Unit 18 – Assignment 3 – P5

Worksheets:

Monohybrid Cross Worksheet

Part A: Vocabulary

Match the definitions on the left with the terms on the right.

D	1. genotypes made of the same alleles	A. alleles
A	2. different forms of genes for a single trait	B. dominant
B	3. gene that is always expressed	C. heterozygous
E	4. gene that is expressed only in the homozygous state	D. homozygous
C	5. genotypes made of two different alleles	E. recessive

Below each of the following words are choices. Circle the choices that are examples of each of those words.

6. Dominant allele

(D) e k (L) (N) n (R) (S)

7. Recessive allele

M (n) (d) F G (r) (k) P

8. Homozygous dominant

(AA) Gg (KK) mm uu Rr (TT)

9. Homozygous recessive

(ee) Ff HH Oo (qq) (LL) (ww)

10. Genotypes in which dominant gene must show

(AA) Dd (EE) Ff Jj (RR) (SS)

11. Genotypes in which recessive gene must show

(aa) Gg Ff KK (rr) Oo Tt

Part B: Punnett Squares

12. Examine the following Punnett squares and circle those that are correct.

	D	d
d	Dd	dd
d	Dd	dd

	D	D
d	Dd	DD
d	Dd	Dd

	A	a
A	AA	aa
a	Aa	Aa

	A	a
a	Aa	aa
a	Aa	aa

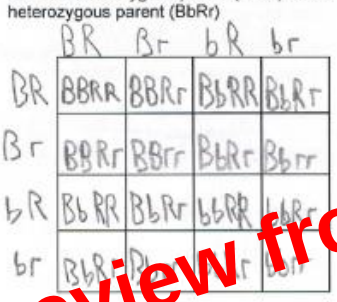
13. What do the letters on the outside of the Punnett square stand for? Genetic genotypes

Dihybrid Cross Worksheet

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)

2. Using the punnett square in question #1:
   a. What is the probability of producing tall plants with purple flowers? 16/16 = 100%
      Possible genotype(s)? DdWw
   b. What is the probability of producing dwarf plants with white flowers? 0/16 = 0%
      Possible genotype(s)? ddww
   c. What is the probability of producing tall plants with white flowers? 0/16 = 0%
      Possible genotype(s)? Ddww
   d. What is the probability of producing dwarf plants with purple flowers? 0/16 = 0%
      Possible genotype(s)? 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)



BBRR = 1 bbrr = 2
BbRR = 2 bbRR = 1
BbRr = 4 BBRr = 2
Bbrr = 2
BBrr = 1
bbrr = 1

4. Using the punnett square in question #3:
   a. What is the probability of producing guinea pigs with black, rough fur? 9/16 =
      Possible genotype(s)? BBRR BbRr BBRr BbRR
   b. What is the probability of producing guinea pigs with black, smooth fur? 3/16 =
      Possible genotype(s)? Bbrr BBrr
   c. What is the probability of producing guinea pigs with white, rough fur? 3/16 =
      Possible genotype(s)? bbRr
   d. What is the probability of producing guinea pigs with white, smooth fur? 1/16 =
      Possible genotype(s)? bbrr

4) Two Heterozygous Tall, Green pea plants are crossed.

TtGg x TtGg

	TG	Tg	tG	tg
TG	TTGG	TTGg	TtGG	TtGg
Tg	TTGg	TTgg	TtGg	Ttgg
tG	TtGG	TtGg	ttGG	ttGg
tg	TtGg	Ttgg	ttGg	ttgg

9/16 Tall/Green : 3/16 Tall/White : 3/16 Short/Green : 1/16 Short/ White

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 x ssWw

	SW	Sw	SW	Sw
sW	SsWW	SsWw	ssWW	ssWw
sw	SsWw	Ssww	ssWw	ssww
sW	SsWW	SsWw	ssWW	ssWw
sw	SsWw	Ssww	ssWw	ssww

Genotypes

Spotted wooly = 4/16
Spotted non-wooly = 4/16
Non-spotted wooly = 4/16
non-spotted non-wooly = 4/16

Phenotypes

Heterozygous spotted wooly = 4/16
Heterozygous spotted non-wooly = 4/16
Homozygous non-spotted wooly = 4/16
Homozygous non-spotted non-wooly = 1/16

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 x bbTT

	BT	BT	BT	BT
bt	BbTt	BbTt	BbTt	BbTt
bt	BbTt	BbTt	BbTt	BbTt
bt	BbTt	BbTt	BbTt	BbTt
bt	BbTt	BbTt	BbTt	BbTt

Short wings and grey body = (116/16) x 3 = 22

Short wings and black body = (116/16) x 1 = 7

	Observed	Expected	(O-E)	$(O-E)^2$	$(O-E)^2/E$
Long wings and grey body	64	65	-1	1	0.015
Long wings and black body	25	22	3	9	0.41
Short wings and grey body	22	22	0	0	0
Short wings and black body	5	7	-2	4	0.57
					Total = 0.995

P value = 0.995

Degrees of freedom = 4 - 1 = 3

CHI SQUARE TABLE

CHI-SQUARE DISTRIBUTION TABLE

Accept Null Hypothesis (chance ONLY)

Reject Null Hypothesis (NOT chance ONLY)

Probability (p)

Degrees of Freedom	0.95	0.90	0.80	0.70	0.50	0.30	0.20	0.10	**0.05**	0.01	0.001
1	0.004	0.02	0.06	0.15	0.46	1.07	1.64	2.71	**3.84**	6.64	10.83
2	0.10	0.21	0.45	0.71	1.39	2.41	3.22	4.60	**5.99**	9.21	13.82
3	0.35	0.58	1.01	1.42	2.37	3.66	4.64	6.25	**7.82**	11.34	16.27
4	0.71	1.06	1.65	2.20	3.36	4.88	5.99	7.78	**9.49**	13.38	18.47
5	1.14	1.61	2.34	3.00	4.35	6.06	7.29	9.24	**11.07**	15.09	20.52
6	1.63	2.20	3.07	3.83	5.35	7.23	8.56	10.64	**12.59**	16.81	22.46
7	2.17	2.83	3.82	4.67	6.35	8.38	9.80	12.02	**14.07**	18.48	24.32
8	2.73	3.49	4.59	5.53	7.34	9.52	11.03	13.36	**15.51**	20.09	26.12
9	3.32	4.17	5.38	6.39	8.34	10.66	12.24	14.68	**16.92**	21.67	27.88
10	3.94	4.86	6.18	7.27	9.34	11.78	13.44	15.99	**18.31**	23.21	29.59

http://slideplayer.com/slide/256718/

When I compare my p value to the table, I identified there to be 3 degrees of freedom. As the P value would need to be 7.82 or higher for the hypothesis to be rejected, and my P value was 0.995, I can therefore accept the hypothesis and reject the null hypothesis. The bigger the sample is, the more valid it would be.

By observing my results, I can say that my experiment may not have been 100% accurate, even though chi squared was accepted. This is due to many errors that could have occurred during the final observation of the fruit flies. One example of an error is, when counting the flies, it was hard to