



# MENDELIAN TRAIT

- A trait that has a dominant (A) and a recessive (a) allele.



# NON-MENDELIAN INHERITANCE

- Not all alleles are dominant and recessive like the ones Mendel studied in his pea plants. Some alleles are equally strong and neither are masked by the other.



# POLYGENIC INHERITANCE

- - the inheritance pattern of a trait that is controlled by two or more genes.
  - Examples in humans include
    - hair color (AABBCC), eye color, & skin color



# **CODOMINANT**

- Occurs when both traits appear in a heterozygous offspring.
- Neither allele is dominant or recessive.

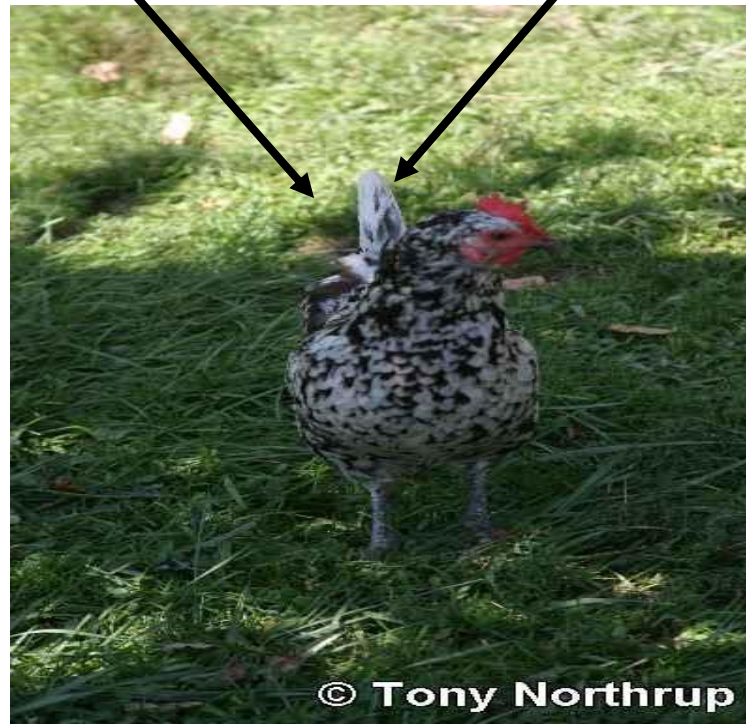


# CODOMINANCE

EX.



BB=Black  
WW=White  
BW= black AND  
white



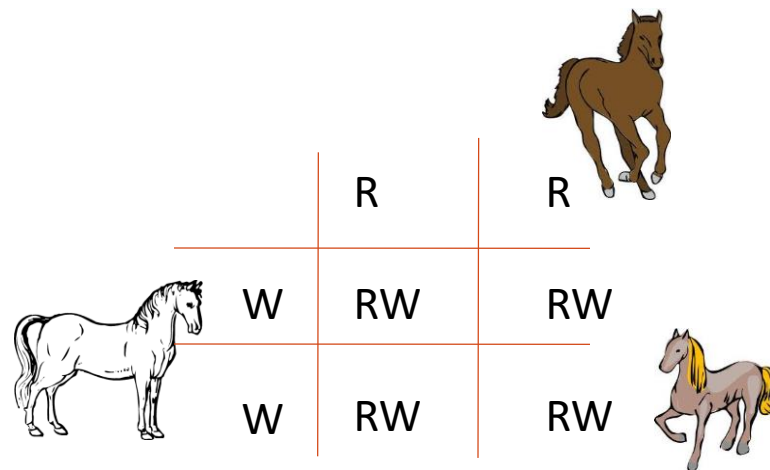
# CO-DOMINANCE --ROAN – RED AND WHITE

- In livestock and horses, a unique color called “Roan” exists.
- Roan looks pink, but it is NOT pink – Roan is a blend of red and white hair and is an example of co-dominance.
- A close-up of a roan animal’s coat shows that the hair is not pink – it is BOTH red and white.



# CO-DOMINANCE AND PUNNETT SQUARES

- Because both traits are dominant, both need to be capitalized.
- Because both need to be capitalized, we need two different letters to show co-dominance.





- Example: In cows, a white cow is WW, a black cow is BB, and the heterozygous condition produces a black and white spotted cow.
- Show a cross between a black cow and spotted cow.

\_\_\_\_\_ % of the offspring should be White

\_\_\_\_\_ % of the offspring should be Black

\_\_\_\_\_ % of the offspring should be Spotted



# INCOMPLETE DOMINANCE

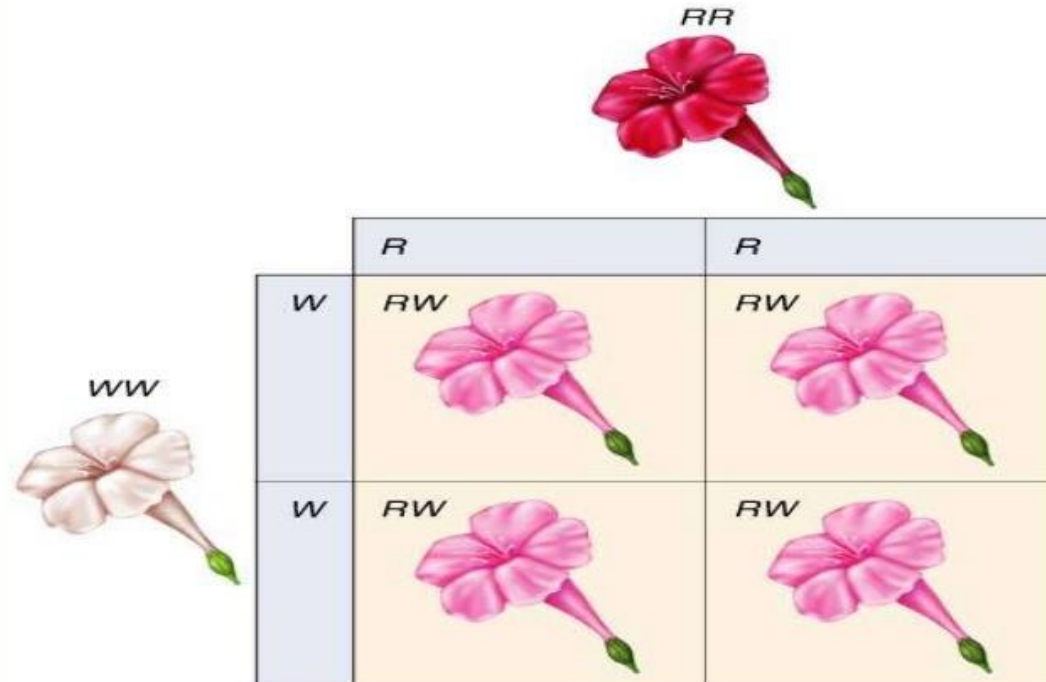
## THE HETEROZYGOTE IS A MIX OF THE OTHER TWO

RR=Red

WW=White

RW=Pink (mix)

Incomplete Dominance



- Example: In snapdragons, red-flowered plants are (RR), pink-flowered plants are (RW), and white flowered plants are (WW).
- Show a cross between a red-flowered plant and a pink flowered plant.

\_\_\_\_\_ % of the offspring should be Red

\_\_\_\_\_ % of the offspring should be Pink

\_\_\_\_\_ % of the offspring should be White



# SEX-LINKED TRAITS

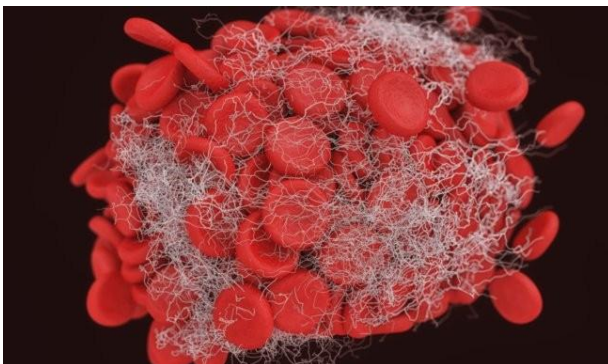
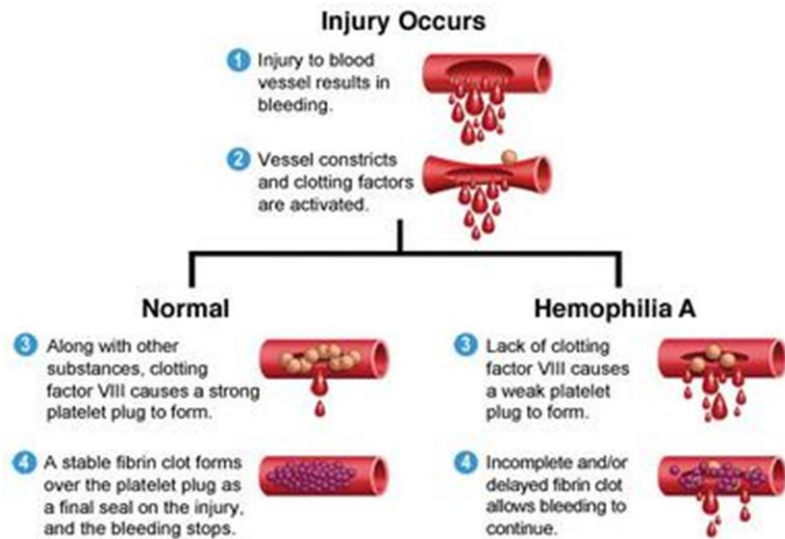
- There are 22 pairs of chromosomes in your body that are called autosomes.
- The other pair are called **sex chromosomes “X” and “Y”**.
- **Male genotype = XY**
- **Female genotype = XX**
- **Sex-linked traits are found on the X or Y chromosome.**



- In Humans, color-blindness is a recessive sex linked trait ( $X^b$ ).
  - A. Show a cross between a mother that is not color-blind a carrier (heterozygous) for the color-blind trait and a father that is not color-blind.
  - B. What chance do their sons have of being color-blind?
  - C. What chance do their daughters have of being color-blind?



# HEMOPHILIA



- This disease is a **Recessive sex-linked** trait causes a particular protein (Clotting factor VIII) not to form. Because of this missing clotting factor, individuals with hemophilia bleed longer than other people because they don't have the proper clotting factor.
- Some people will have more severe bleeds than others. Scientists have produced engineered clotting factors that hemophiliacs can take to help their blood clot properly. Some people receive the missing protein from plasma donors.
- *Show the Punnett square of a female who is heterozygous mating with a male who does have Hemophilia. What proportion of their male and female offspring would have Hemophilia?*

