

## Science 9 Review

### Outline of Chapter 5 & 6

1. Structures of both plant and animal cells along with their definition.  
Study your diagrams of plant and animal cells.  
Know all of the organelles and their functions.  
Your quiz would be a good reference as well as your notes.
2. Differences between cell wall and cell membrane.  
The cell wall is only found in the plant cell and provides structure.  
The cell membrane is found in both the plant and animal cell and acts like a gatekeeper, controlling what goes into and out of the cell.
3. The different stages of mitosis and what happens in interphase.  
Interphase is the stage cells are in 90% of the time. This is between mitosis cycles when the cell is growing and duplicating its genetic material.  
Prophase is the 1<sup>st</sup> stage of mitosis when the individual chromosomes shorten and thicken and become visible. The nucleus begins to dissolve in this phase.  
Metaphase – the double-stranded chromosomes line up in the middle of the cell.  
Anaphase- the double-stranded chromosomes split into single stranded chromosomes and move to opposite poles of the cell.  
Telophase- the chromosomes reach the opposite poles of the cell and a new nuclear membrane forms around each set of chromosomes. Cytokinesis (splitting of cytoplasm and organelles into roughly equal parts) begins and the two daughter cells are formed.
4. Difference in cytokinesis of plant and animal cells.  
In plant cells, a cell wall forms between the two new nuclei.  
In animal cells, the cell membrane tends to pinch off in the middle between the two nuclei.
5. Why do cells divide faster in an embryo than in adults?  
Most adult cells don't divide that often. In fact, uncontrolled cell division is a condition known as cancer. Babies need to grow to their adult size, and that means that their cells must divide faster than adult cells.
6. What is the cell theory  
The three tenets to the cell theory are as described below:
  1. All living organisms are composed of one or more cells.
  2. The cell is the basic unit of structure and organization in organisms.
  3. Cells arise from pre-existing cells.
7. Question 2 on page 172.  
A – Plant ; Prophase (the nucleus is gone, but the chromosomes have not quite organized in a line at the middle of the cell)  
B – Plant ; Cytokinesis (the two new nuclei have formed and the new cell wall is forming in the middle of the cell, splitting it in two)  
C – Animal ; Anaphase (chromosomes have split and are moving to opposite poles of the cell)  
D – Animal ; Telophase/Cytokinesis (the two new nuclei have formed and the cell membrane is pinching off to create two daughter cells)
8. What are the differences between asexual and sexual reproduction?  
In sexual reproduction genetic information from two cells (ex. Sperm and egg) is combined to produce a new organism. When two specialized sex cells unite to form a zygote. Sexual reproduction produces offspring which are genetically DIFFERENT from the parents.

Asexual reproduction is when a single organism gives rise to offspring with IDENTICAL genetic information.

9. Describe two types of asexual reproduction.

**Binary fission** – Organism splits directly into two equal-sized offspring, each with a copy of the parents genetic information. This type of reproduction is common with single-celled organisms such as bacteria.

**Budding** – The offspring begins as a small outgrowth on the parent and eventually breaks off and becomes an organism on its own (Hydra)

**Fragmentation** – A new organism is formed from a part that breaks off from the parent. Many types of algae and some plants and animals reproduce this way. (Starfish)

**Spore formation** – undergoes frequent cell division to produce many smaller, identical cells called spores. Usually spores are kept inside the parent until released.

**Vegetative reproduction** – Use runners that can develop into new plants with identical genetic info. (Strawberries)

10. ~~What parts of the body appear to grow the most during development?~~

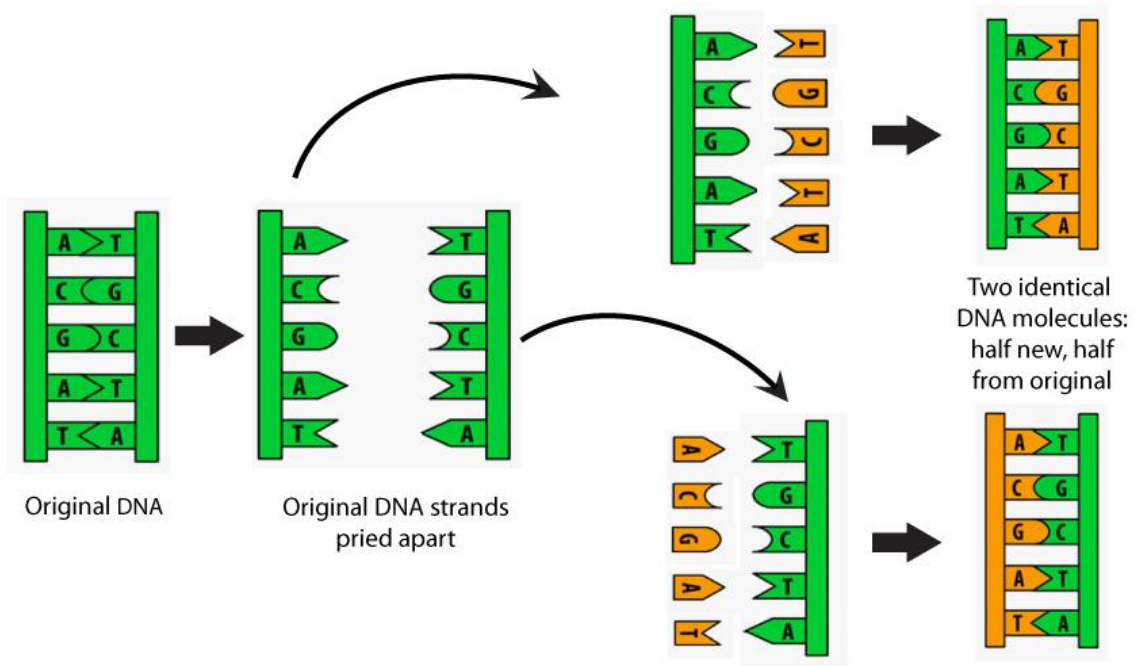
11. ~~At what age does the brain stop growing?~~

12. How many chromosomes do humans have and what is it made up of?

Humans have 23 pairs of chromosomes for a total of 46 chromosomes. Chromosomes are made up of tightly coiled DNA (deoxyribonucleic acid) which has sugar/phosphate backbone and nitrogen bases – adenine, guanine, cytosine, and thymine.

13. Understand how DNA works, how it replicates and why we can use it to convict people like Allen Legere (DNA FINGERPRINTING). (Remember A binds with T and C binds with G).

The DNA helix unwinds and unzips, separating the base pairs. Free nitrogen bases in the nucleus bond with the original strands of DNA. Since only A/T pair up and C/G pair up, both of the two new double helix will be complements of one another.



14. Know the meaning of dominant, recessive, homologous chromosomes, heterozygous, genes and homozygous.

Having a copy of a dominant gene for a specific trait will result in the carrier expressing that trait. A person would need two recessive copies of the trait, one from each parent, to not express the trait.

**Homologous chromosomes** – Carry genes that code for the same trait, in the same position on the chromosome (one from mother and one from father)

Genes are the basic physical and functional unit of heredity and determines a specific characteristic of an individual.

Homozygous – refers to having two identical copies of a gene.

Heterozygous chromosomes – The maternal and paternal chromosomes in a heterozygous pair have different alleles (ie. One dominant and one recessive copy).

15. Know the definition for cancer, mutation, carcinogens (plus examples), tumor, benign and malignant.

Cancer – The term for a group of diseases associated with uncontrolled, unregulated cell division.

Mutation – A change in the genetic code.

Carcinogens – a substance or energy that causes a mutation in the genes that regulate cell division (ex. UV light, radiation, tobacco)

Tumor – A mass of cancer cells

Benign – a tumor that remains in a confined area, causing little damage

Malignant – A cancerous tumor that spawns cells that can break away and move to other parts of the body and is harmful.

16. Know the importance of Dolly.

**Sections we have studied**

- 5.2, 5.5, 5.8, ~~5-12~~, 6.1, 6.2, 6.3, 6.9