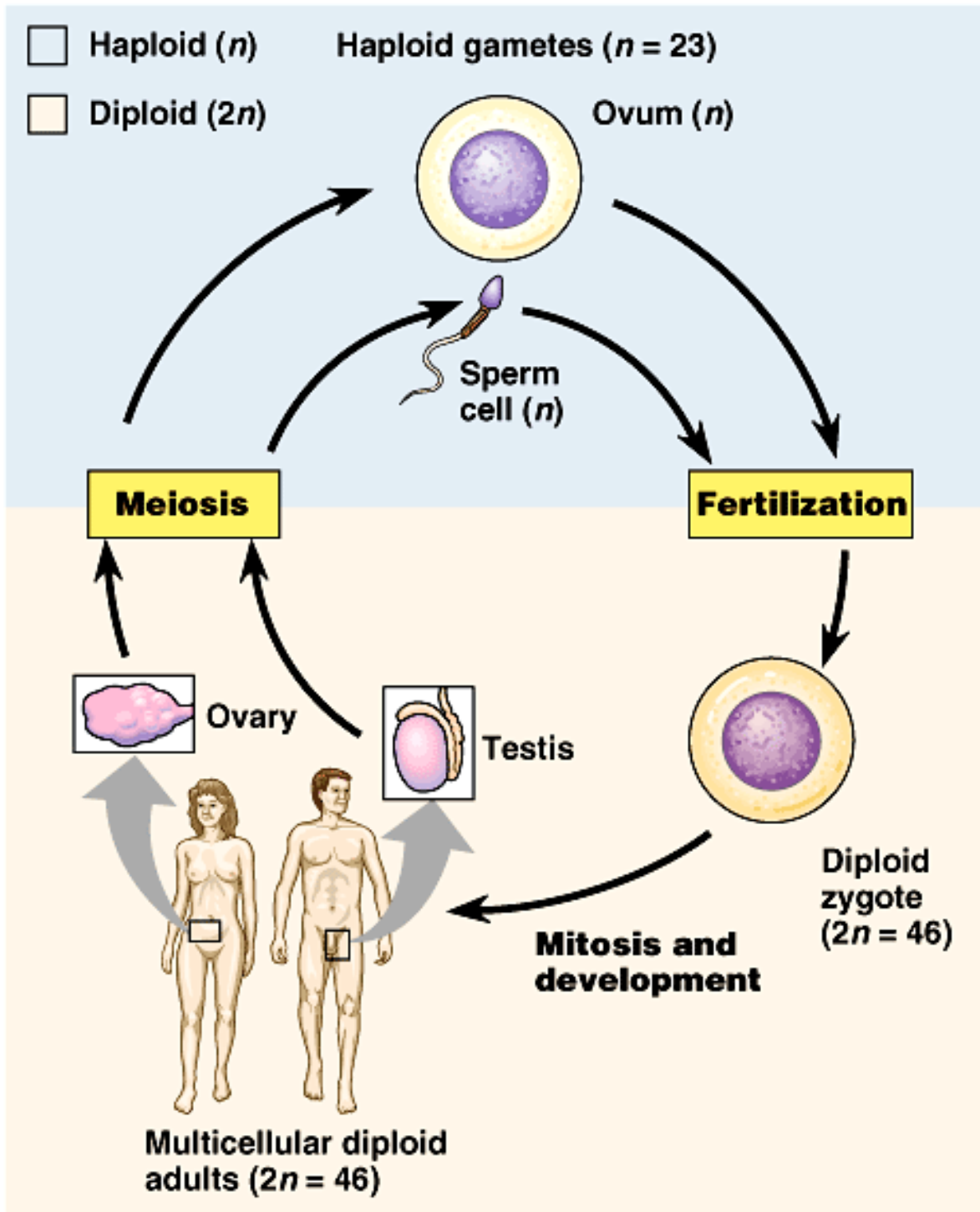


**(Introduction to Meiosis)**

**Guided Reading: Chapter 13**

**Keep in Mind – This process makes the cells that make babies.**



# An Introduction to Heredity

1. Let's begin with a review of several terms that you may already know. If not...look them up in the chapter.

(p.234-35) a) gene – hereditary units (segments of DNA) that program cells to synthesize proteins

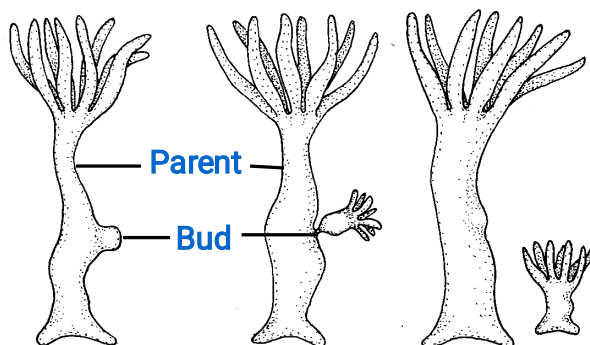
(Glossary) b) locus – a particular place along the length of a certain chromosome where a given gene is located

(p.236) c) gamete – reproductive cell

(p.236) d) male gamete – sperm

(p.236) e) female gamete – egg or ovum

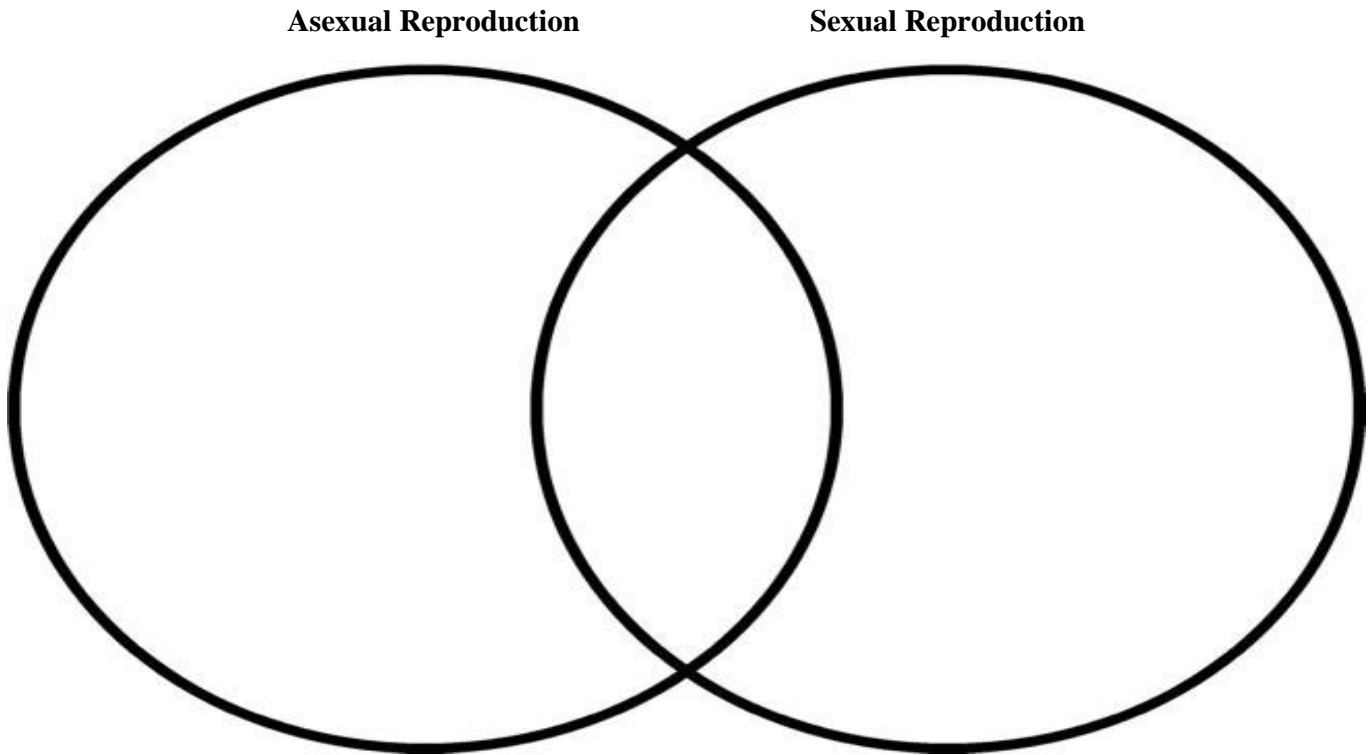
(p.235) 2. Use the picture below to help you describe how does a hydra reproduce?



Simple multicellular organisms like the hydra reproduce by budding. The bud, a localized mass of MITOTICALLY dividing cells, develop into a small hydra, which detaches from the parent. The new offspring is GENETICALLY IDENTICAL to the parent.

(p.235) 3. Which type of reproduction will result in genetically identical offspring?  
Asexual reproduction results in genetically identical offspring.

4. Complete the Venn diagram below about asexual reproduction and sexual reproduction. Feel free to add to it after each lecture.



- (p.236) 5. What is a somatic cell? Give examples of two human somatic cell types.

**Somatic cells are any other cell other than a sperm or ovum (egg).**

- (p.236) 6. How does a somatic cell compare to a gamete in terms of chromosome number?

**Somatic cells have twice the number (diploid;  $2n$ ) of chromosomes than gametes (haploid;  $n$ )**

- (p.236) 7. Distinguish between sex chromosomes and autosomes. How many of each are found in human cells?

**Sex chromosomes are the pair of X and Y chromosomes while autosome are the other 22 pairs of chromosomes. Humans have one pair of sex chromosomes (XX or XY) and 44 autosomes (22 pairs).**

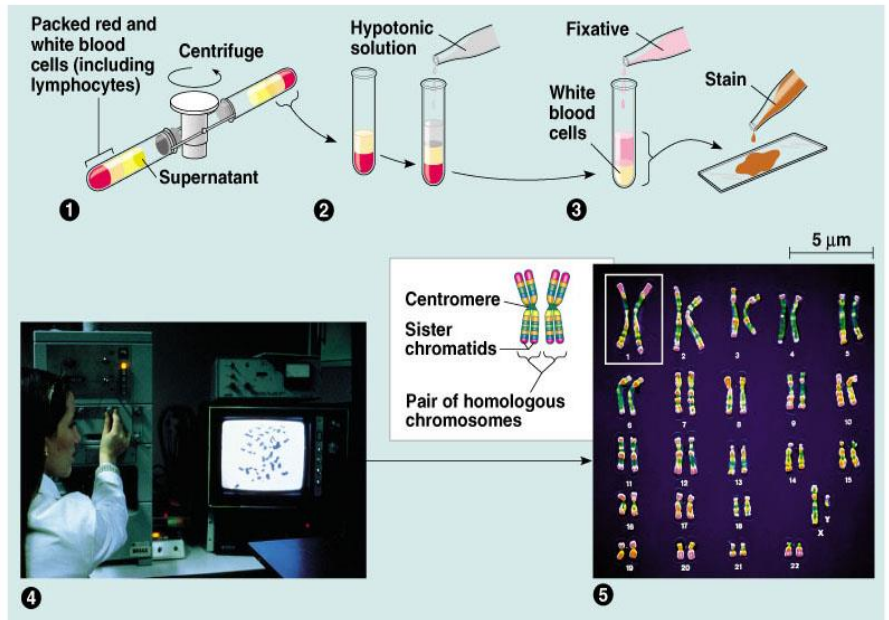
- (p.236) 8. Explain what is meant by homologous chromosomes.

**Homologous chromosomes are a pair of chromosomes that have the same length, centromere position, staining pattern and carry genes controlling the same inherited characteristics. Ex: eye color**

- (p.237) 9. Use the diagram below to help you explain what is a karyotype? How is it prepared? What are three things that can be determined from a karyotype?

### Preparation of a Human Karyotype

- (1) The blood culture is centrifuged to sediment the blood cells.
- (2) The supernatant is discarded, and a HYPOTonic solution is mixed with the cells. The white blood cells swell and their chromosomes spread out. The red blood cells burst or LYSE.
- (3) Another centrifugation step sediments the white blood cells. After the fluid is poured off, a fixative (preservative) is mixed with the cells. A drop of the cell suspension in fixative is spread on a microscope slide, dried and stained.



- (4) The slide is viewed with a microscope, and the chromosomes are photographed. The photograph is entered into a computer, and the chromosome are electronically arranged into pairs according to size, shape, centromere position and banding pattern.
- (5) The resulting display is the karyotype.

10. Cells that have only one of each homologous pair are said to be haploid or monoploid, a condition that is represented by  $n$ . Cells that have two of each homologous pair are said to be diploid or  $2n$ . For each of the following, is the cell haploid or diploid?

liver cell diploid

gamete haploid

egg haploid

zygote diploid

skin cell diploid

sperm haploid

somatic cell diploid

sex cell haploid