Lipids

Main groups of lipids are Triglycerides / phospholipids.

Lipids contain Carbon/ Hydrogen/ Oxygen.

Insoluble in water

Soluble in organic substances (alcohol).

A triglyceride is an ester of fatty acids and glycerol.

Triglyceride

A molecule of fatty acid consists of a hydrocarbon chain and carboxyl group (-COOH).

Molecules that have two ends (poles) that behave differently in this way are said to be Polar.

Triglycerides:

Insoluble in water and store chemical energy

Readily hydrolysed to fatty acids and glycerol

Used in respiration when glucose in short supply

Can pass through phospholipid bilayer of cell membranes

Roles of Lipids:

Energy Source (long-term food reserve as insoluble in water)

Insulation (a layer of fat beneath the skin prevents heat loss/ overheating as fat isn't a good conductor of heat.)

Protection (fat surrounds delicate organs)

Structural (phospholipids in cell membranes)

Waterproofing (insoluble in water)

Phospholipids:

Similar to lipids but a fatty acid is replaced by a phosphate molecule.

Phosphate molecules attract water (hydrophilic)

Fatty Acid molecules are Hydrophobic.

Phospholipid is made up of:

Hydrophilic head and hydrophobic tail.

If a hydrocarbon chain has no carbon-carbon bonds the fatty acid is saturated because the carbon atoms are linked to the maximum amount of hydrogen atoms.

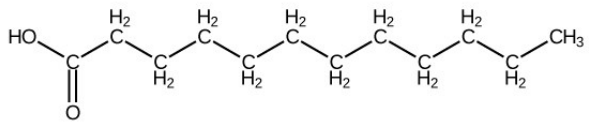
If there is a single double bond = mono-unsaturated.

If there is more than one double bond = polyunsaturated.

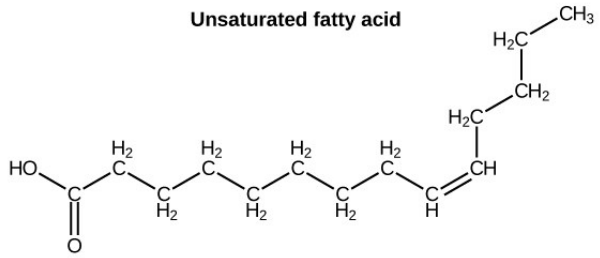
Emulsion Test:

Mix ethanol and the test material / shake to help dissolve lipids present / add water / shake ——> milky white emulsion indicates the presence of lipids.

Saturated fatty acid



Unsaturated fatty acid



Triglycerides have low mass to energy ratio = good storage molecules.

Being large, non polar molecules they are insoluble in water. Their storage doesn't affect osmosis in cells or the water potential of them.