

Name: _____

Cells: Dividing to Multiply

What do you know about cells?

(Consider: Definition, Types, Parts (of), Function(s), Size, Growth, Living?, Importance)

Conditions Essential for Life

- The conditions essential for the emergence of life on earth are the conditions that made it possible for _____ and their _____

- These conditions are:
 - Presence of _____
 - Presence of _____
 - Presence of _____
 - A very long period of _____

Table: Conditions for Life (see handout)

Cells

- The cell is the building block of all _____ organisms.
- We are made of about 10,000 billion cells.
- At the beginning all cells are _____, but as they develop they become _____.
- There are about _____ of cells that vary in _____

Review of Cells

Structures most essential for cellular reproduction:

- **Cell Membrane:** _____ which _____ the cell, and _____ what can _____ the cell.
- **Cytoplasm:** _____ inside the _____ which allows substances to circulate in the cell
- **Nucleus:** _____ cells activities (growth and reproduction) and contains _____
- **Nuclear Membrane:** _____ the nucleus and controls _____ between nucleus and the rest of the cell

DNA

- DNA stands for Deoxyribonucleic Acid
- A complete molecule of DNA is called a _____.
- A DNA molecule is a _____ structure which when straightened looks like a _____.
 - Each “bar” in the ladder is called a _____ and is made of 2 _____.
 - There are 4 bases: _____ (A), _____ (C), _____ (G) and _____ (T)
 - They are always paired: _____ and _____
 - The order in which these base pairs are arranged determines the _____

Chromosomes & Genes

- **Chromosomes:** structures containing an individual's _____. In animal and plant cells, the chromosomes are located in the _____.

Chromosomes contain:

- **Genes:** chromosome _____ that determine specific _____. We all have _____ genes but _____ differences make us all unique.
- Genes are segments of _____ that determine a particular genetic characteristic. They can be _____ or _____. Gene contains _____ for _____ such as eye color, skin color, etc.

- Chromosomes form when DNA packs itself up tightly by _____ again and again until it is shaped like an _____.

Cell Division:

- Cells divide for three reasons:
 - To _____ in numbers and allow _____ (_____ cells (2n))
 - Tissue _____ (somatic/diploid cells (2n))
 - _____ reproduction (_____ cells (n))

** But they are not always dividing. Mostly they are ensuring the proper functioning of the human organism.**

How cells multiply

- Cells use _____ to multiply.
- Mitosis:** process of _____ in which the _____ cell divides to produce _____ cells called _____ cells (diploid cells (2n)).
- Used for the _____ and to _____

Mitosis

- Ensures **growth** (an _____ of cells that make up an organism).
 - When our bodies grow so does the # of cells, so we have more cells when we are adults than when we are babies

- Mitotic activity: # of mitoses carried out by cells (more intense during _____ and _____ than any other stage of life)
- Ensures **repair** of _____, repair areas of the body that have been accidentally _____ (ex. Injuries, cuts, fractures and hemorrhages)
- Certain cells wear down _____ than others and need replacing more often (eg. Skin cells are replaced every 2 wks and white blood cells every 120 days)

Process of Mitosis

- DNA is _____ before the cell divides (process called “DNA _____”). To do this, the DNA unzips like a _____ and new bases are _____ in the right order and attach to each of the separate strands, forming _____.
- Steps:
 1. DNA _____
 2. _____ are formed
 3. DNA lines up in _____
 4. Chromosomes _____ up and go to _____ ends
 5. Cell _____ creating two daughter cells (_____ cells) with the _____ genetic information.

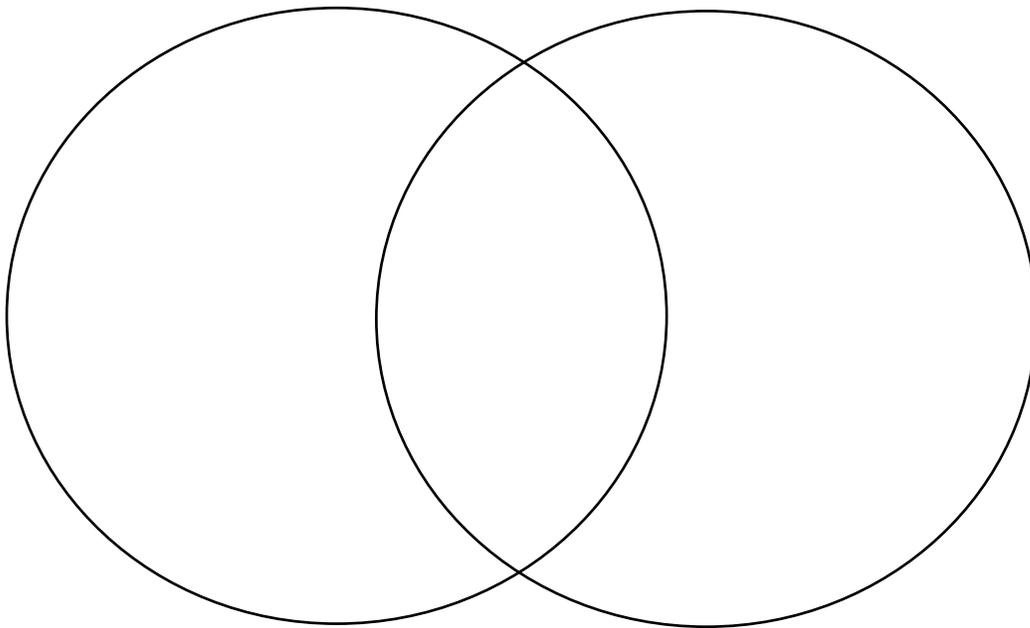
Meiosis

- **Meiosis** is a form of cell division that produces _____
_____ that are _____ from the original
cell because they each contain _____ the DNA
- The result is _____, each contain
_____ and all _____ genetic
material.
- Each daughter cell ends up with _____ the genetic info.
These are called _____ (**n**) cells.
- This is used to create _____
- Sex Cells: Sperm and ova (eggs), are also called _____
- In order to produce cells that contain only half the DNA, there are
_____ divisions that take place.
- The first one is _____ to mitosis (where DNA _____
itself first)
- The second division happens right after the first division, but _____
duplicating the DNA
- During _____ millions of spermatozoa (n) encounter
the ovum (n).
- Only one of the sperm will be able to penetrate the ovum and combine the
male genetic info (n) with that of the female (n) to produce a zygote (2n).

- Further _____ results in the development of an _____
(first steps to a baby)

Mitosis vs Meiosis

- Using your notes, create a Venn Diagram to compare Mitosis and Meiosis



Cellular Organization

- Remember: 23 _____ give a total of _____ chromosomes of which $\frac{1}{2}$ come from the _____ and $\frac{1}{2}$ from the _____.
- 22 of the 23 pairs are _____ in both _____
- The 23rd pair is the _____

- A _____ showing the pairs of chromosomes in descending order of _____ is called a _____

Genetic Diversity

- Every human being is unique.
- The pairs of chromosomes that the offspring receive from their parents is pure _____.
- It is pure chance _____ and ovum will combine.
- Genetic diversity:
 - is the _____ of genes among the individuals of the same _____.
 - Prevents _____ of a species

Factors that contribute to Genetic Diversity

- **Genetic recombination:** similar chromosomes _____ of their genes during the beginning of _____
- **Genetic mutation:** where _____ happen in the bases of DNA (A,C,T,G). This can be caused by _____ or _____.
- **Population mixing:** where individuals from _____ populations _____

What's after Cells?

- _____ can perform all the basic functions to survive.
- _____ organisms being more complex require cells to _____ and _____ to perform these same functions.
- These cells are _____ into:

Tissues

Organs

Organ Systems

Organism