Staining for light microscopy

In basic light microscopy the images have a low contrast as most cells do not absorb a lot of light. Stains increase contrast as different components within a cell take up stains to different degrees. To prepare a sample for staining it is first placed on a slide & allowed to air dry. This is then here fixed by passing through a flame. The specimen will then adhere to the microscope slide & take up stains.

- Positively charge does are attracted to negatively charged materials in the cytoplast e.g. eosin.
- Negatively charged dyes are repelled by the negatively charged cytosol. These dyes stay outside the cells, leaving the cells unstained, which then stand out against the stained background.

Differential staining can distinguish between 2 types of organisms or organelles that would otherwise be hard to identify.

- Gram stain technique- used to separate bacteria in 2 groups gram-positive & gram-negative. Crystal violet is first applied to a bacterial specimen on a slide, then iodine, which fixes the dye. The slide is then washed with alcohol. The grampositive bacteria retain the crystal violet stain. Gram-negative bacteria have thinner cell walls, so lose the stain. They are then stained with safranin dye, which is called a counterstain.
- Acid-fast technique- used to differentiate species of mycobacterium from other bacteria. A lipid solvent is used to carry carbolfuchsin dye into the cells. the cells are then washed with a dilute alcohol solution. Mycobacterium are not affected by the acid-alcohol & retain the carbolfuchsin stain which is bright red.

Cell theory

- Cytology the study of cells
- Cells are the smallest united life & the building Blocks of structure in living things
 All cells are dealed from pre-existing cells by
- division
- Cells contain a blueprint (information for their growth, development and behaviour)
- Within cells are the sites of all the chemical reactions of life (metabolism)
- There are 2 fundamental types of cellprokaryotic & eukaryotic
- The ultrastructure of a cell is those features that can be seen using an electron microscope.