

Source: [\[KB20200823182634\]](#)

Others: [\[KBe2020bio101refFreeAssociation\]](#) - Exr0n

Free associate: atoms, 2nd law of thermodynamics, energy, electronegativity, polarity, types of chemical bonds, lipid(s), carbohydrate(s), protein(s), amino acid(s), fold, enzyme.

- Atoms
 - Exhibit electronegativity, which allows them to
 - Form molecules, which exhibits the property of polarity
 - Depending upon polarity, different types of bonds can be formed.
 - Covalent bonds are the bonds which peptides exhibit, the bond which joins amino acids, which form proteins when chained together.
 - These proteins then fold, and the way they fold is critical to their function. [\[KBe2020bio101refProteinFoldingConflict\]](#)
 - Some of these functions are turning carbohydrates into ATP.
 - ATP is biological energy (along with some lipids which form fats), which is fundamental for reactions to occur.
 - A way of lowering the activation energy for reactions to take place is with enzymes.
 - This increases reaction rate, just like heat does.
 - Each of these reactions contributes to the inevitable heat death of the universe, due to the second law of thermodynamics

Never done a free associate before, so lets see how this goes.

Atoms Are the fundamental building blocks of the universe. Atoms make up matter, and they are made of protons, neutrons, and electrons. The number of protons within a given atom determines what element it is. The neutrons bind said protons together. Electrons reside on rings (orbits) around the nucleus of the atom, and are attracted to this nucleus. The count and placement of these electrons, in part, determine the **electronegativity** of an atom. Electronegativity is a measure of an atoms attraction to shared electron pairs. It is fundamental in forming **chemical bonds**. Bond types are dependent upon the difference in electronegativity of the atoms bonding. A difference between 0.4 1.7 (if I remember correctly) forms a polar covalent bond. Below 0.4 is non-polar, and above 1.7 is ionic. These differences in electronegativity also effect the **polarity** of the molecule they form. Polarity is a very important concept, and effects how molecules interact with one another. For example, this allows water to form hydrogen bonds, and quite a bit more. Polarity determines whether a substance is hydrophobic or hydrophilic, which determines the way **proteins fold**. The way proteins fold determines the function of the protein – one such function is converting **carbohydrates** to ATP. ATP (along with **Lipids** which is commonly used to hold energy in the form of fat) is the primary **energy** carrying molecule of virtually all carbon based life forms. Energy is required for chemical reactions to occur. As things always seek their lowest energy form, reactants can get stuck in a “valley,” where the energy required to initiate a reaction (the activation energy) is higher than their current state. In order to surpass this barrier, energy must be added to the reaction. One way of lowering this activation energy is with **enzymes**. Enzymes are a type of bio-catalyst which, as previously noted, helps facilitate reactions by lowering their activation energy. This increases reaction rate, just like heat does. every single one of these reactions contributes to the inevitable heat death of the universe due to **The Second Law of Thermodynamics**, which states that the entropy in an isolated system cannot decrease, and instead only increases. Entropy is the my ten minute timer just went off.

****2nd law of thermodynamics

****Energy

****Electronegativity

****Polarity

****Types of chemical bonds

****Lipids

****Carbohydrates

****Protein

****Amino acids

****fold

****enzyme