# Chemistry Questions of the Day with Example Student Answers and Feedback

1. Explain why CaO has a high melting point and CO has a low melting point. (3)

CaO is a molecule of metal and a non-metal, which means that the bonds it forms are ionic. CaO has a continuous structure, and being ionic, a high melting and boiling point. CO forms covalent molecular bonds and is generally gas at room temperature, having a very low melting and boiling point. The reason CaO has a much higher melting point is because a lot more energy is required to break its bonds, whereas CO only has weak bonds and not much energy is required to break these bonds.

1. Explain why molecules of water are V-shaped and molecules of carbon dioxide are linear. (3)

The bonding of atoms is determined by the number of electrons. The shape which that molecule then adopts is determined by the non-bonding electrons. oxygen has 6 valence electrons. In a molecule of H2O each H atom only has one valence electron, each of which bond with one of oxygen's 6 electrons. This leaves 4 non-bonding electrons. Because there are two hydrogen's and only one oxygen, the non-bonding electrons of oxygen, it being the central atom, repel each other and the hydrogens, pushing them down and creating the V-shape, causing the dipoles to share a direction. In a molecule of CO2, the carbon is the central atom, and forms double bonds with the oxygen. Carbon then has no non-bonding electrons, but the oxygens still each have 4 non-bonding electrons. Because there are two oxygen's they push away from each other in exactly opposite directions, causing the linear shape.

1. Explain the secondary interaction that occurs between molecules of hydrogen sulfide. (3)

H2S, hydrogen sulfide, forms polar molecules with hydrogen and sulfur. It is also a gas at room temperature. Therefore, the secondary interaction that occurs between molecules of H2S, can't be hydrogen bonding, as the property of this type of interaction is, liquid at room temperature. Thus, the secondary interaction that occurs between molecules of hydrogen sulfide is dipole to dipole attraction.

1. Explain why unpolluted rainwater is acidic but is not classified as acid rain. (3)

A common property of acids is that they have a H2 attached to the molecule, and water is H2O. Therefore, water is actually an acid, although a very weak one. Also rain water reacts naturally with CO2 in the atmosphere, to form H2CO3, which is also acidic, or and acid. However, they are both weak acids and do not have a low enough pH to cause the rain to be considered dangerously acidic.

1. Explain how acid rain containing nitric acid can affect plant growth both positively and negatively. (3)

Acid rain can affect plants negatively, as it does kill and damage sensitive plants. However, plants take nutrients in the form of nitrogen, and because the acid rain contains nitric acid, when it rains there is a supply of soluble nitrogen immediately available to the plants. This means that plants which are not killed by the acid rain will be helped by it.