**Biological Molecules**

**Answer the following questions using the information from the PowerPoint.**

**Carbohydrates**

* Explain the role of carbohydrates.   
  Carbohydrates are important as both energy storage molecules and as the structural elements in cells and tissues.
* Identify the elements that carbohydrates are made of.   
  Carbohydrates are made up of carbon, hydrogen, and oxygen atoms.
* List the three types of carbohydrates and give an example of each.  
  Monosaccharides (e.g. glucose, fructose), disaccharides (e.g. sucrose, lactose, maltose), and polysaccharides (e.g. glycogen, starch, cellulose, chitin).
* Explain the role of monosaccharides, disaccharides and polysaccharides.  
  Monosaccharides are single-sugar molecules that are used as a primary energy source for fuelling cellular metabolism.  
  Disaccharides are double-sugar molecules bonded together and are used as energy sources and as building blocks for larger molecules, provide a convenient way to transport glucose.  
  Polysaccharides are polymeric carbohydrate molecules composed of long chains of monosaccharide units, and fulfill varying functions: Energy storage (glycogen in animals, starch in plants), structural support in plants (cellulose – cell wall), and making up the hard skeleton of insects (chitin).
* Define the term chemosynthesis.  
  Chemosynthesis is the process by which a carbohydrate source is made by bacteria using chemicals as the energy source, rather than sunlight. It occurs around hydrothermal vents and methane seeps in the deep sea where sunlight is absent.

**Lipids**

* List the elements that lipids are made of.  
  Like carbohydrates, lipids are also constructed of carbon, hydrogen, and oxygen atoms, but the proportion of oxygen in lipids is much smaller.
* Lipids are hydrophobic. Explain the meaning of the statement.  
  Lipids being hydrophobic means that they repel or are insoluble in water.
* Explain the role of lipids.   
  Lipids can be classified into simple lipids (fats, oils, waxes), phospholipids, and steroids. They can function as biological fuels, hormones, and as structural components of membranes. Fats provide twice as much energy as carbohydrates. Proteins and carbohydrates can be converted into fats stored in adipose tissue.

**Proteins**

* Identify the role of proteins.   
  Proteins play a key role in the body. They are involved in: enzyme reactions, oxidation-reductions, structure (e.g. collagen), storage (e.g. ferratin stores iron), transport (haemoglobin), cell signalling (hormones), defence (antibodies), and energy production.

**Nucleic Acids**

* Explain the role of nucleic acids.  
  Nucleic acids are biochemical macromolecules involved with the transmission of inherited information.
* List the three components that make a nucleic acid and draw a diagram as an example.   
  The nucleotides that make up nucleic acids are composed of a phosphate, a sugar, and a base.

**Waste Products**

* Identify waste products that are eliminated by the body.   
  Waste products that are eliminated by the body include: carbon dioxide and hydrocarbonate ions produced in cellular respiration, ammonia produced by gut bacteria in the breakdown of proteins, urea produced to lower the level of toxic ammonia, and uric acid produced in the breakdown of purines found in some foods.