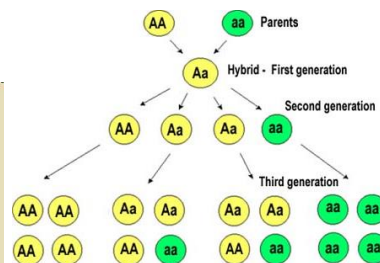
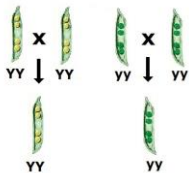


Life Science

Chapters 3 & 4 Genetics

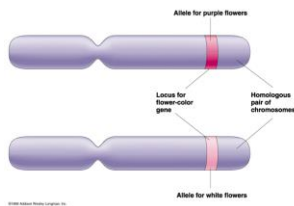
Gregor Mendel

- “father of genetics”
- experiments using pea plant traits
- a. Tall or short plants
- b. Round or wrinkled peas
- c. Yellow or green peas
- d. Smooth or pinched pods
- e. Green or yellow pod color



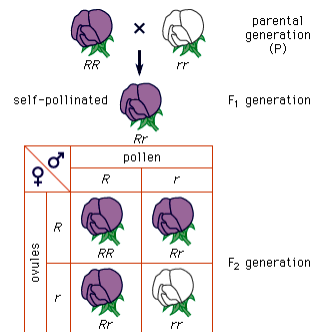
New Terms

- **Gene:** factor that controls a trait
- **Allele:** the different forms of a gene
- **Purebred:** always produces the same trait
- **Hybrid:** an organism w/ two different alleles for a trait – it is heterozygous

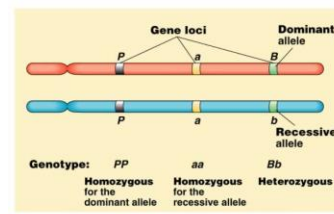


More Terms...

- **Dominant** allele: trait shows up in the organism when the allele is present represented by a Capital letter ie “T” for tall
- **Recessive** allele: trait is masked or covered up unless homozygous represented by a small case letter ie “t” for short
- **Phenotype:** The outward visible trait being shown
- **Genotype:** The genetic makeup of the trait
 - **Homozygous:** both alleles are the same for the trait in question
 - **Heterozygous:** Alleles are different for the trait in questions

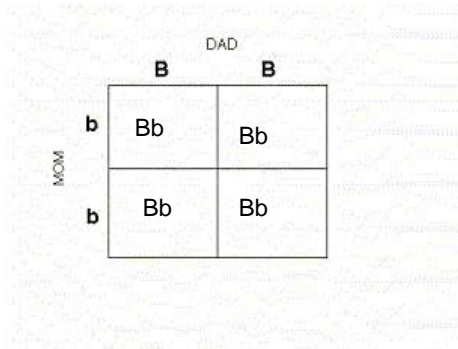
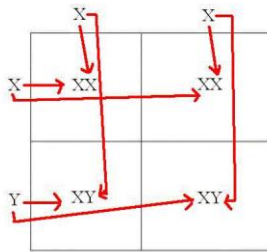


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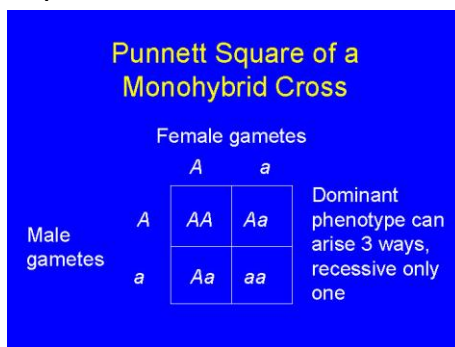
Punnett Square

- Way of predicting the possible phenotype & genotype outcomes when parents are crossed
- Must be able to determine the genotypes of the parents



Punnett Square

- Way of predicting the possible phenotype & genotype outcomes when parents are crossed
- Must be able to determine the genotypes of the parents



In this case, when two hybrids are crossed, the possible outcomes are:

the phenotype ratio is 3:1

3 dominant

1 Recessive

genotype ratio is 1:2:1

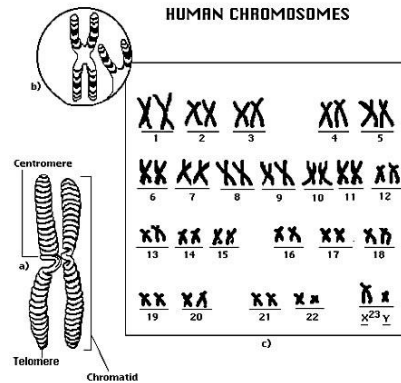
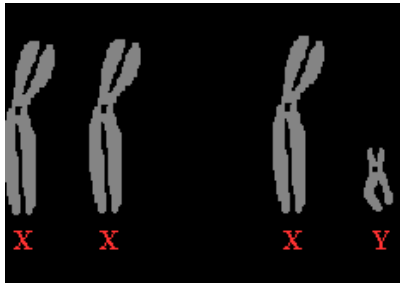
1 Homozygus dominant

2 Heterozygus

1 Homozygus recessive

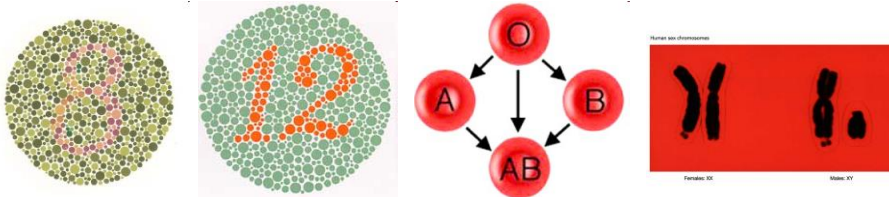
Human Genetics

- 23 pairs of homologous chromosomes in the human cell: 46 total chromosomes
- small sections of each chromosome, genes, are responsible for inheritance
- Chromosomes named as numbered pairs
- Pair 23 determines sex of individual
- Long chromosome X, short chromosome Y
- XX is Female, XY is Male



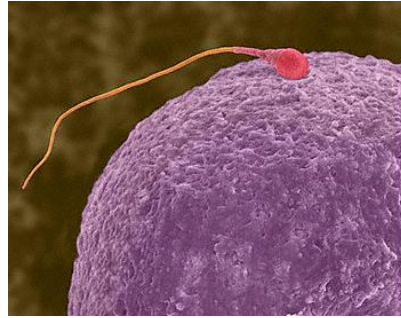
Human Genetics

- Sex-Linked Traits
 - Because males have only 1 X chromosome, they do not have another X chromosome to hide any recessive traits that might show up.
 - 1. Color Blindness, male pattern baldness
- Genetic diseases and disorders
 - i. Problems during mitosis or meiosis and or genetic mutations
 - ii. Cystic Fibrosis, Sickle Cell Anemia, Hemophilia, Down Syndrome
 - iii. Dr.s can test for genetic disorders by testing "sloughed" off cells from the fetus found in the amniotic fluid during pregnancies.
- Blood Type 3 alleles
 - 1. A allele and B allele are codominant
 - 2. O allele is recessive



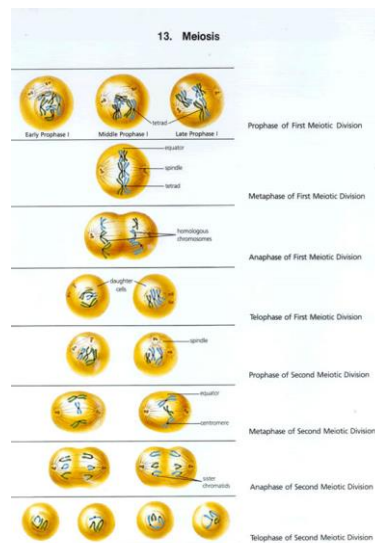
Gamete Formation

- Normal chromosome # 23 pairs = 46 total
- **Diploid** – a cell that has both homologous chromosomes (one from each parent) –2N
- **Haploid** – 1N - has only one of the homologous chromosomes (one from the father or the one from the mother)
 - Egg & Sperm cells are haploid so when they combine during fertilization the zygote is once again diploid.



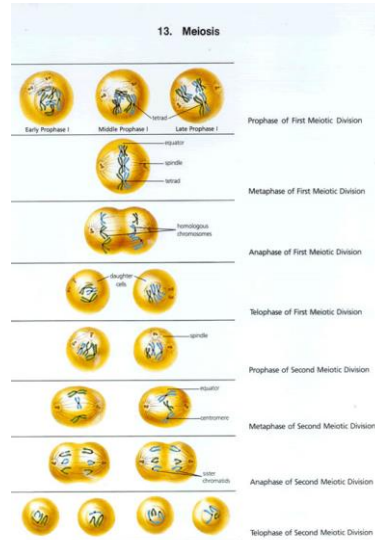
Meiosis – gamete formation

- Two phases: Meiosis I and Meiosis II
- Meiosis I
 - i. **Prophase I**:
 - 1. Chromatin has duplicated, chromosomes condense and coil.
 - 2. The pairs of chromosomes stay next to each other forming a “Tetrad”
 - ii. **Metaphase I**
 - 1. Tetrads line up along equator
 - iii. **Anaphase I**
 - 1. Tetrad separates so that each one of the duplicated homologous chromosomes separate to the poles
- iv. **Telophase I**
 - 1. New nuclear membrane forms around the new nuclei
 - a. Chromosomes uncoil becoming chromatin again
 - b. Each new cell has only half of the original number of chromosomes



Meiosis – gamete formation

- Meiosis II – The two new cells divide
- 1. **Prophase II**
 - a. Chromatin condenses and forms the chromosome (has two Chromatids and a centromere)
- 2. **Metaphase II**
 - a. Chromosomes line up on the equator
- 3. **Anaphase II**
 - a. Centromere dissolves pulling each separated chromatid to the poles
 - b. Chromatids pulled to the poles
- 4. **Telophase II**
 - a. New cells formed- 4 gametes- from the original 1 mother cell.
 - b. These 4 gametes have only one of the two homologous chromosomes from the original cell



Mitosis vs Meiosis

