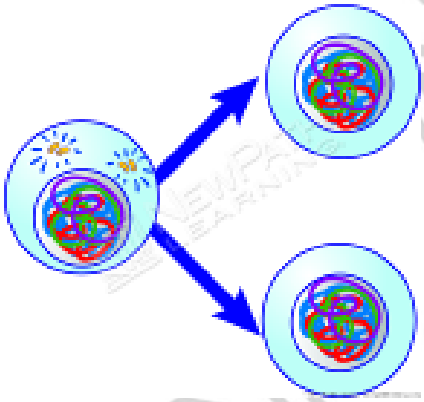
CELL REPRODUCTION

Cell Division

The process where one cell forms two identical daughter cells is called cell division.



Stages of Cell Growth

The **cell cycle** is the sequence of stages of growth and division that a cell underg **rphase, mitosis, a**

Interphase is the first stage of the cell cycle.

- The cell matures, copies (replicates) its DNA, and prepares to divide.
- DNA stands for DeoxyriboNucleic Acid.
- **Replication** is a process when the cell makes a copy of its DNA in the nucleus.

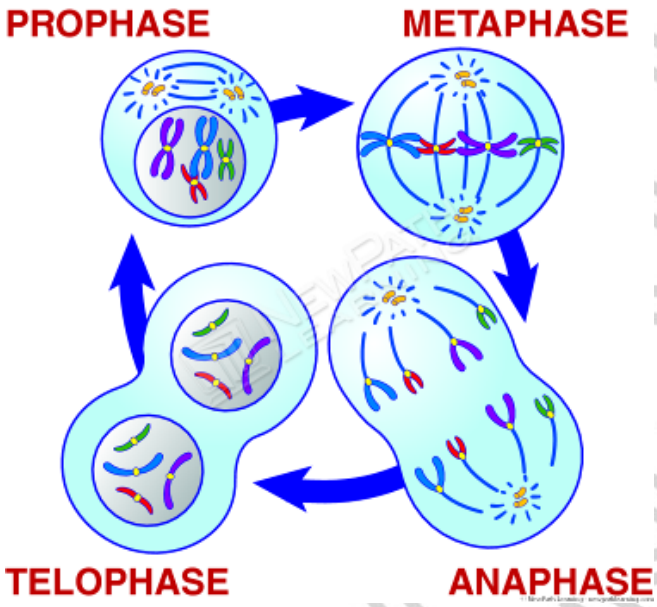
The second stage of the cell cycle is called **mitosis**.

- During this stage the cell distributes all of the organelles and the DNA to each identical daughter cell.
- There are four phases during mitosis. They are: Prophase, Metaphase, Anaphase, and Telophase.

Components of DNA

To understand the phases of mitosis, you have to know the components of the DNA that is replicated in the process of mitosis. At the end of mitosis, one cell has become two identical cells, each with the same DNA. The stages of mitosis define the process by which the chromatin, the chromatic, the centromere, and the chromosome interrelate.

- The **chromatin** is the genetic material that has the instructions for how the cell is to be run. It is the actual DNA.
- The **chromatid** is the one half or one rod of the condensed chromatin.
- The **chromosome** is the two daughter strands of a replicated chromatin that are condensed into a rod shape and connected by a centromere.
- The **centromere** is the point on the chromosome where the two chromatids are held together.
- So in other words the chromatin makes up the chromatids, which make up the chromosome.



Prophase: The chromatin condenses and spindle fibers form at each side of the cell. The nuclear membrane breaks apart.

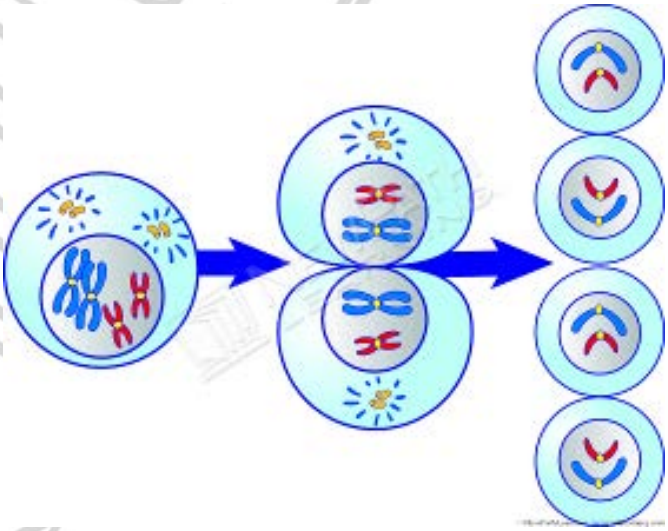
Metaphas ...e cell and the spindle ...ere.

Anaphase ...hromatids move to o...

Telophas ...nuclear membrane...

Cytokines

The third stage of the cell cycle is cytokinesis. During this stage the cell membrane pinches in at the middle of the cell until they become two separate daughter cells.



Sexual Reproduction and Meiosis

The majority of the species on Earth reproduce sexually.

The process that reduces the total number of chromosomes to half and forms the sex cells is called **meiosis**. The only cells that are created by meiosis are the sex cells. Sex cells are cells that make up the sperm (male) and the egg (female). There are two separate cell divisions during meiosis: meiosis 1 and meiosis 2. There are four phases in each cell division that have the same names as those from mitosis.
The end result of meiosis is four sex cells that have half of the genetic material of a mitotically produced cell.

DNA Structure and Replication

The cell makes an identical copy of its DNA before cell division called DNA replication. In 1953, James Watson and Francis Crick discovered the structure of DNA.

The Stru

DNA's stru round and around. T Helix."

The two sides of the double helix are made from a combination of molecules, one being a sugar and the other being a phosphate. They are called a nitrogen base when they are together.

Nitrogen Bases in DNA

There are four different nitrogen bases:
Adenine, Thymine, Guanine, and Cytosine. The nitrogen bases are referred to as A (Adenine), T (Thymine), G (Guanine), and C (Cytosine) when the topic is DNA.

A major point when talking about the nitrogen bases of DNA is that there is a specific pairing of the molecules. For example, A (Adenine) is always paired with T (Thymine) and G (Guanine) is always paired with C (Cytosine).