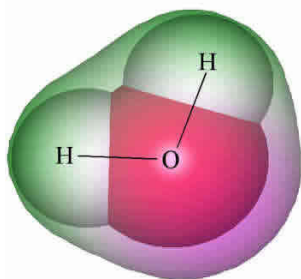


Topic	Properties of water	Level	A Level
Outcomes	<ol style="list-style-type: none"> 1. To make observations about the properties of water by carrying out a series of experiments 2. To explain the properties of water using an understanding of hydrogen bonding 		



The properties of water: thinking tasks

Water is an incredibly important biological molecule that is vital for life. Many of the **properties*** of water are unusual and need explaining. The following experiments should get you thinking about water and why it is needed by living organisms.

- *a property is a characteristic of something, for example, the property of a knife is it is sharp.*

Carry out the experiments below and then describe and explain what you see.

1. Pour 10ml of water into a test tube. Look at the surface closely. **Describe** what you observe and **explain** why this is occurring.
2. Place a 2 pence piece on the table and slowly add water using a Pasteur pipette. **Describe** what you observe and **explain** why this is occurring.
3. Take a 250ml beaker. Pour in roughly 200 ml of water. Place an ice cube in the water. Watch it carefully for a few minutes. **Describe** what you observe and **explain** why this is occurring.
4. Remove the ice cube from the beaker. Pour in 20ml of oil. **Describe** what you observe and **explain** why this is occurring.
5. Into (3) place an ice cube. Place the beaker in a warm water bath and leave for 3 minutes. **Describe** what you observe and **explain** why this is occurring.
6. In a beaker pour in 250ml water. Add 2 spatulas of salt and stir for 3 minutes. **Describe** what you observe and **explain** why this is occurring.
7. In a beaker pour in 20ml of oil. Add 2 spatulas of salt and stir for 3 minutes. **Describe** what you observe and **explain** why this is occurring.

- Q1)** Draw a water molecule, label the polar bonds and show the lone pairs of electrons.
- Q2.** Using your textbook write a detailed explanation of what hydrogen bonding is.
- Q3.** Now go through your observations. Can you explain them using your knowledge of hydrogen bonding?
- Q4)** What must a molecule have if it is going to be able to do hydrogen bonding?
- Q5)** If you repeated the tests with cyclohexane how would they differ?

Progress: further resources on bonding are available here:
<http://www.thescienceteacher.co.uk/bonding/>