



Inheritance

🕒 Created	@July 15, 2025 12:43 AM
🏷️ Tags	

Define sex linked inheritance

- Alleles are located on X chromosome/ sex chromosome
 - Males have only one X chromosome from the mother while females have two X chromosomes one from each parent
-

Explain how different characteristics can be inherited independently in dihybrid inheritance

9:3:3:1 phenotypic ratio

- Indicates that the alleles of each character are found on different chromosomes and inherited independently of one another
 - The alleles of different genes assort independently of each other because alignment of each homologous pair is independent of other homologous pairs
-

Explain why heterozygotes have the same phenotype as dominant homozygotes

- Dominant allele codes for functional enzyme or functional copy of gene involved in synthesis of protein
- Recessive allele codes for non-functional enzyme/copy of gene

- In a heterozygote, dominant allele mask the presence of recessive allele and presence of 1 dominant allele causes it to be expressed producing a functional enzyme
-

Explain why it would be useful to carry out a chi-squared test

- To determine if the difference between observed numbers and expected ratio (specify the ratio) was significant or due to chance
 - If the calculated χ^2 value is larger than critical value at probability of 0.05 the. There is at least 95% confidence that the observed results are significantly different from the expected results
-

Why is there a greater number than expected of parental phenotypes (offspring with same phenotypes of parents)

- The 2 genes coding for specific protein are linked on same chromosome
 - Dominant alleles are linked on the same chromosome
 - Recessive alleles are linked on same chromosome
 - Number of recombinations smaller because crossing over of alleles or recombination is a chance event and frequency of recombination is dependent on distance between the two genes
-

How are recombinants produced in linked chromosomes

- During prophase I of meiosis I, crossing over between non-sister chromatids occur in the homologous chromosomes
 - At the chiasmata, portion of chromatid containing allele A/a breaks and rejoins to portion containing allele B/b
 - Resulting in new linkage group where Allele A/a and allele B/b are found on the same chromosome
 - Gamete that contained chromosome that contain the new linked chromosome fuses with another gamete that contain to another recombinant chromosome to form the recombinant cell
-

Explain the significance of chi squared value and state and explain the conclusion

- State the type of inheritance from ratio
 - 9:3:3:1 follows a normal Mendelian mono hybrid inheritance
 - Check number of degrees of freedom= $n-1$ where n is number of phenotypes
 - Check the probability where the chi-squared value lies
 - Eg. Chi squared value is 0.47 with number degree of freedom=3, at a level of significance
 - if chi squared value (χ^2) is less than critical value at a level of significance we do not reject the null hypothesis (Opposite of z test)
 - The difference between observed and expected phenotypic ratios is not significant difference and is due to chance
 - Inheritance of these genes follows Mendels laws of independent assortment, random segregation and dominance
-

Explain how pure-breeding offspring's can be selected and obtained from previous cross

- Perform a cross test between off spring from previous cross with a homozygous recessive offspring
 - If all offspring have the same phenotype then the original parent is a pure bred
 - If offspring produced a ratio of 1:1, original parent is not pure bred
-

Explaining epistasis according to context

- Figure out the pathway to produce the phenotype
- Does the genotype result in production of inhibitor to prevent conversion of let's say from colour to colour or does it produce a functional protein that converts colour to colour

- The genotype that produces inhibitors usually is epistatic as it masks the phenotypic expression of another genotype