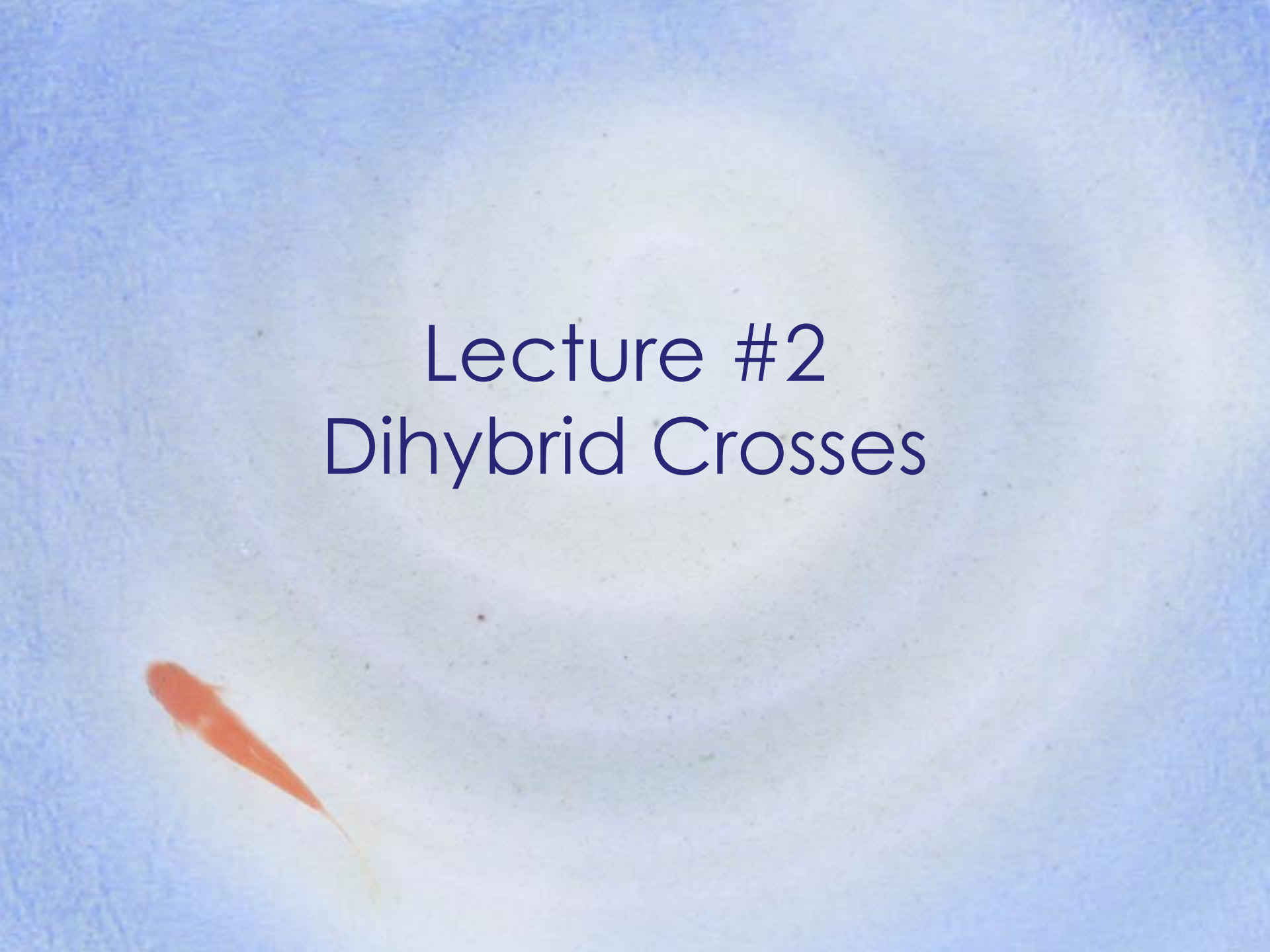
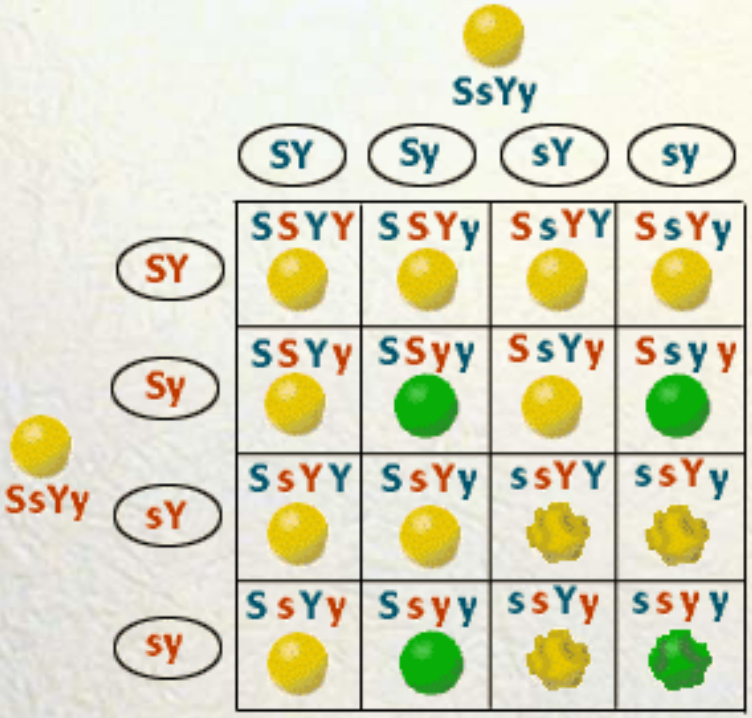
Lecture #2
Dihybrid Crosses



Dihybrid Cross



- **Monohybrid Cross**: Single Trait Punnett Square. Uses a 4 square punnett square.
- **Dihybrid Cross**: Two Trait Punnett Square. Uses a 16 square punnett square. Used to track 2 traits at once.

Dihybrid Cross

Example: Cross a -

- Yellow and wrinkled corn plant with a:
- Heterozygous purple and heterozygous smooth corn plant

Assuming:	
Purple =	P
Yellow =	p
Smooth =	S
Wrinkled =	s

Step #1: Determine the formula

P = ppss x PpSs

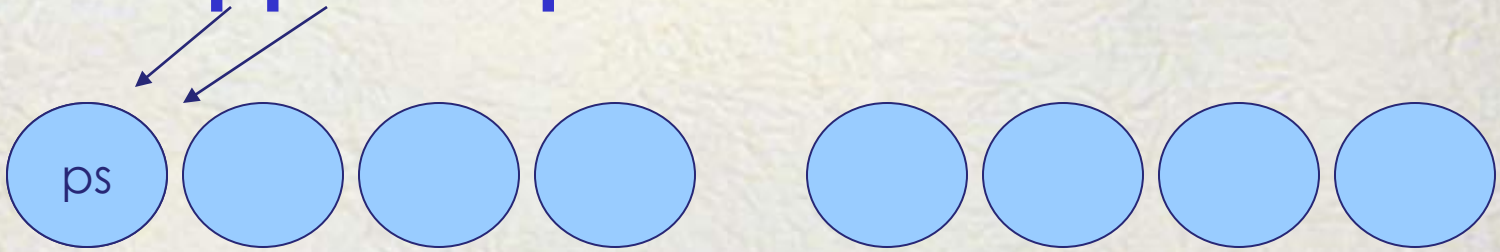
(Yellow Wrinkled x Purple Smooth)

Step #2: Determine the genotypes of the gametes (sex cells) of each parent.

Segregation: The two alleles for each trait separate.
Independent Assortment: Each trait sorts independently of the other traits.

How: Sort the alleles of each trait with the alleles of the other trait in each parent.

P = ppss x PpSs

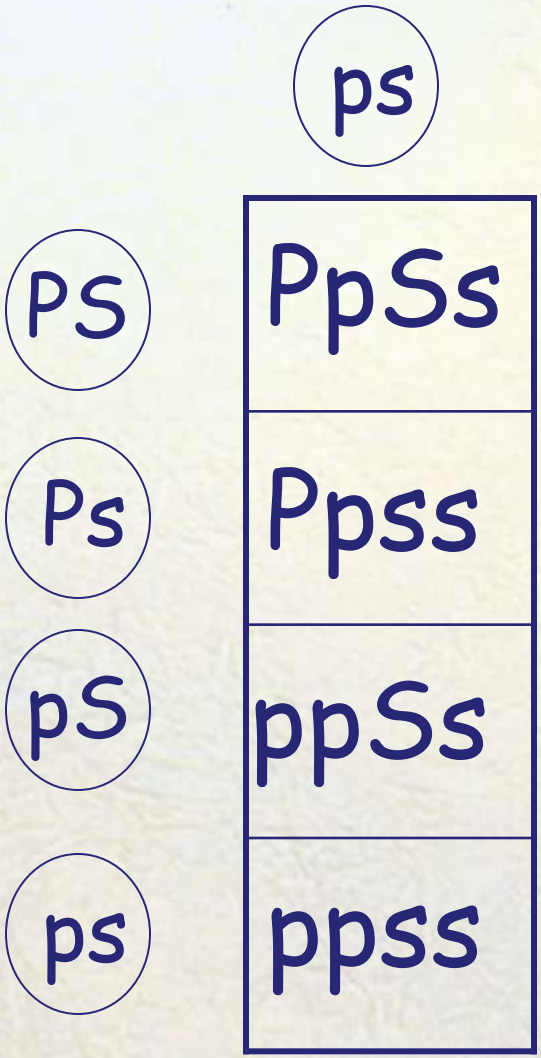


Fill in the remaining gametes. These combinations of alleles are placed at the top and side of the punnett square.

Step #3: Set up Punnett Square, add parent gametes and fill in potential offspring. Re-organize to put all the P's and S's together.

	ps	ps	ps	ps
PS	PpSs	PpSs	PpSs	PpSs
Ps	Ppss	Ppss	Ppss	Ppss
pS	ppSs	ppSs	ppSs	ppSs
ps	ppss	ppss	ppss	ppss

Step #4: Calculate the results. (% of Phenotype)



25% Purple & Smooth

25% Purple & Wrinkled

25% Yellow & Smooth

25% Yellow & Wrinkled

Practice: Do the Punnett Square

P = TtAa x TtAa

What are the phenotypic ratios of the offspring?

	TA	Ta	tA	ta
TA	TTAA	TTAa	TtAA	TtAa
Ta	TTAa	TTaa	TtAa	Ttaa
tA	TtAA	TtAa	ttAA	ttAa
ta	TtAa	Ttaa	ttAa	ttaa

Probable outcomes:

9/16 Dom & Dom (Tall & Axial)

3/16 Dom & Rec (Tall & Terminal)

3/16 Rec & Dom (Short & Axial)

1/16 Rec & Rec (Short & Terminal)

Mendel did this cross when working with his Pea Plants.