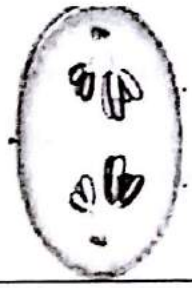
Meiosis - Name the Phases

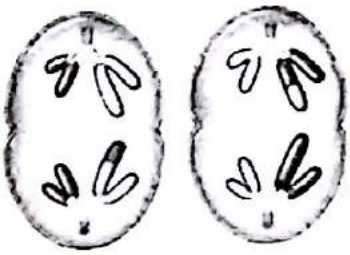
Name: KEY

Phases of Meiosis

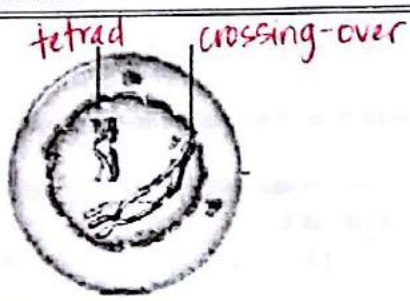
Name of Phase	Description
1. Prophase I	Homologous chromosomes pair up and form tetrad
2. Anaphase I	Spindle fibers move homologous chromosomes to opposite sides
3. Telophase II & Cytokinesis	Nuclear membrane reforms, cytoplasm divides, 4 daughter cells formed
4. Metaphase II	Chromosomes line up along equator, not in homologous pairs
5. Prophase I	Crossing-over occurs
6. Anaphase II	Chromatids separate
7. Metaphase I	Homologs line up along equator
8. Telophase I and Cytokinesis	Cytoplasm divides, 2 daughter cells are formed



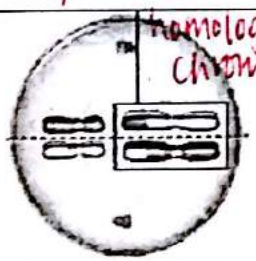
1. Anaphase I



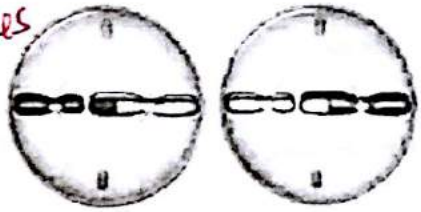
2. Anaphase II



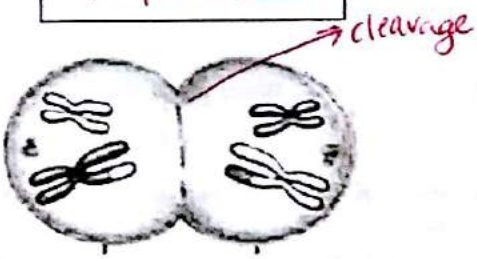
3. Prophase I



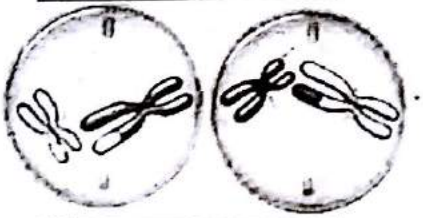
4. Metaphase I



5. Metaphase II



6. Telophase I and cytokinesis



7. Prophase II

8. Telophase II and cytokinesis

CP Unit 6 Review: Meiosis

Page _____

1. What type of cell undergoes meiosis? Gamete cells or Somatic cells

2. What are homologous chromosomes?
pairs of chromosomes, 1 from mom and 1 from dad.

3. For each of the following state if the cell is haploid or diploid.
Sperm cell = Haploid Liver cell = Diploid Egg cell = haploid Stomach cell = Diploid

4. If the diploid number in a liver cell is 52, how many chromosomes are there in the egg of this organism?
26

5. During meiosis, the chromosome number:
a) is doubled b) is reduced c) remains the same d) becomes diploid

6. Cells starting mitosis & meiosis begin with a (haploid or diploid) set of chromosomes.

7. How many times do cells divide during meiosis? 2

8. What are the stages of meiosis called?
Meiosis I: Prophase I, Metaphase I, Anaphase I, Telophase I /cytokinesis

Meiosis II: Prophase II, Metaphase II, Anaphase II, Telophase II /cytokinesis

9. Draw a tetrad: What phase do you first see this in?
Prophase I

10. Which of the following best describe the term "crossing over"?
a.) An exchange of information between two homologous chromosomes
b.) A molecular interaction between two sister chromatids
c.) A molecular interaction between two non-sister chromatids
d.) A separation of two sister chromatids

11. Crossing-over can be found in the stage of
a.) Prophase I b) Prophase II
c) Anaphase I d) Anaphase II

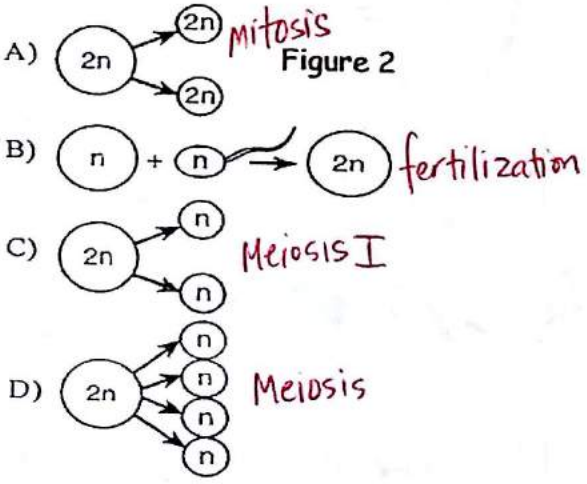


Figure 2

12. Which letter in figure #2 represents meiosis? *Why?*
D - You start w/ one 2N cell and end w/ 4 haploid cells

13. Which letter in figure #2 represents mitosis? Why? A – Start w/ 2N cell and make 2 diplad daughter cells

14. Is DNA copied before Meiosis II? NO

15. How many cells form at the end of Meiosis II and how many chromosomes do they contain?
4 , N

16. A sperm cell is a (gamete, zygote), and is (haploid, diploid).

17. When a sperm cell and an ovum/egg merge, they undergo the process of fertilization, and give rise to a (gamete, zygote), which is (haploid, diploid).

18. What is the ultimate goal/purpose of mitosis? What term do we use to describe the new cells?
~~to replace~~ to produce identical body cells → daughter cells

19. Be able to identify pictures of Meiosis 1 and Meiosis 2.

20. Describe cancer. abnormal cell growth

21. What is the difference between chromosomes, chromatids, and homologous chromosomes? You may draw a picture as your answer.
homologous = pairs of chromosome, 1 from mom, 1 from dad
chromatids = $\frac{1}{2}$ of chromosome

22. How are DNA and chromosomes related?
chromosomes are made of DNA

23. What is the difference between a haploid, diploid, and zygote?
Haploid: N, $\frac{1}{2}$ set
Diploid: 2N, full
Zygote: fertilized egg (2N)

24. How does Meiosis differ from Mitosis?
Meiosis produces gametes - 4 different N cells
Mitosis produces 2 identical daughter cells (2N)

25. What does Meiosis create? Haploids or Diploid? Somatic cells or gametes?
Meiosis creates haploid cells, gametes.

26. What is a gamete? How do we represent the chromosome number: 2n or n?
gamete = sex cell, N

27. What is crossing over? When does it happen? Draw a picture.
crossing-over = occurs in prophase I
portion of chromatids on homologous chromosomes switch ~~place~~ places

ANSWER KEY

Codominance Worksheet

In shorthorn cattle, color shows ~~incomplete dominance.~~ codominance. A red cow has the genotype RR. A white cow has the genotype WW. Heterozygous cattle are called Roan (red and white spotted) (RW).

1. Cross a red bull with a roan cow. Show the Punnett Square:

RR RW

50 % Red Cow 50 % Roan Cow 0 % White Cow

	R	R
R	RR	RR
W	RW	RW

2. Cross a roan bull with a roan cow. Show the Punnett Square:

RW RW

25 % Red Cow 50 % Roan Cow 25 % White Cow

	R	W
R	RR	RW
W	RW	WW

3. Cross a red bull with a red cow. Show the Punnett Square:

RR RR

100 % Red Cow 0 % Roan Cow 0 % White Cow

	R	R
R	RR	RR
R	RR	RR

4. Cross a white bull with a white cow. Show the Punnett Square:

WW WW

0 % Red Cow 0 % Roan Cow 100 % White Cow

	W	W
W	WW	WW
W	WW	WW

5. Cross a roan bull with a white cow. Show the Punnett Square:

RW WW

0 % Red Cow 50 % Roan Cow 50 % White Cow

	R	W
W	RW	WW
W	RW	WW

6. Cross a red bull with a white cow. Show the Punnett Square: RR WW

	R	R
W	RW	RW
W	RW	RW

0 % Red Cow 100 % Roan Cow 0 % White Cow

Andalusian chickens have one allele for white feathers and one allele for black feathers. Andalusian Chickens appear to have black and white checkered feathers (BW). Where pure chickens are either black (BB) or white (WW).

7. Cross two Andalusian Chickens. Show the Punnett Square: BW

25 % Black Chickens 50 % Andalusian Chicken 25 % White Chickens

	B	W
B	BB	BW
W	BW	WW

8. Cross an Andalusian rooster with a white hen. Show the Punnett Square:

BW WW

0 % Black Chickens 50 % Andalusian Chicken 50 % White Chickens

	B	W
W	BW	WW
W	BW	WW

9. Cross a black rooster with a white hen. Show the Punnett Square:

BB WW

0 % Black Chickens 100 % Andalusian Chicken 0 % White Chickens

	B	B
W	BW	BW
W	BW	BW

10. Cross a black rooster with an andalusian hen. Show the Punnett Square:

BB BW

50 % Black Chickens 50 % Andalusian Chicken 0 % White Chickens

	B	B
B	BB	BB
W	BW	BW

Codominance Worksheet (Blood types) Name: _____

Human blood types are determined by genes that follow the **CODOMINANCE** pattern of inheritance. There are two dominant alleles (A & B) and one recessive allele (O).

Blood Type (Phenotype)	Genotype	Can donate blood to:	Can receive blood from:
O	OO	A,B,AB and O (universal donor)	O
AB	AB	AB	A,B,AB and O (universal receiver)
A	AA or AO	AB, A	O,A
B	BB or BO	AB,B	O,B

1. Write the genotype for each person based on the description:
   a. Homozygous for the "B" allele — BB or I^BI^B
   b. Heterozygous for the "A" allele — AO or I^Ai
   c. Type O — OO or ii
   d. Type "A" and had a type "O" parent — AO or I^Ai
   e. Type "AB" — AB or I^AI^B
   f. Blood can be donated to anybody — OO or ii
   g. Can only get blood from a type "O" donor — OO or ii

2. Pretend that a man is homozygous for the type B allele (BB), and a woman is type "O." (OO)
   What are all the possible blood types of their baby? *(Do the punnett square)*

   All babies will have Type B blood

	B	B
O	BO	BO
O	BO	BO

3. Complete the punnett square showing all the possible blood types for the offspring produced by a type "O" mother and an a Type "AB" father. **What are percentages of each offspring?**

   50% Type A, 50% Type B

	O	O
A	AO	AO
B	BO	BO

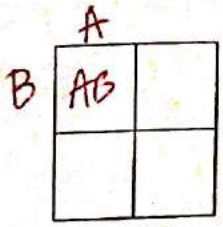
4. Mrs. Bio is type "A" and Mr. Bio is type "O." They have three children named Gregor, Rosalind, and Charles. Gregor is type "O," Rosalind is type "A," and Charles is type "AB." Based on this information:
   a. Mr. ~~Easy~~ Bio must have the genotype AOO
   b. Mrs. ~~Easy~~ Bio must have the genotype AO because Gregor has blood type OO
   c. Can Charles be their son? No. Explain: Neither parent could pass the B allele

	A	O
O	AO	OO
O	AO	OO

5. Two parents think their baby was switched at the hospital. Its 1968, so DNA fingerprinting technology d The mother has blood type "O," the father has blood type "AB," and the baby has blood type "B."
   a. Mother's genotype: OO
   b. Father's genotype: AB
   c. Baby's genotype: ~~AA~~ or BO
   d. Punnett square showing all possible genotypes for children produced by this couple.
   e. Was the baby switched? No, Type B blood is possible.

	O	O
A	AO	AO
B	BO	BO

6. Two other parents think their baby was switched at the hospital. Amy the mother has blood type "A," Linville the father has blood type "B," and Priscilla the baby has blood type "AB."
   a. Mother's genotype: AA or AO
   b. Father's genotype: BB or BO
   c. Baby's genotype: AB
   d. Punnett square that shows the baby's genotype as a possibility
   e. Could the baby actually be theirs? yes.



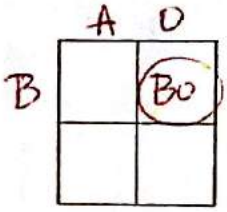
7. Based on the information in this table, which men **could not** be the father of the baby?

(hint... look at the baby's blood type only...)
You can use the Punnett square if you need help figuring it out.

Name	Blood Type
Mother	Type A
Baby	Type B
The mailman	Type O
The butcher	Type AB
The waiter	Type A
The cable guy	Type B

Not father

Not father



8. The sister of the mom above also had issues with finding out who the father of her baby was. She had the state take a blood test of potential fathers. Based on the information in this table, why was the baby taken away by the state after the test?
(hint... look at the baby's blood type only...)

Name	Blood Type
Mother	Type O
Baby	Type AB
Bartender	Type O
Guy at the club	Type AB
Cabdriver	Type A
Flight attendant	Type B

Yes. The mother could not have given birth to an AB baby.

Name: _____ Row: _____

Date: _____ Period: _____

ABO Blood Types

A blood type or blood group is a classification of blood based on antigens on the surface of red blood cells. There are two major blood type systems, ABO and Rhesus.

The ABO blood group system has an A antigen and B antigen that are inherited. Blood type A has the A antigen on the surface of the red blood cell. Blood type B has the B antigen on the surface of the red blood cell. Blood type AB has both of the antigens on the surface of the red blood cell. Blood type O does not have any antigens on the surface of the red blood cell.

1) What are the four different blood groups? A, B, AB and O

The purpose of understanding the different antigens found on red blood cells is because of blood transfusions. Blood transfusion is the process of transferring blood from one person into another person's circulatory system. Blood transfusions can are useful when the recipient loses a large amount of blood due to trauma or surgery. For blood transfusions to work, blood must be donated from people with matching blood types. If the blood is not matched, then the immune system of the recipient will attach the donated blood.

After birth, the immune system then makes antibodies against the antigens not found on the red blood cells. Antibodies are present on the B white blood cells. Below is a table containing information about antigens, antibodies and blood transfusions.

Blood Type	Red Blood Cell Antigen	Antibodies in Blood	Receive Blood From	Donate Blood To
A	A	anti-B	O, A	A, AB
B	B	anti-A	O, B	B, AB
AB	A, B	None	O, A, B, AB	AB
O	None	anti-A, anti-B	O	O, A, B, AB

2) Which blood type would you have if antibodies A and B were made during your first year of life? Type O

3) Which blood type is the universal donor? Type O

4) Which blood type is the universal recipient? Type AB

5) Which ABO blood type has two different antigens on the surface of red blood cells? AB

6) If the blood plasma had antibody A, what type of blood would the immune system attack? Type A, & AB

7) How are antibodies related to the type of blood a person can receive? You need to make sure that the person has no antibodies for the receiving blood. If they do, the blood will clot.

A single gene controls ABO blood type system with three alleles. Two of the alleles are dominant (I^A, I^B) and the third allele (i) is recessive. The gene encodes an enzyme glycosyltransferase that modifies carbohydrates that make up the red blood cell antigens. Since there are two of the dominant alleles, I^AI^B genotype expresses codominance. The three genotypes result in four phenotypes, A, B, AB, and O. Fill in the punnett square below and then answer its corresponding questions.

	I^A	I^B	i
I^A	I^AI^A	AB	AO
I^B	AB	BB	BO
i	AO	BO	OO

8) What genotypes would create the phenotype blood type A? I^AI^A or I^Ai

9) What genotypes would create the phenotype blood type B? I^BI^B or I^Bi

10) What genotypes would create the phenotype blood type AB? I^AI^B

11) What genotypes would create the phenotype blood type O? ii

12) What is the phenotypic ratio of ABO blood types? 3A: 3B: 2AB: 1 OO

Name: _____

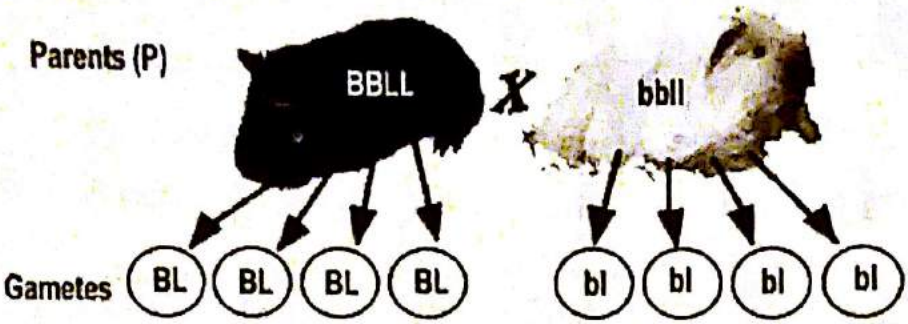
DIHYBRID CROSS

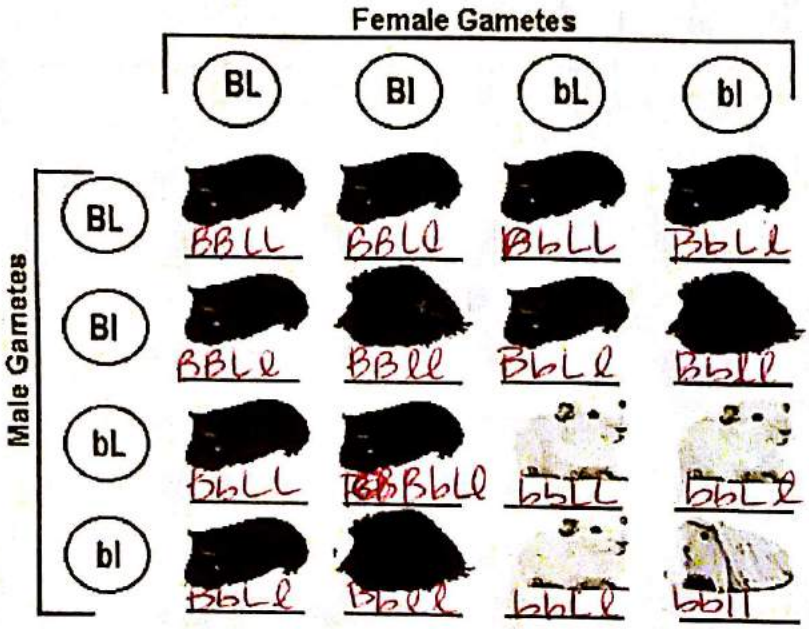
A cross (or mating) between two organisms where two genes are studied is called a **DIHYBRID** cross.

The genes are located on separate chromosomes, so the traits themselves are unrelated.

BB = black
Bb = black
bb = white

LL = short hair
Ll = short hair
ll = long hair





Fill out the genotypes of each of the offspring to determine how many of each type of offspring are produced.

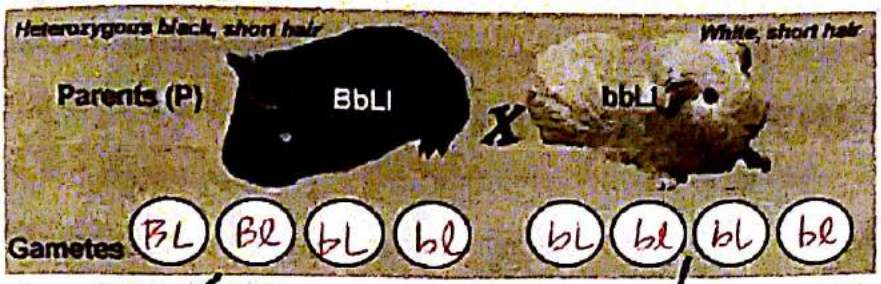
How many (out of 16) will be...

Black, Short — 9

Black, Long — 3

White, Short — 3

White, Long — 1



Female Gametes

Male Gametes	bL	bl	bL	bl
BL	BbLL	BbLl	BbLL	BbLl
Bl	BbLl	Bbll	BbLl	Bbll
bL	bbLL	bbLl	bbLL	bbLl
bl	bbLl	bbll	bbLl	bbll

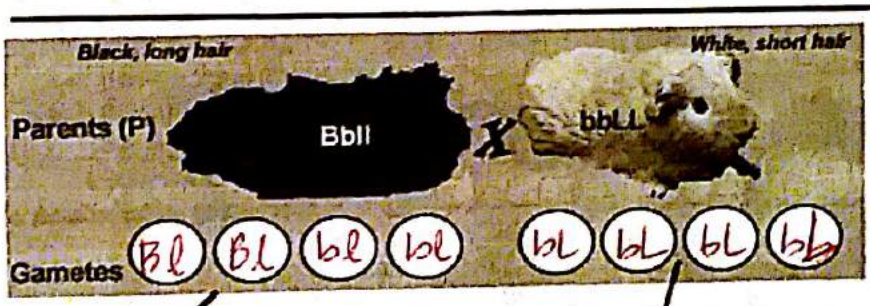
How many of the offspring are:

Black, Short |||| | 6

Black, Long || 2

White, Short |||| | 6

White, Long || 2



Female Gametes

Male Gametes	bL	bL	bL	bL
Bl	BbLl	BbLl	BbLl	BbLl
Bl	BbLl	BbLl	BbLl	BbLl
bl	bbLl	bbLl	bbLl	bbLl
bl	bbLl	bbLl	bbLl	bbLl

How many of the offspring are:

Black, Short |||| ||| 8

Black, Long ____ 0

White, Short |||| ||| 8

White, Long ____ 0

Name: _____ Period: ____ Date: _____

Chapter 10: Dihybrid Cross Worksheet

In rabbits, gray hair is dominant to white hair. Also in rabbits, black eyes are dominant to red eyes. These letters represent the genotypes of the rabbits:

GG = gray hair Gg = gray hair gg = white hair	BB = black eyes Bb = black eyes bb = red eyes

1. What are the phenotypes (descriptions) of rabbits that have the following genotypes?

Ggbb gray, red eyes ggBB white hair, black eyes

ggbb white hair, red eyes GgBb gray hair, black eyes

2. A male rabbit with the genotype GGbb is crossed with a female rabbit with the genotype ggBb the square is set up below. Fill it out and determine the phenotypes and proportions in the offspring.

	Gb	Gb	Gb	Gb
gB	GgBb	GgBb	GgBb	GgBb
gB	GgBb	GgBb	GgBb	GgBb
gb	Ggbb	Ggbb	Ggbb	Ggbb
gb	Ggbb	Ggbb	Ggbb	Ggbb

How many out of 16 have gray fur and black eyes? |||| ||| 8

How many out of 16 have gray fur and red eyes? |||| ||| 8

How many out of 16 have white fur and black eyes? 0

How many out of 16 have white fur and red eyes 0

3. A male rabbit with the genotype GgBb is crossed with a female rabbit with the genotype GgBb The square is set up below. Fill it out and determine the phenotypes and proportions of offspring

	GB	Gb	gB	gb
GB	GGBB	GGBb	GgBB	GgBb
Gb	GGBb	GGbb	GgBb	Ggbb
gB	GgBB	GgBb	ggBB	ggBb
gb	GgBb	Ggbb	ggBb	ggbb

How many out of 16 have gray fur and black eyes? |||| |||| 9

How many out of 16 have gray fur and red eyes? ||| 3

How many out of 16 have white fur and black eyes? ||| 3

How many out of 16 have white fur and red eyes? 1 1

4. Show the cross between a ggBb and a GGBb. You'll have to set this one up yourself:

Punnett Square:

	gB	gb	gB	gb
GB	GgBB	GgBb	GgBB	GgBb
Gb	GgBb	Ggbb	GgBb	Ggbb
GB	GgBB	GgBb	GgBB	GgBb
Gb	GgBb	Ggbb	GgBb	Ggbb

5. An aquatic arthropod called a Cyclops has antennae that are either smooth or barbed. The allele for barbs (B) is dominant over smooth (bb). In the same organism Non-resistance to pesticides (N) is dominant over resistance to pesticides (nn). Make a "key" to show all the possible genotypes (and phenotypes) of this organism.

Genotype	Phenotype
BB	barbs
Bb	barbs
bb	smooth
NN	non-resistance
Nn	non-resistance
nn	resistance

6. A Cyclops that is resistant to pesticides and has smooth antennae is crossed with one that is heterozygous for both traits. Show the genotypes of the parents.

nn bb

bbnn x BbNn

7. Set up a punnett square for the cross.

	bn	bn	bn	bn
BN	BbNn	BbNn	BbNn	BbNn
Bn	Bbnn	Bbnn	Bbnn	Bbnn
bN	bbNn	bbNn	bbNn	bbNn
bn	bbnn	bbnn	bbnn	bbnn

8. What are the phenotypic ratios of the offspring?

barbs non-resistance IIII

barbs, resistance IIII

smooth, non-resistance IIII

smooth, resistance IIII

4:4 4. 4

DiHybrid Practice Problems

1. In man, assume that spotted skin (S) is dominant over non-spotted skin (s) and that wooly hair (W) is dominant over non-wooly hair (w). Cross a marriage between a heterozygous spotted, non-wooly man with a heterozygous wooly-haired, non-spotted woman. Give genotypic and phenotypic ratios of offspring.

SsWw × ssWw

	SW	sW	SW	sW
W	SsWw	ssWw	SsWw	ssWw
sw	Ssww	ssww	Ssww	ssww
sW	SsWw	ssWw	SsWw	ssWw
sw	Ssww	ssww	Ssww	ssww

spotted, wooly |||| 4

spotted, non-wooly |||| 4

non-spotted, wooly || 4

non-spotted, non-wooly |||| 4

2. In horses, black is dependent upon a dominant gene, B, and chestnut upon its recessive allele, b. The trotting gait is due to a dominant gene, T, the pacing gait to its recessive allele, t. If a homozygous black pacer is mated to a homozygous chestnut trotter, what will be the appearance of the F1 generation?

BBtt × bbTT

	Bt	Bt	Bt	Bt
bT	BbTt	BbTt	BbTt	BbTt
bT	BbTt	↓	↓	↓
bT	↓	↓	↓	↓
bT	↓	↓	↓	↓

All are BbTt

black, trotters

3. In summer squash, white fruit color (W) is dominant over yellow fruit color (w) and disk-shaped fruit (D) is dominant over sphere-shaped fruit (d).. If a squash plant true-breeding for white, disk-shaped fruit is crossed with a plant true-breeding for yellow, sphere-shaped fruit,

WWDD × wwdd

	WD	WD	WD	WD
wd	WwDd	WwDd	WwDd	WwDd
wd	↓	↓	↓	↓
wd	↓	↓	↓	↓
wd	↓	↓	↓	↓

All are WwDd

white, disk-shaped

5. In mice, the ability to run normally is a dominant trait. Mice with this trait are called running mice (R). The recessive trait causes mice to run in circles only. Mice with this trait are called waltzing mice (r). Hair color is also inherited in mice. Black hair (B) is dominant over brown hair (b).For each of the following problems, determine the parent genotypes, determine possible gametes then construct a Punnet square to solve.

a. Cross a heterozygous running, heterozygous black mouse (RrBb) with a homozygous running, homozygous black mouse (RRBB)

Parental genotypes RrBb × RRBB
Possible gametes RB Rb rB rb
Offspring phenotypic ratio 16:0:0:0

	RB	Rb	rB	rb
RB	RRBB	RRBb	RrBB	RrBb
RB	RRBB			
RB				
RB				

running, black 16 (100%)
running, brown
waltzing, black
waltzing, brown

b. Cross a homozygous running, homozygous black mouse (RRBB) with a heterozygous running, brown mouse (Rrbb)

Parental genotypes RRBB × RrBb
Possible gametes Rb rb Rb rb
Offspring phenotypic ratio 16:00:0

	Rb	rb	Rb	rb
RB	RRBb	RrBb	RRBb	RrBb
RB				
RB				
RB				

black, running 16 (100%)
running, brown
waltzing, black
Waltzing, brown

c. Cross a waltzing brown mouse with a waltzing brown mouse

Parental genotypes rrbb × rrbb
Possible gametes rb rb rb rb
Offspring phenotypic ratio 0:0:0:16

	rb	rb	rb	rb
rb	rrbb	rrbb	rrbb	rrbb
rb				
rb				
rb				

all rrbb
waltzing, brown 16 (100%)

d. Cross a homozygous running, heterozygous black mouse with a waltzing brown mouse

Parental genotypes RRBb x rrbb
Possible gametes RB Rb RB Rb
Offspring phenotypic ratio 8:8:0:0

running, black 8
running, brown 8
waltzing, blck 0
waltzing brown 0

	RB	Rb	RB	Rb
rb	RrBb	Rrbb	RrBb	Rrbb
rb				
rb				
rb				

e. Cross a heterozygous running, brown mouse with a heterozygous running, homozygous black mouse

Rrbb

Parental genotypes Rrbb x RrBB
Possible gametes Rb Rb rb rb
Offspring phenotypic ratio 12:0:4:0

running, black 12
running, brown 0
waltzing, blck 4
waltzing, brown 0

	RB	RB	rB	rB
Rb	RRBb	RRBb	RrBb	RrBb
Rb	RRBb	RRBb	RrBb	RrBb
rb	RrBb	RrBb	rrBb	rrBb
rb	RrBb	RrBb	rrBb	rrBb

f. Cross a heterozygous running, heterozygous black mouse with a heterozygous running, heterozygous black mouse

Parental genotypes RrBb x RrBb
Possible gametes RB Rb rB rb
Offspring phenotypic ratio 9:3:3:1

	RB	Rb	rB	rb
RB	RRBB	RRBb	RrBB	RrBb
Rb	RRBb	RRbb	RrBb	Rrbb
rB	RrBB	RrBb	rrBB	rrBb
rb	RrBb	Rrbb	rrBb	rrbb

1. Set up a punnett square using the following information:
- Dominate allele for tall plants = D
- Recessive allele for dwarf plants = d
- Dominate allele for purple flowers = W
- Recessive allele for white flowers = w
- Cross a homozygous dominate parent (DDWW) with a homozygous recessive parent (ddww)

	DW	DW	DW	DW
dw	DdWw	DdWw	DdWw	DdWw
dw				
dw				
dw				

2. Using the punnett square in question #1:

a. What is the probability of producing tall plants with purple flowers? 100%
Possible genotype(s)? DdWw DDWw DdWW

b. What is the probability of producing dwarf plants with white flowers? 0%
Possible genotype(s)? ddww

c. What is the probability of producing tall plants with white flowers? 0%
Possible genotype(s)? DDww Ddww

d. What is the probability of producing dwarf plants with purple flowers? 0%
Possible genotype(s)? ddWW ddWw

3. Set up a punnett square using the following information:
- Dominate allele for black fur in guinea pigs = B
- Recessive allele for white fur in guinea pigs =b
- Dominate allele for rough fur in guinea pigs =R
- Recessive allele for smooth fur in guinea pigs = r
- Cross a heterozygous parent (BbRr) with a heterozygous parent (BbRr)

	BR	Br	bR	br
BR	BBRR	BBRr	BbRR	BbRr
Br	BBRr	BBrr	BbRr	Bbrr
bR	BbRR	BbRr	bbRR	bbRr
br	BbRr	Bbrr	bbRr	bbrr

4. Using the punnett square in question #3:
a. What is the probability of producing guinea pigs with black, rough fur? 9/16 = 56.25%
Possible genotype(s)? BBRR BbRR BBRr BbRr

b. What is the probability of producing guinea pigs with black, smooth fur? 3/16 = 18.75%
Possible genotype(s)? BBrr Bbrr

c. What is the probability of producing guinea pigs with white, rough fur? 3/16 = 18.75%
Possible genotype(s)? bbRR bbRr

d. What is the probability of producing guinea pigs with white, smooth fur?
Possible genotype(s)? bbrr

1/16 = 6.25%

Name _____

GENETICS: X LINKED GENES

****In fruit flies, eye color is a sex linked trait. Red is dominant to white ****

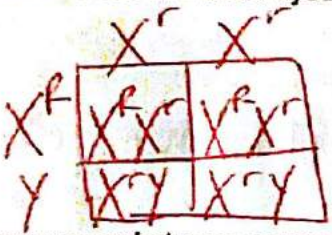
1. What are the sexes and eye colors of flies with the following genotypes:

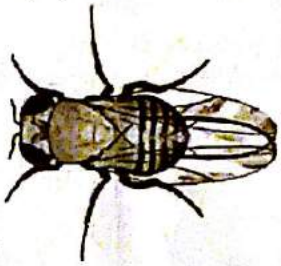
X^RX^r F, red X^RY M, red X^rX^r F, white
X^RX^R F, red X^rY M, White

2. What are the genotypes of these flies:

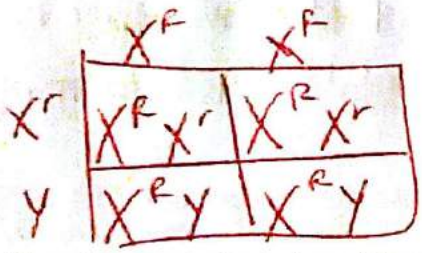
white eyed, male X^rY red eyed female (heterozygous) X^RX^r
white eyed, female X^rX^r red eyed, male X^RY

3. Show the cross of a white eyed female X^rX^r with a red-eyed male X^RY.



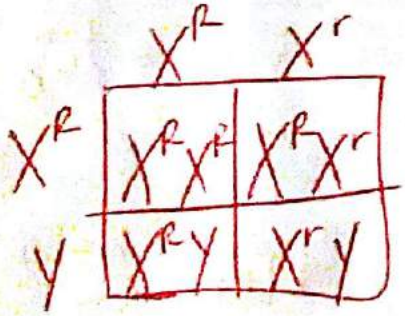


4. Show a cross between a pure red eyed female and a white eyed male.
What are the genotypes of the parents: X^RX^R & X^rY



How many are:
white eyed, male 0
white eyed, female 0
red eyed, male 2
red eyed, female 2

5. Show the cross of a red eyed female (heterozygous) and a red eyed male. What are the genotypes of the parents? X^RX^r & X^RY



How many are:
white eyed, male 1
white eyed, female 0
red eyed, male 1
red eyed, female 2

Math: What if in the above cross, 100 males were produced and 200 females. How many total red-eyed flies would there be? 250

6. In humans, hemophilia is a sex linked trait. Females c e.
Males will either have the disease or not (but they won't ever be carriers)

$X^H X^H$ = female, normal

$X^H X^h$ = female, carrier

$X^h X^h$ = female, hemophiliac

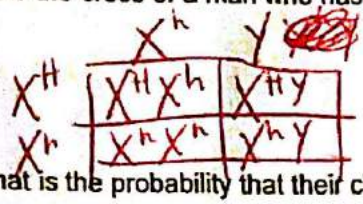
$X^H Y$ = male, normal

$X^h Y$ = male, hemophiliac

Show the cross of a man who has hemophilia with a woman who is a carrier.

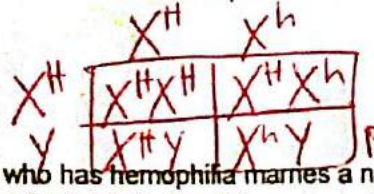
X^{hY}

$X^H X^h$



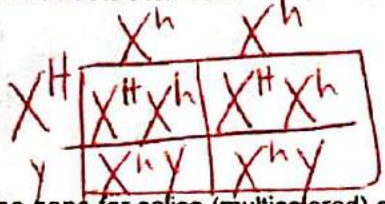
What is the probability that their children will have the disease? 50% of females, 50% of males

7. A woman who is a carrier marries a normal man. Show the cross. What is the probability that their children will have hemophilia? What sex will a child in the family with hemophilia be?



male child w/ hemophilia

8. A woman who has hemophilia marries a normal man. How many of their children will have hemophilia, and what is their sex?

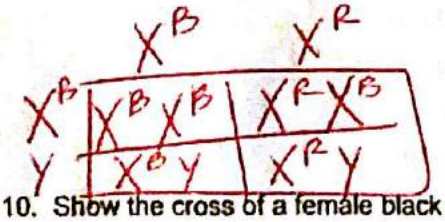


All male children will have hemophilia
All female children will be normal

9. In cats, the gene for calico (multicolored) cats is codominant. Females that receive a B and an R gene have black and oRange splotches on white coats. Males can only be black or orange, but never calico.

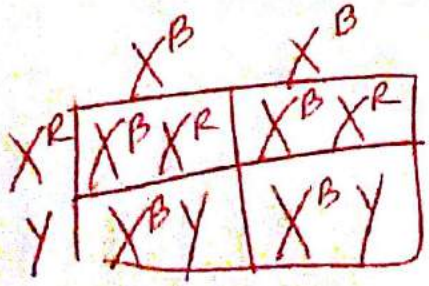
Here's what a calico female's genotype would look like. $X^B X^R$

Show the cross of a female calico cat with a black male?



What percentage of the kittens will be black and male? 25%
What percentage of the kittens will be calico and male? 0%
What percentage of the kittens will be calico and female? 25%

10. Show the cross of a female black cat, with a male orange cat.



What percentage of the kittens will be calico and female? 100%
What color will all the male cats be? black

Week 11 List of Prefixes, Suffixes and Roots

Suffix, Root, Prefix	Definition	Example
Agri-	Field, soil	Agriculture
-ary, -arium	Denotes a place for something	Aviary, aquarium
Aster-, astr-	Star	Astrology, astronomy
Audi-	Hear	Auditory nerve
Glut-	Buttock	Gluteus Maximus
Hapl-	Simple	haploid
Sangui-, sanguine-	Of or pertaining to blood	Sanguine
Sarco-	Muscular, fleshlike	Sarcoma, sarcoidosis
Scoli(o)-	Twisted	Scoliosis
-spadias	Slit, fissure	Hypospadias
-stasis	Stopping, standing	Cytostasis, homeostasis
Tetan-	Rigid, tense	Tetanus
Therm(o)-	Heat	Thermophile
Tympan(o)-	Eardrum	Tympanocentesis
Ungui-	Of or pertaining to the nail, a claw	Unguiform, ungula
Vagin-	Of or pertaining to the vagina	Vagina
Ventr(o)-	Of or pertaining to the belly, the stomach cavities	Ventrodorsal
-y	Condition or process of	Surgery
Zym(o)-	Fermentation	Enzyme, lysozyme