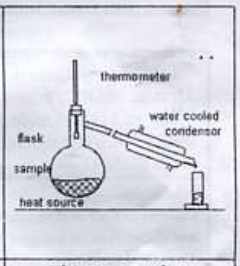
- distillation
- chromatography
- filtration
- partial freezing
- partial melting
- diffusion



This separation process is: filtration



This is separated using: freezing



This separation process is: distillation

Match the separation method with the physical principal

4. C Filtering a mixture of water, sand , and sugar
5. B Distilling a mixture of water and ethanol
6. D Centrifuging a mixture of Uranium 235 and Uranium 238
7. A Heating a rock over a campfire until the metal called *lead* comes out of the rock.
8. D Crushing iron ore rocks and collecting the iron that sinks to the bottom of a tank of soapy water while the sand and silica floats to the top

a) different melting points
b) different boiling points
c) different solubility (dissolves differently
d) different mass or density

9. If a 14.1g disc made of unknown metal is heated using 349 joules, its temperature rises 3.79°C. Calculate the specific heat of the disc.

$C = \frac{Q}{(m)(\Delta t)}$ $C = \frac{349\ J}{(14.1g)(3.79°c)}$ $C = 6.5 \frac{J}{g°c}$

10. If you used distillation to separate a mixture of decane and hexane, which would distill first?

hexane (lower b.p. boils first)

11. Distillation works because two substances have different
    a. melting points
    b. boiling points
    c. densities

12. If you used partial freezing to separate a mixture of ethane and butane, which would freeze first?

butane (higher MP. would freeze at warmer temperature)

13. After the mixture in the previous question started to freeze, what would you do to get the two substances away from each other?

SCOOP OR FILTER THE SOLID TO TAKE IT FROM THE LIQUID

table 1 Hydrocarbon boiling points

Hydrocarbon	boiling point (°C)
Butane	-0.5
Decane	174.0
Ethane	-88.6
Heptane	98.4
Hexane	68.7
Methane	-161.7
Nonane	150.8
Octane	125.7
Pentane	36.1
Propane	-42.1

Magnesium — (*Magnesia*, district in Thessaly) Mg; at. wt. 24.305; at. no. 12; m.p. 648.8±0.5°C; b.p. 1090°C; sp. gr. 1.738 (20°C); valence 2. Compounds of magnesium have long been known. Black recognized magnesium as an element in 1755. It was isolated by Davy in 1808, and prepared in coherent form by Bussy in 1831. Magnesium is the eighth most abundant element in the earth's crust. It does not occur uncombined, but is found in large deposits in the form of *magnesite*, *dolomite*, and other minerals. The metal is now principally obtained in the U.S. by electrolysis of fused magnesium chloride

Lutetium — (Lutetia, ancient name for Paris, sometimes called *cassiopeium* by the Germans), Lu; at. wt. 174.967; at. no. 71; m.p. 1663°C; b.p. 3395°C; sp. gr. 9.840 (25°C); valence 3. In 1907, Urbain described a process by which Marignac's ytterbium (1879) could be separated into the two elements, ytterbium (neoytterbium) and lutetium. These elements were identical with "aldebaranium" and "cassiopeium," independently discovered by von Welsbach about the same time. Charles James of the University of New Hampshire also independently prepared the very pure oxide.

Lithium — (Gr. *lithos*, stone), Li; at. wt. 6.941; at. no. 3; m.p. 180.54°C; b.p. 1342°C; sp. gr. 0.534 (20 °C); valence 1. Discovered by Arfvedson in 1817. Lithium is the lightest of all metals, with a density only about half that of water. It does not occur free in nature; combined it is found in igneous rocks and in the waters of many mineral springs. *Lepidolite*, *spodumene*, *petalite*, and *amblygonite* are the more important minerals containing it. Lithium is presently

14. If a mixture of these two metals is heated, circle which substance will melt first (based on their melting point (mp):

lithium lutetium

15. If crushed and placed in foaming water which substance would sink fastest (based on their specific gravity):

lutetium magnesium

16. If a mixture of the following two metals was heated until it was completely liquid and then allowed to cool, circle which substance would freeze (become solid) first ,based on their melting point (mp):

magnesium lutetium