Forms part of the Gr 10 Physical Sciences 3-in-1 Class text and Study Guide.
See p. 4 MODULE 1 TOPIC 1 Unit 2 for the theory.

PRACTICAL ACTIVITY

Distinguish between homogeneous and heterogeneous mixtures

Materials

- 6 beakers, half filled with water
- carbon tetrachloride ($CC\ell_4$)
- a small amount of each of the following substances:
  - sugar
  - iodine crystals (I_2)
  - vinegar
  - potassium permanganate ($KMnO_4$)
  - sand
  - oil

Method

1. Draw a table to record your results:

Mixture	Homogenous	Heterogenous
Sugar and water		
Potassium permanganate and water		
Sand and water		
Vinegar and water		
Oil and water		
Iodine crystals and water		
Iodine crystals and $CC\ell_4$		
Iodine crystals, $CC\ell_4$ and water		

2. Add a teaspoon of sugar to a beaker of water and stir it well.
3. Indicate whether the mixture is homogeneous or heterogeneous.
4. Repeat for the potassium permanganate ($KMnO_4$), sand, vinegar, oil and iodine (I_2) crystals.
5. Add a teaspoon of I_2 crystals to a beaker with $CC\ell_4$ and stir well.
6. Add some $CC\ell_4$ to the beaker with water and I_2. Stir or shake it well and note the type of mixtures.

Observations and discussion

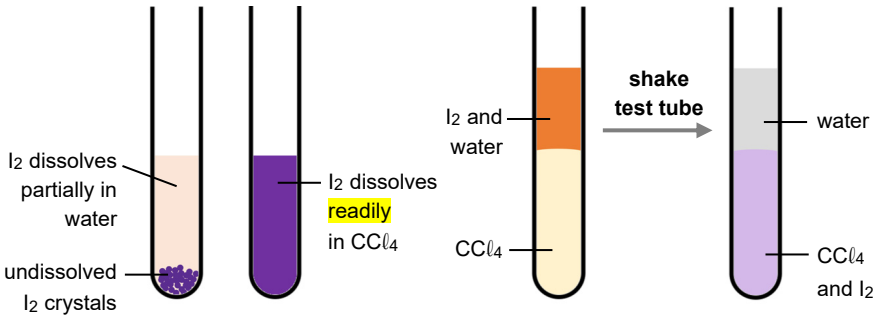
- Sugar, $KMnO_4$ and vinegar form homogeneous mixtures with water.
- Sand and oil form heterogeneous mixtures with water.

Potassium permanganate in water

NOTE

Sand and water form a suspension and oil and water form an emulsion when mixed.

- The purple I_2 crystals dissolve partially in water to form an orange/brown solution, but due to the remaining undissolved I_2 it is a heterogeneous mixture.
- The I_2 crystals dissolve completely in $CC\ell_4$ to form a homogeneous purple mixture.
- When $CC\ell_4$ is added to the I_2-water solution, the I_2 is removed from the water and completely dissolves in the $CC\ell_4$ (as in the previous example). This occurs in a separate layer underneath the water. All together the three substances form a heterogeneous mixture.



Iodine (I_2) dissolves partially in water, but readily in $CC\ell_4$

Conclusion

- When a mixture has a constant (uniform) composition and only a single phase can be observed, it is a homogeneous mixture.
- When particles of the mixed substances can still be distinguished, it is a heterogeneous mixture.

DID YOU KNOW

At room temperature, only a small amount of iodine can dissolve in water, resulting in a slightly brownish solution. However, by heating the water, more iodine can dissolve, producing a darker solution. In grade 11 it will be explained why I_2 is more soluble in $CC\ell_4$ than in water.