

### Asexual Reproduction

|                                    |                                                                                                         |
|------------------------------------|---------------------------------------------------------------------------------------------------------|
| Cell Cycle                         | How eukaryotic cells divide asexually                                                                   |
| Binary Fission                     | How prokaryotic cells divide asexually                                                                  |
| Spore Formation                    | Parent cell produces spores that grow and develop under favourable conditions (i.e. yeast)              |
| DNA Replication                    | DNA replicates, unwinds with the help of an enzyme, then attaches to a new base                         |
| DNA Location                       | Nucleus; in the form of chromatin                                                                       |
| Nucleotide Pattern                 | AxT, CxG                                                                                                |
| Stages of Cell Cycle               | Interphase, Mitosis, Cytokinesis                                                                        |
| Asexual Reproduction Disadvantages | Negative mutations/bad conditions can wipe out colonies; offspring can compete for food/space           |
| Asexual Reproduction Advantages    | Lots of offspring, quickly; Colonies can form quickly and compete with others; No energy to find a mate |

### Sexual Reproduction

|                                |                                                                                                                |
|--------------------------------|----------------------------------------------------------------------------------------------------------------|
| Sexual Reproduction Advantages | Genetic variety; ext. means little energy used to find a mate; Intrnl. means protection given to embryo/zygote |
|--------------------------------|----------------------------------------------------------------------------------------------------------------|

### Sexual Reproduction (cont)

|                                   |                                                                                                                    |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Sexual Reproduction Disadvantages | Intrnl.= more energy to find a mate; Intrnl.=less offspring; ext.= gametes/embryos/zygotes aren't protected        |
| Gametes                           | Use meiosis to reproduce; have 23 chromosomes; are sex cells                                                       |
| Morula                            | Embryo at the end of week 1; a ball of cells                                                                       |
| Blastula                          | embryo at the end of week 2; hollow ball of cells; these cells turn into gastrula later                            |
| Gastrula                          | 3 layers of cells: ectoderm (skin/nerves), mesoderm (muscle/bones), endoderm (lungs/liver/digestive system lining) |
| Differentiation                   | Formation of organs and tissues from the cell layers of gastrula                                                   |
| Meiosis                           | How gametes reproduce; makes 4 cells                                                                               |
| Embryo                            | The stage of a multi-cellular organism that develops from a zygote                                                 |
| Embryonic Development             | The early development of an organism                                                                               |
| Homologous Chromosomes            | A pair of matching chromosomes (eye color, skin colour, etc.)                                                      |

### Sexual Reproduction (cont)

|                        |                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Fertilization          | When an egg cell is penetrated by a sperm cell and the haploid genetic information of both male and female gametes combines        |
| Angiosperms            | Flowering plants that have seeds protected by an ovary or fruit                                                                    |
| Gymnosperms            | A plant with seeds unprotected by an ovary or fruit (i.e. conifers)                                                                |
| Crossing Over          | Chromatids of chromosomes pairs cross over and exchange DNA segments, producing genetic variation (during prophase I)              |
| Independent Assortment | Homologous pairs separate independently, creating different combinations of chromosomes in the daughter cells (during Metaphase I) |

### Genes

|                   |                                                                      |
|-------------------|----------------------------------------------------------------------|
| Gene Mutation     | Substitution, deletion, addition; mutagens or viruses can cause them |
| Genetic Disorders | A disease caused by failed separation of chromosomes in Meiosis      |
| Karyotype         | How geneticists view someone's chromosomes                           |

### Stages of Meiosis

|              |                                                                                                                                      |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Meiosis I    | Homologous chromosomes are involved                                                                                                  |
| Prophase I   | Spindle fibres form, pushing centrioles apart; nuclear membrane/nucleus dissolves; homologous chromosomes pair; crossing over occurs |
| Metaphase I  | Spindle fibres guide chromosomes to the equator of the cell; homologous pairs line up on 2 sides of the equator                      |
| Anaphase I   | Homologous pairs separate to opposite poles of the cell                                                                              |
| Telophase I  | 2 nuclei/nuclear membrane forms; spindle fibres disappear; one chromosome from each homologous pair is at each pole of the cell      |
| Meiosis II   | 2 cells separate again, resulting in 4 cells                                                                                         |
| Prophase II  | Spindle fibres form; nuclear membrane/nucleus dissolves; There is 1 homologous pair in the cell (2 chromosomes in total)             |
| Metaphase II | X-shaped chromosomes form 1 line at the equator of the cell                                                                          |
| Anaphase II  | Sister chromatids move to opposite poles of cell; sister chromatids are now considered a chromosome                                  |
| Telophase II | Spindle fibres disappear; nuclear membranes form around each set of chromosomes                                                      |