Punnett Squares Answer Key

Directions: Work the following problems out in your notebook or on a separate piece of paper.

Monohybrid Crosses *(Monohybrid crosses look at one character such as hair color.)*

1. If striped squash (S) is dominant to spotted squash (s)

   a. Write the genotype for a homozygous dominant striped squash. **SS**

   b. Write the genotype of a homozygous spotted squash. **ss**

   c. Draw a Punnett square and cross the homozygous striped squash with the homozygous spotted squash.

	S	S
s	Ss	Ss
s	Ss	Ss

   d. What percentage of the offspring are striped? **100%** What percentage are spotted? **0%**

   e. Draw a Punnett square and *cross two offspring* from the problem above.

	S	S
s	Ss	Ss
s	Ss	Ss

   f. What percentage of this second generation appear striped squash? **75%** What percentage appear spotted? **25%**

2. In both male and female cattle, hornless or polled (H) is dominant to having horns (h). Perform the following crosses using Punnett squares and list the phenotype and genotype of each offspring.

   a. Heterozygous bull x cow with horns.

	H	h
h	Hh	hh
h	Hh	hh

   2 Hh = polled
   2 hh = horns

b. Homozygous polled bull x cow with horns.

	H	H
h	Hh	Hh
h	Hh	Hh

All offspring = Hh = polled

3. A calf is born with horns but neither one of its parents had horns. What are genotypes of this calf's parents? **Hh**

4. Incomplete dominance occurs when a hybrid cross of two true breeding parents does not resemble either one of the parents but instead resembles a blend of the two. For example, when a homozygous red Snapdragon is crossed with a homozygous white Snapdragon, all of the heterozygous offspring are pink.

    a. Show this cross in a Punnett square. Use AA for red and aa for white.

	A	A
a	Aa	Aa
a	Aa	Aa

Aa = pink

    b. Draw a Punnett square and cross two of the heterozygous offspring from the F1 generation. What percentage of the F2 generation are white? 25% What percentage are pink? 50% What percentage are red? 25%

	A	a
A	AA	Aa
a	Aa	aa

5. In the case of codominance, hybrids of two true breeding parents resemble both parents. For example a blue flower crossed with a yellow flower would produce an F1 generation that are all blue and yellow striped.

    a. Show the F1 generation using a Punnett square and BB for blue flowers and YY for yellow flowers.

	B	B
Y	BY	BY
Y	BY	BY

b. Now cross two from the F1 generation. Show the F2 generation with Punnett square.

	B	Y
B	BB	BY
Y	BY	YY

c. How many F2 generation flowers would be yellow? **1** How many would be striped? **2**
How many would be blue? **1**

Dihybrid Crosses *(Dihybrid crosses look at two characters such as hair color and tongue rolling.)*

1. In rocker guinea pigs, spiky hair (S) is dominant to flat hair (s) and black spotted tongues (B) are dominant to pink tongues (b).

   a. If you cross a homozygous dominant mother (SSBB) with a homozygous recessive father (ssbb), what will the genotype of the offspring be? **The genotype of all offspring will be SsBb**.

   b. What is the phenotype of the offspring? **Spikey hair and black spotted tongue**.

   c. If you have a parent who is SsBb, it could give SB, Sb, sB, and sb as gametes. Cross two parents who are heterozygous for both traits. Draw the Punnett Square.

	SB	Sb	sB	sb
SB	SSBB	SSBb	SsBB	SsBb
Sb	SSbB	SSbb	SsbB	Ssbb
sB	sSBB	sSBb	ssBB	ssBb
sb	sSbB	sSbb	ssbB	ssbb

   d. How many offspring will have flat hair and black spotted tongues? **3**
   How many will have flat hair and pink tongues? **1**