

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)

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

- All offspring will be heterozygous for both traits (DdWw) and their phenotype will be Tall and purple flowers.

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?

$$9/16 = 56\%$$

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 bbRr

d. What is the probability of producing guinea pigs with white, smooth fur?

1/16

Possible genotype(s)? bbrr

5. Set up a punnett square using the following information:

- Dominate allele for purple corn kernels = R
- Recessive allele for yellow corn kernels = r
- Dominate allele for starchy kernels = T
- Recessive allele for sweet kernels = t
- Cross a homozygous dominate parent with a homozygous recessive parent

RRTT x rrtt

	rt	rt	Rt	rt
RT	RrTt	RrTt	RrTt	RrTt
RT	RrTt	RrTt	RrTt	RrTt
RT	RrTt	RrTt	RrTt	RrTt
RT	RrTt	RrTt	RrTt	RrTt

6. Using the punnett square in question #5:

a. What is the probability of producing purple, starchy corn kernels?

16/16

Possible genotype(s)? RrTt

b. What is the probability of producing yellow, starchy corn kernels? 0

Possible genotype(s)?

c. What is the probability of producing purple, sweet corn kernels? 0

Possible genotype(s)?

d. What is the probability of producing yellow, sweet corn kernels? 0

Possible genotype(s)?

7. Set up a punnett square using the following information:

- Dominant allele for normal coat color in wolves = N
- Recessive allele for black coat color in wolves = n
- Dominant allele for brown eyes = B
- Recessive allele for blue eyes = b
- Cross a heterozygous parent with a heterozygous parent

NnBb x NnBn

	NB	Nb	nB	nb
NB	NNBB	NNBb	NnBB	NnBb
Nb	NNBb	NNbb	NnBb	Nnbb
nB	NnBB	NnBb	nnBB	nnBb
nb	NnBb	Nnbb	nnBb	nnbb

8. Using the punnett square in question #7:

a. What is the probability of producing a wolf with a normal coat color with brown eyes?

9/16

Possible genotype(s)? NNBB NNbB NnBB NnBb

b. What is the probability of producing a wolf with a normal coat color with blue eyes?

3/16

Possible genotype(s)? NNbb Nnbb

c. What is the probability of producing a wolf with a black coat with brown eyes?

3/16

10. Suppose a white, straight haired guinea pig mates with a brown, curly-haired animal. All five babies in their first litter have brown fur, but three are curly and two have straight hair. The second litter consists of six more brown offspring, where two are curly and four are straight haired.

a. Assuming curly is dominant to straight, what are the genotypes of the parents and the offspring?

* brown dominate to white (all babies brown)

Hair color brown dominate = B

Hair color white recessive = b

Curly = T

Straight = t

Parent Genotypes: white straight haired = bbtt

Brown curly haired = BBTt (we know this because no white guinea pigs were produced)

	BT	Bt	BT	Bt
bt	BbTt	Bbtt	BbTt	Bbtt
bt	BbTt	Bbtt	BbTt	Bbtt
bt	BbTt	Bbtt	BbTt	Bbtt
bt	BbTt	Bbtt	BbTt	Bbtt

b. What is the probability of getting two female guinea pigs with straight hair in a row?

.50 x .50 = .25..... 25% chance of getting two female guinea pigs with straight hair in a row.

11. About 70% of Americans get a bitter taste from the substance called phenylthiocarbamide (PTC). It is tasteless to the rest. The "taster" allele is dominant to non-taster. Also, normal skin pigmentation is dominant to albino. A normally pigmented woman who is taste-blind for PTC has an albino-taster father. She marries an albino man who is a taster, though the man's mother is a non-taster. Show the expected offspring of this couple.

Taster : T normal pigment: P

Non taster: t albino: p

Cross: normal pigmented women non taster (Pp^{tt}) x albino taster (ppTt)

	Pt	pt	Pt	pt
pT	PpTt	ppTt	PpTt	ppTt
pt	Pp ^{tt}	pp ^{tt}	Pp ^{tt}	pp ^{tt}
pT	PpTt	ppTt	PpTt	ppTt
pt	Pp ^{tt}	pp ^{tt}	Pp ^{tt}	pp ^{tt}

12. In pigeons the checkered pattern is caused by a dominant allele. A plain (non-checkered) pattern is recessive. Red color is also caused by a dominant allele and brown color by a recessive allele.

a. Show the expected offspring of a cross between a homozygous checkered red bird and a plain brown one. Carry out this cross through the F2 generation.

Checkered – C

Plain – c

Red – R

Brown - r

Genotypes: CCRR x ccr

Gametes: CR cr

F1

	cr	cr	cr	cr
CR	CcRr	CcRr	CcRr	CcRr
CR	CcRr	CcRr	CcRr	CcRr
CR	CcRr	CcRr	CcRr	CcRr

CR	CcRr	CcRr	CcRr	CcRr
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F2: Genotypes CcRr x CcRr

	CR	Cr	cR	cr
CR	CCRR	CCRr	CcRR	CcRr
Cr	CCRr	CCrr	CcRr	Ccrr
cR	CcRR	CcRr	ccRR	ccRr
cr	CcRr	Ccrr	ccRr	ccrr

b. Carry out to the F2 generation a cross between a homozygous plain red bird and its homozygous checkered brown mate.

F1: ccRR x CCrr

	Cr	Cr	Cr	Cr
cR	CcRr	CcRr	CcRr	CcRr
cR	CcRr	CcRr	CcRr	CcRr
cR	CcRr	CcRr	CcRr	CcRr
cR	CcRr	CcRr	CcRr	CcRr

F2: CcRr x CcRr

	CR	Cr	cR	cr
CR	CCRR	CCRr	CcRR	CcRr
Cr	CCRr	CCrr	CcRr	Ccrr
cR	CcRR	CcRr	ccRR	ccRr
cr	CcRr	Ccrr	ccRr	ccrr

c. A plain brown female pigeon laid five eggs. The young turned out to be: 2 plain red, 2 checkered red, and 1 checkered brown. Describe the father pigeon. Give the genotypes of all birds in this cross. Could any other types of offspring have been produced by this pair?

Mother: ccrr

Children: plain red – ccRr or ccRR

Checkered red – CCRR or CcRr or CCRr or CcRR

Checkered brown – CCrr or CcRR

Father must be CcRr because the recessive traits are visible in his offspring.

Yes, plain brown