Chemistry of Swimming

Swimming, one of the oldest and most universal sports, has been practiced as a sport since Ancient Greek times. Although not practised at the ancient Olympic Games it was one of only five sports included in the first modern Olympic Games in 1896. Nowadays a whole range of sports take place in the swimming pool including swimming, water polo, synchronized swimming, diving and aqua hockey. Swimming pools have one of the clearest links to chemistry we see in the sporting environment. Nearly anybody who has ever been to a public swimming pool will say they have encountered chlorine - although maybe not quite as they thought. Strangely, water sports taking place in the sea would also encounter chlorine, but in the form of sodium chloride - this is what makes sea water salty - although there would be many impurities and other salts also present. The following questions are exploring some of the chemistry surrounding chlorine and the periodic group it is from.

Fact
As you descend the halogen group the elements become less reactive. Fluorine is the most reactive halogen.

1. Chlorine, the chemical so readily associated with the swimming pool, can also be found in common salt. What is the chemical name and chemical formula for salt?

Fact
Fluorine and chlorine are both present in gases harmful to the atmosphere known as CFCs, or chlorofluorocarbons. athletes' wetsuits.

2. Fluorine, chlorine and bromine are all group 7 elements. What is another name given to this group of elements?

3. In the table below write the chemical symbol corresponding to the element and also the appearance of that element when in molecular form at room temperature. Fluorine has been included as the example.

Element	Symbol	Appearance at room temperature
Fluorine	F	Pale yellow gas
Chlorine		
Bromine		
Iodine		

4. What type of bonding has occurred when two chlorine atoms have bonded together to form a molecule of chlorine?

Fact
Tracy Caulkins is the only swimmer ever, man or woman, to own American records in every stroke.

5. In question 1 you wrote down the chemical formula for salt. Identify which atom has lost an electron and which atom has gained an electron to form the ionic bond in the compound.

6. Chlorine forms salts with other metals as well as those in group 1. A common chloride is iron(III) chloride. Balance the following equation between iron and chlorine to produce iron(III) chloride.

$$\_\_Fe(s) + \_\_Cl_2(g) \longrightarrow 2FeCl_3(s)$$

7. At room temperature, only one of the first four halogens can be found in a solid state. This halogen, when in a solution, can be used to test for starch. What is the halogen? What colour does the starch go when tested with this halogen?

Fact

When a group 7 element, such as chlorine, reacts with a group 1 metal a salt is formed. Salts are ionic compounds. When two elements bond to form an ionic compound like this, one element will lose an electron and one element will gain an electron.