SI Session 13

1. A true breeding tall, purple-flowered pea plant is crossed with a true breeding dwarf, white flowered plant. What are the ~~phenotypes~~ genotypes of the parents?

TTPP x ttpp

b. What is the phenotype of the F_1 generation?

all will be tall w/ purple flowers

c. What is the genotype of the F_1 generation?

all TtPp

TP Tp tP tp

d. Complete a Punnett square crossing two of the F_1 generation offspring

	TP	Tp	tP	tp
TP	TTPP	TTPp	TtPP	TtPp
Tp	TTPp	TTpp	TtPp	Ttpp
tP	TtPP	TtPp	ttPP	ttPp
tp	TtPp	Ttpp	ttPp	ttpp

2. *A* = big apples; *R* = red apples; *a* = small apples; *r* = yellow apples. You have one tree that produces big yellow apples and another tree that produces small red apples. When the two are crossed, you find that half of the new trees produce big red apples and half produce big yellow apples. What are the genotypes of the parents?

Big yellow AArr

small red aaRr

3. Physically, what are different alleles?

different DNA sequences found @ the same locus on homologous chromosomes

9. In dogs, there is a hereditary deafness gene "d" (recessive). You have a male dog you would like to use for mating purposes. The dog can hear so you know it must have the genotype _____ or _____.

Dd or DD

b. You mate the male dog (with unknown genotype) with a deaf female and produce 6 puppies. Only three of the puppies have functional hearing. What was the genotype of the father?

test cross!

	D	d
d	Dd	dd
d	Dd	dd

1/2 deaf

	D	D
d	Dd	Dd
d	Dd	Dd

all can hear

Dad was Dd

SI Session 14

1. A red bull is crossed with a white cow and all of the offspring are roan, an intermediate color that is caused by the presence of both red and white hairs. This is an example of _____?

   a. Incomplete Dominance
   b. Codominance
   c. Epistasis

2. How is Tay-Sachs recessive at phenotypic level but incompletely dominant at the biochemical level?

a child must inherit both recessive alleles to have the disease. children heterozygous for the gene have an intermediate phenotype at the biochem. level. their lipid-metabolizing enzymes don't work like the homozygous dom. individuals but they function enough to be normal

3. Human blood groups are governed by three alleles, A, B, and O. A and B are codominant and O is recessive to both. A man who has type B blood and a woman who has type A blood could have children of which of the following phenotypes? (**HINT**: write out the possible alleles)

   a. A or B only
   b. AB
   c. AB or O
   d. A, B, or O
   e. A, B, AB, or O

mom: I^A, I^A or $I^A i$
dad: $I^B, I^B, I^B i$

4. Which of the following matings cannot produce a child with blood type O? The letters refer to blood types (phenotypes).

   a. A x B
   b. A x A
   c. O x O
   d. O x AB

AB = $I^A I^B$

- one parent doesn't have the recessive allele

5. Epistasis occurs when the expression of a gene at one locus is affected by _____.

A gene at another locus

SI Session 15

I. Morgan's Fruit Fly Experiment

a. In the parent generation Morgan crossed a wild-type red eyed female and a white eyed male. What are the phenotypes of the parents?

$X^{Wt}X^{Wt}$ (female) $X^{W}Y$ (male)

Wt = red eye
W = white

b. Show the cross of the parental generation

	X^{Wt}	X^{Wt}
X^{W}	$X^{Wt}X^{W}$	$X^{Wt}X^{W}$
Y	$X^{Wt}Y$	$X^{Wt}Y$

all female have red eyes
all males have red eyes

c. Show the cross of two F_1 generation flies

	X^{Wt}	X^{W}
X^{Wt}	$X^{Wt}X^{Wt}$	$X^{W}X^{Wt}$
Y	$X^{Wt}Y$	$X^{W}Y$

d. Using Morgan's results to explain, how is eye-color in fruit flies sex-linked?

All of the females had red eyes and one male had white eyes. The gene for red eyes is located on the X chrom. Because males only have 1 copy of X chromosome they are more likely to get white eyes (they dont have a chance for a wt to dominate the W)

II. X-inactivation

a. In which of the following structures would you expect to find a Barr body?

a. An egg
b. ~~A sperm~~
c. A liver cell of a woman
d. A liver cell of a man
e. A mitochondria

b. What is a Barr body? Why does this phenomenon occur?

Females have 2 copies of the X chromosome. They don't need to express the same gene twice so one copy of the X is inactivated. This inactivated copy is the barr body

Duplication	repeated segments
Inversion	removes a segment w/in a chromosome
Translocation	a part of a chromosome is transferred to a nonhomologous chromosome

SI Session 16

1. Describe the Griffith experiment. What is transformation?

When heat killed S cells were mixed w/ living R cells the mouse died → living S cells were found in the dead mouses blood. Something transformed the healthy cells to killer cells.

2. Describe the Hershey-Chase experiment. How did they conclude that protein was not the genetic material?

used radioactive phosphorous (dna) & sulfur (protein to determine what the genetic material was made of. Sulfur was incorporated into protein coat of the phage while the dna stayed in the bacterial cell

3. What is Chargaff's rule?

the amount of A = amount of T
the amount of C = amount of G

15% A = 15% T

4. A sample of DNA contains 28% adenine. How much guanine is present in the sample?

28% A = 28% T

28
28
56% A & T

SO → 44% between C & G

22% G = 22% C

SO 22% guanine