and mechanical stability
    - if absent in plant cells, plasma membrane surrounded and supported by a rigid cell wall made of cellulose
- cholesterol is an amphipathic molecule (like phospholipids) meaning it has both hydrophilic an hydrophobic regions
    - cholesterol's hydroxyl (-OH) group is hydrophilic and aligns towards the phosphate heads of phospholipids
    - the remainder of the molecule (steroid ring and hydrocarbon tail) is hydrophobic and associates with the phospholipid tails
- phospholipid bilayers are fluid, in that the phospholipids are constant in movement relative to one another
- cholesterol interacts with fatty acid tails to moderate the membrane properties
    - immobilizes the outer surface of membrane, reducing fluidity
    - makes the membrane less permeable to very small water-soluble molecules that would otherwise freely cross
    - functions to separate phospholipid tails and so prevent crystallization of the membrane
    - helps secure peripheral proteins by forming high density lipid rafts capable of anchoring the protein

Fluid-Mosaic Model
- cell membranes are represented according to fluid-mosaic model due to fact that they are:
    - fluid: the phospholipid bilayer is a viscous and individual phospholipids can move position
    - mosaic: the phospholipid bilayer is embedded with proteins, resulting a mosaic of components

Components of Plasma Membrane:
- phospholipids: form a bilayer with phosphate heads facing outwards and fatty acids tails facing inwards
- cholesterol: found in animal cell membranes and functions to improve stability and reduce fluidity
- proteins: may be either integral (transmembrane) or peripheral and serve a variety of roles

Membrane Models
- fluid-mosaic model was not the first scientifically accepted paradigm to describe membrane structure
- the first model that attempted to describe the position of proteins within the bilayer was proposed by Hugh Davson and James Danielli in 1935
- When viewed under a transmission electron microscope, membranes exhibit a characteristic trilaminar appearance
- Danielle and Davson proposed a model whereby two layers of protein flanked a central phospholipid bilayer
    - the model was described as a "lipo-protein sandwich", as the lipid layer was sandwiched between two protein layers
    - the dark segments seen under electron microscope were identified wrongly as representing the two protein layers
- there were a number problems with the lipo-protein sandwich model proposed by Davson and Danielli
    - assumed all membranes were a uniform thickness and would have a constant lipid-protein ratio