

Haploids vs. Diploids

Diploid cell 2n, two sets of chromosomes

Haploid Cell n, one set of chromosome

homologous chromosomes duplicate versions of each chromosome, essence of sexual reproduction: each parent donates half its chromosomes to its offspring.

Gametes *sex cells are haploid cells.

Genetics

Traits The position of a gene on a chromosome is called a **locus**.

Diploid organisms **alleles**: two gene copies may be different from one another.

Homozygous: two identical alleles for a given trait
Heterozygous: two different alleles for a given trait

Non Mendelian Genetics

Linked Genes when genes on the same chromosome stay together during assortment and move as a group. (ex: flower color and pollen shape show up together)

cannot segregate independently, violating Law of Independent Assortment.

in the unlinked, there are four (TG, Tg, tG, tg), in the linked, there are only two (Tg and tG).

If a crossover event occurs between linked genes, then recombinant gametes can occur, however, it's unlikely to occur.

if certain combinations of alleles are found more often in offspring than they should, probably the two genes are close together and linked.

Recombinants offspring formed from recombination events

Haploids vs. Diploids (cont)

frequency of crossing-over between any two linked alleles is proportional to the distance between them, the farther apart two linked alleles are on a chromosome.

Sex-linked/X-linked traits Some traits, such as **color blindness and hemophilia**, are carried on sex chromosomes.

most are found on the X chromosome

A female with one color blind-X is called a **carrier**

Barr Body X chromosome that is condensed and visible. In every female cell, one X chromosome is activated and the other X chromosome is deactivated during embryonic development.

Incomplete dominance (blending inheritance) Traits are blend.

Codominance equal expression of both alleles.

Polygenic inheritance a trait results from the interaction of many genes (height, skin color, weight)

Non-nuclear inheritance genetic material not from nucleus, but from mitochondria or chloroplast. mitochondrial inheritance is always through the maternal (female) line, not the male line.

Pedigrees Traits that skip generations are usually recessive. Traits that appear more in one sex than the other are usually sex-linked.

Phenotypic plasticity two individuals with the same genotype have different phenotypes because they are in different environments



Meiosis

production of gametes, only sex cells, female gamete (n) + male gamete (n) = zygote (2n)

more variations in a population, more likely survive extreme changes in the environment.

Meiosis is far more likely to produce these sorts of variations than is mitosis

Interphase same as mitosis

Meiosis I the homologous chromosome pairs separate

Prophase I **synapsis**: two sets of chromosomes that come together to form a **tetrad**, then **crossing over**(exchange of segments) - genetic variation

Metaphase I line up. the alignment during metaphase is random, so the copy of each chromosome that ends up in a daughter cell is random.

Anaphase I moves to opposite poles.

Telophase I nuclear membrane forms around each set of chromosomes.

Meiosis II to separate sister chromatids, same as mitosis

Meiotic Errors

nondisjunctions chromosomes failed to separate properly during meiosis. can occur in anaphase I (meaning chromosomes don't separate when they should), or in anaphase II (meaning chromatids don't separate).

translocation occurs when a segment of a chromosome moves to another nonhomologous chromosome.

