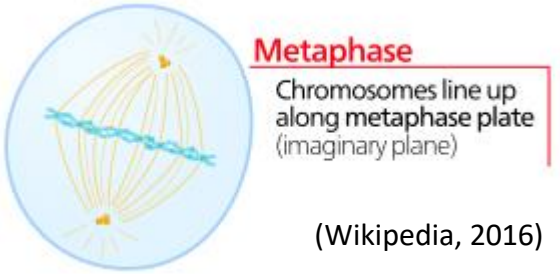
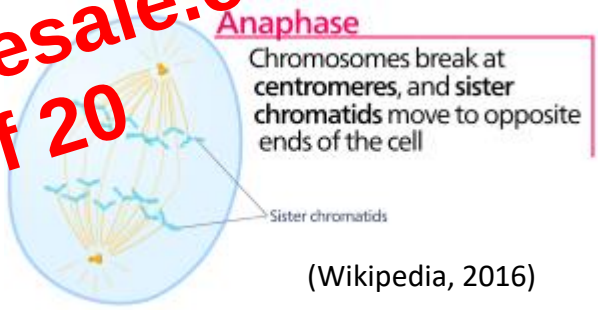
extended from poles on opposite sides of the cell, which stabilize the mitotic spindle and form a structure known as the aster (Khanacademy 2016).

Metaphase- Metaphase is the stage in which the duplicated genetic material of the parent nucleus is separated into two separate daughter cells. In metaphase the mitotic spindle has captured and aligned all of the chromosomes at the metaphase plate. The sister chromatids (chromosomes which have been replicated) remain joined at a central point called the centromere. Prior to the metaphase stage, kinetochores proteins were formed around the centromere and kinetochore microtubules extended from poles from opposite sides of the cell and attached themselves to the kinetochores. During this stage (metaphase), the sister chromatids are pulled back and forth by the kinetochore microtubules until they (the sister chromatids) are aligned properly along the equator of the cell. Once aligned the metaphase checkpoint occurs, during this checkpoint the cell will make sure that it is fully capable and ready to divide. It will do this by making sure that all of the chromosomes are properly aligned at the metaphase plate and that the kinetochores are correctly attached to the microtubules. This is vital as it makes sure that the sister chromatids will divided evenly between the two daughter cells when they are separated. If for any reason a chromosome is not attached or aligned correctly, the cell will put a stop to the division until the issue has been rectified (Quora, 2015).



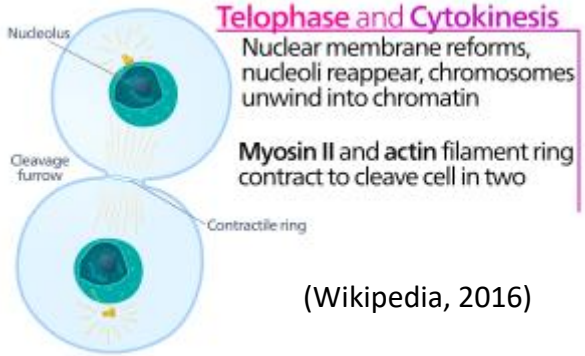
(Wikipedia, 2016)

Anaphase- During this stage, the protein which was holding the sister chromatids together is broken down thus allowing the sister chromatids to be separated from each other by the spindle. The daughter chromosomes are then pulled towards opposite sides of the cell. The microtubules which are not attached to any chromosomes begin to elongate and push apart from each other; this separates the poles apart and elongates the cell (Macroevolution, 2016).



(Wikipedia, 2016)

Telophase and cytokinesis- Telophase is the stage in which the cell has almost completed its division. During this phase, the daughter chromosomes reach opposite poles of the cell. The formation of nuclear vesicles occurs around the group of chromosomes at each end of the cell. When the nuclear envelope is reformed two separate nuclei are made within the one cell. As the nuclear envelope is beginning to re-form, the chromosomes start to decondense and regain their stringy appearance. After telophase a process known as cytokinesis occurs, this is when the cell divides into two daughter cells. Two nuclei are present at opposite poles of the cell, the cytoplasm of the cell begins to separate, and next the cell pinches in the middle, forming a cleavage. The mitotic spindle then decides at what point and where the cell will begin to split. In animal cells, cytokinesis is contractile however plant cells are unable to divide like this due to the presence of a cell wall making the structure too stiff. Therefore a cell plate is formed down the middle of a cell, resulting in the formation of



(Wikipedia, 2016)

Type of RNA	Involved at which stage of protein synthesis	Role
mRNA	Transcription	The role of mRNA is to carry genetic information which has been copied from the DNA in the form of a series of 3 base codes; each of these base codes is specified for an amino acid (Wikipedia 2017).
tRNA	Translation	The role of tRNA is to decipher the code words which mRNA has carried. Each amino acid has a specific type of tRNA, on which it binds to and then carries this amino acid to the forming polypeptide chain when the mRNA asks for it. The right tRNA is able to attach onto an amino acid because it has a specific three-base sequence which is only able to pair with its complementary base (Chemguide, 2007).
rRNA	Translation	rRNA is usually associated with a particular set of proteins which role is to produce ribosomes. These complex structures of rRNA's also have several other functions these being; to move the mRNA molecules, to also catalyse the group of amino acids into polypeptide protein chains. rRNA's also bind tRNA's and a variety of other molecules which are needed for protein synthesis. Ribosomes are comprised of several large and small subunits, each of these subunits consist of its own rRNA molecule (Khanacademy, 2016).

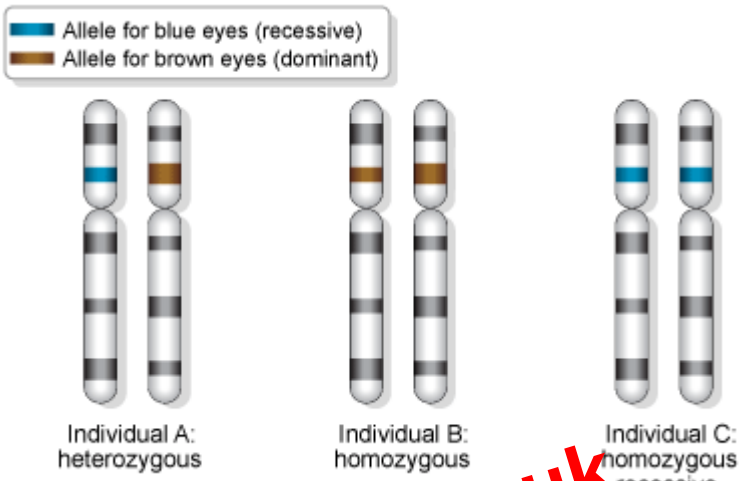
- Allele

Different types of the same gene are known as alleles. Alleles are either dominant or recessive.

An example may be; the gene which determines the eye colour of a human has an allele for a blue eye colour and also an allele for the brown eye colour. For any type of gene, a person will always have the same two types of alleles or two different types of alleles Evolibrary (2016).
Alleles can either be recessive or dominant.

A recessive allele is only shown when an individual has two copies of it. An example of this is eye colour, because if the allele for blue eyes is recessive. The individual will need two copies of this type of allele so they have blue eyes.

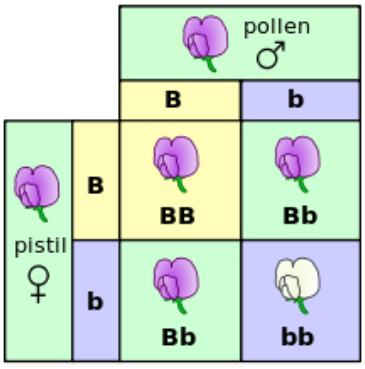
A dominant allele is always able to show, despite whether the individual only has one copy of it. An example, of this may be is if the allele for brown eyes is seen to be dominant. The only one copy of the allele would be needed for the individual to have brown eyes. However if the individual had two copies of brown eyes alleles it would not affect the colour of the eyes and the individual would still have brown eyes (BBC 2006).



(BBC, 2016)

- Genotype

Genotype is known to hold the genetic make-up of a particular organism. The function of genotype is to guide instructions which are responsible for the growth and development of the organism. The actual word 'genotype' is used when discussing about the genetics for a particular trait (like eye colour). An organism's genotype determines the chemical composition of its particular DNA this enables it to give rise to the specific phenotype. A genotype is comprised of many types of nucleic acids which exist in the DNA molecules which are responsible for coding a specific type of trait. External appearances (phenotypes) exist due to the interactions of different types of proteins which have been produced by DNA. A genotype consists of a large number of different alleles. These different alleles are formed through mutations through the DNA; these alleles are also able to give favour to any detrimental changes. In organisms which produce by sexual production, there are two types of alleles which are present in each of type of the sexually producing organisms; these alleles are known to have complex interactions with not only each other but other genes. The occurrences of mutations are possible in these particular alleles, new combinations are able to form during meiosis, and a countless number of combinations can be produced. These newly formed combinations of genotype are responsible for the variety of life. The genotype of any organism is responsible for demonstrating the alleles which are present for a particular set of characteristic (BBC 2014)
Example of genotypes of petal colour in a pea plant as shown in the image.



(Wikimedia 2016)