

Solving Genetics Problems

Essential Questions:

- **How are traits inherited for single-factor crosses?**
- **How are traits inherited for two-factor crosses?**
- **How are sex-linked traits inherited?**

Single-factor cross:

Tongue-rolling is dominant to non-rolling. Cross a hybrid female with a non-roller.

1. **Assign symbols for traits.** — $R = \text{roller}$ $r = \text{non-roller}$
2. **Write parental genotypes.** $\text{♀} : Rr$ $\text{♂} : rr$
3. **Make a Punnett square of the cross.**
4. **Predict the genotype ratio of the offspring.**
5. **Predict the phenotype ratio of the offspring.**

$0:2:2$

$2:2$

	R	r
r	Rr	rr
r	Rr	rr

Two-factor cross:

Peas
Round is dominant to wrinkled
Yellow is dominant to green

Cross two parents that are hybrid for both traits

Assign symbols

Specify possible gamete combinations

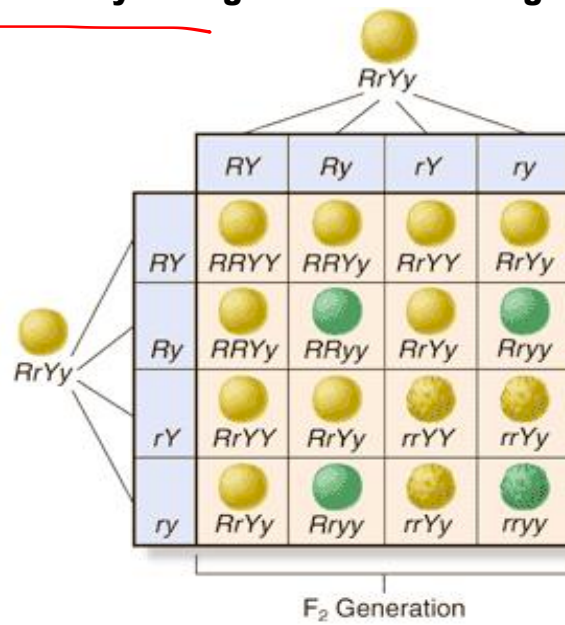
Make a Punnett square

P Genotypes: $RrYy \times RrYy$

Gametes: FOIL: $RY \quad Ry \quad rY \quad ry$

	RY	Ry	rY	ry
RY	$RRYY$	$RRYy$	$RrYY$	$RrYy$
Ry	$RRYy$	$RRyy$	$RrYy$	$Rryy$
rY	$RrYY$	$RrYy$	$rrYY$	$rrYy$
ry	$RrYy$	$Rryy$	$rrYy$	$rryy$

How does this result demonstrate that alleles segregate independently during the formation of gametes?

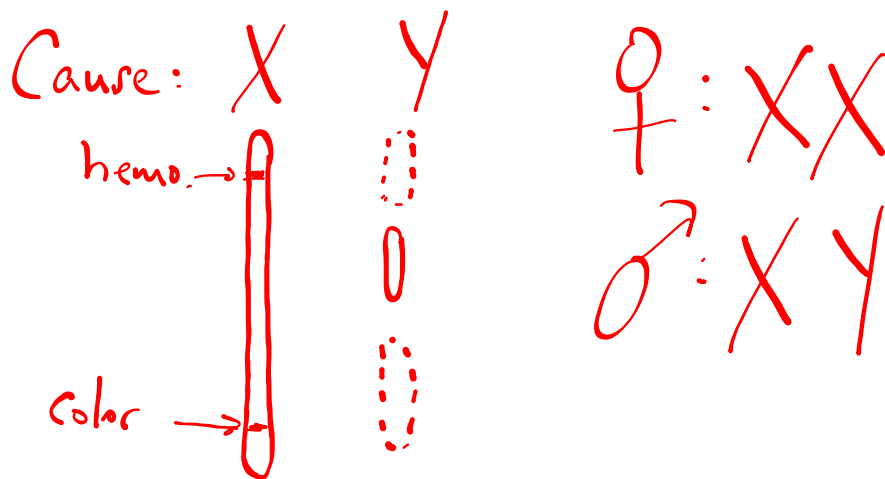


Sex-linked inheritance:

Traits in one gender more than another

hemophilia

color-blindness



♀ : heterozygous color vision
 X^C - sees color (normal)
 X^c - colorblind $[X^c X^c]$

♂ : normal vision, $X^C Y$

