



Year: 10

Topic: 2.3 Water

Knowledge and Understanding to be developed:

The first section of this topic deals with the composition and treatment of the water supply, including fluoridation. Different types of water hardness are investigated, with relevant knowledge of the ions involved. Higher tier learners should be able to write word and balanced symbol equations relating to the removal of hardness.

Working Scientifically
Learners can consider the ethical issue of water fluoridation in this topic, using this to explain every day and technological applications of science; to evaluate associated personal, social, economic and environmental implications; and to make decisions based on the evaluation of evidence and arguments. They can plan experiments or devise procedures to make observations and test hypotheses.

Mathematical Skills
Work on solubility curves gives learners the opportunity to plot variables and interpret data. They can analyse results of investigations into different types of water hardness and use these to determine hardness levels in unknown samples

Key Terms to be learned this topic:

Sustainable water	Water treatment
sedimentation	filtration
chlorination	Hard and soft water
Solubility	Distillation
Ion exchange	

**Learning Objectives and Outcomes:
Students should be able to demonstrate and apply their knowledge and understanding of :**

- a) the composition of water in 'natural' water supplies, including dissolved gases, ions, microorganisms and pollutants
- (b) the need for a sustainable water supply to include reducing our water consumption, reducing the environmental impacts of abstracting, distributing and treating water
- (c) the treatment of the public water supply using sedimentation, filtration and chlorination
- (d) the arguments for and against the fluoridation of the water supply in order to prevent tooth decay
- (e) desalination of sea water to supply drinking water including the sustainability of this process on a large scale
- (f) the separation of water and other miscible liquids by distillation
- (g) simple methods to determine solubility and produce solubility curves
- (h) the interpretation of solubility curves
- (i) the causes of hardness in water and how to distinguish between hard and soft waters by their action with soap
- (j) the difference between temporary and permanent hardness
- (k) the processes used to soften water to include boiling, adding sodium carbonate and ion exchange; the advantages and disadvantages of different methods of water softening and the explanation of how these methods work
- (l) the health benefits of hard water and its negative effects, e.g. on boiler elements

SPECIFIED PRACTICAL WORK

- Determination of the amount of hardness in water using soap solution

