SB

Scholars Biology/ Biology Dihybrid Cross Worksheet

1. In summer squash, white fruit color (W) is dominant over yellow fruit color (w) and disk-shaped fruit (D) is dominant over oval shaped fruit (d).. If a squash plant true-breeding for white, disk-shaped fruit is crossed with a plant true-breeding for yellow, oval shaped fruit, what will the phenotypic ratios be for:
   a. the F_1 generation?
   b. the F_2 generation?

2. In mice, black (B) is dominant over tan (b), and short tails (S) are dominant over long (s). Determine the phenotype ratio for a cross between two heterozygous black, short-tailed mice.

3. In certain bacteria, an oval shape is dominant over round and thick cell walls are dominant over thin. Cross a heterozygous oval, thick cell walled bacteria with a round, thin cell walled bacteria. Describe the phenotype of the offspring.

4. In guinea pigs, black coat color is dominant over white, short hair is dominant over long. In a cross between a homozygous black, short-haired, guinea pig and a homozygous white, long-haired, guinea pig, what is the expected phenotype ratio of the offspring?

5. In rabbits, the coat color black dominant (B) over brown (b). Short hair is dominant (S) over long (s). In a cross between a homozygous black short-haired male and a brown homozygous long-haired female, what would be the ratios for phenotype of the F1 generation?

6. In horses, the coat color black is dominant (B) over chestnut (b). The trotting gait is dominant (T) over the pacing gait (t). If a homozygous black pacer is mated to a homozygous chestnut, heterozygous trotter, what will be the ratios for phenotype of the F1 generation

SB 3A **Scholars Biology/ Biology Dihybrid Cross Worksheet**

1. In summer squash, white fruit color (W) is dominant over yellow fruit color (w) and disk-shaped fruit (D) is dominant over oval shaped fruit (d).. If a squash plant true-breeding for white, disk-shaped fruit is crossed with a plant true-breeding for yellow, oval shaped fruit, what will the phenotypic ratios be for:
   a. the F_1 generation?
   b. the F_2 generation?

W white
ww yellow
D disc
d oval

WWDD x wwdd

WW x ww
W W
ww | Ww | Ww
ww | Ww | Ww

DD x dd
D D
d | Dd | Dd
d | Dd | Dd

(a) F1 100% WwDd

WwDd x WwDd

W w
W | WW | Ww
w | Ww | ww

D d
D | DD | Dd
d | Dd | dd

F2

(b) 9 : 3 : 3 : 1
wh wh yel ye
disc oval disc ov

2. In mice, black (B) is dominant over tan (b), and short tails (S) are dominant over long (s). Determine the phenotype ratio for a cross between two heterozygous black, short-tailed mice.

B - black
b - tan
S - short
s - long

BbSs x BbSs

Bb x Bb
B | b
B | BB | Bb
b | Bb | bb

Ss x Ss
S | s
S | SS | Ss
s | Ss | ss

black short
3/4 x 3/4 = 9/16

black long
3/4 x 1/4 = 3/16

tan short
1/4 x 3/4 = 3/16

9 : 3 : 3 : 1 → tan long
1/4 x 1/4 = 1/16

3. In certain bacteria, an oval shape is dominant over round and thick cell walls are dominant over thin. Cross a heterozygous oval, thick cell walled bacteria with a round, thin cell walled bacteria. Describe the phenotype of the offspring.

O - oval
o - round
T - thick
t - thin

OoTt x oott

Oo x oo
O | o
o | Oo | oo
o | Oo | oo

Tt x tt
T | t
t | Tt | tt
t | Tt | tt

4 : 4 : 4 : 4
1 : 1 : 1 : 1

oval thick
2/4 x 2/4 = 4/16

oval thin
2/4 x 2/4 = 4/16

round thick
2/4 x 2/4 = 4/16

Round thin
2/4 x 2/4 = 4/16

4. In guinea pigs, black coat color is dominant over white, short hair is dominant over long. In a cross between a homozygous black, short-haired, guinea pig and a homozygous white, long-haired, guinea pig, what is the expected phenotype ratio of the offspring?

B - black
b - white
S - short
s - long

BBSS x bbss

BB x bb
B B
b Bb | Bb
b Bb | Bb

SS x ss
S S
s Ss | Ss
s Ss | Ss

1 = 100% ← 16 : 0 : 0 : 0

black short
4/4 x 4/4 = 16/16 =

black long
4/4 x 0/4 = 0/16

white short
0/4 x 4/4 = 0/16

white long
0/4 x 0/4 = 0/16

5. In rabbits, the coat color black dominant (B) over brown (b). Short hair is dominant (S) over long (s). In a cross between a homozygous black short-haired male and a ~~brown homozygous long~~ black heterozygous short haired female, what would be the ratios for phenotype of the F1 generation?

B - black
b - brown
S - short
s - long

BBSS x BbSs

BB x Bb
B B
B BB | BB
b Bb | Bb

SS x Ss
S S
S SS | SS
s Ss | Ss

0 : 16 : 0 : 0
bl bl bR bR
sh long sh long

black short
4/4 x 0/4 = 0/16

black long
4/4 x 4/16 = 16/16

brown short
0/4 x 4/4 = 0/16

brown long
0/4 x 4/4 = 0/16

6. In horses, the coat color black is dominant (B) over chestnut (b). The trotting gait is dominant (T) over the pacing gait (t). If a homozygous black pacer is mated to a homozygous chestnut, heterozygous trotter, what will be the ratios for phenotype of the F1 generation

B - black
b - chestnut
T - trotting
t - pacing

BBtt x bbTt

BB x bb
B B
b Bb | Bb
b Bb | Bb

Tt x tt
T t
t Tt | tt
t Tt | tt

8 : 8 : 0 : 0
bl bl ch ch
tr. pace tr pace

black trot
4/4 x 2/4 = 8/16 =

black pace
4/4 x 2/4 = 8/16 =

chestnut trot
0/4 x 2/4 = 0/16

chestnut pace
0/4 x 2/4 = 0/