

Name \_\_\_\_\_

Biology: Test Cross Practice Problems

1. In African-violet plants, purple flowers are dominant to white flowers. You purchase an African-violet plant with white flowers. Its genotype could be represented as:

- A. PP
- B. Pp
- C. pP
- D. pp

2. To discover whether an animal showing the dominant trait is homozygous or heterozygous, it must be crossed with an animal that is:

- A. homozygous dominant
- B. homozygous recessive
- C. heterozygous
- D. choices B & C

3. Two tall pea plants are crossed, producing 105 tall plants & 32 short plants. The genotypes of the tall parent plants are:

- A. Tt & Tt
- B. TT & Tt
- C. Tt & tt
- D. tt & tt

4. A spotted dalmation is mated with a pure-white dalmation (ss) to determine whether its genotype is SS or Ss for spots. Three puppies are born, all with spots. We can conclude that the spotted dalmation is SS.

- A. true
- B. false

5. In mice brown (B) is dominant to white (b). A brown mouse is mated with a white mouse. Twelve brown mice are produced. The brown mouse's genotype is:

- A. BB
- B. Bb
- C. bb
- D. a reliable conclusion can't be reached

6. Two brown-eyed parents have a child with blue eyes. The best explanation is:

- A. a mutation occurred before the child was born
- B. both parents carry the allele for blue eyes
- C. both parents are pure for brown eyes
- D. they were blue contacts during sexual intercourse

7. Which scenario best supports the conclusion that a black guinea pig's genotype is homozygous dominant?

- A. after mating with a white guinea pig, 2 black & 2 white guinea pigs were produced
- B. after mating with a white guinea pig, 10 black & 8 white guinea pigs were produced
- C. after mating with a white guinea pig, 12 black guinea pigs were produced
- D. after mating with a black guinea pig, 4 black guinea pigs were produced

8. Individuals with the same phenotype have the same genotype.

- A. true
- B. false

9. In a test cross to determine whether a fruit fly is homozygous (WW) or heterozygous (Ww) for long wings, 7 long-winged flies & 1 short winged-fly are produced. Which is a valid conclusion?

- A. the unknown fruit fly is WW
- B. the unknown fruit fly is Ww
- C. the unknown fruit fly is ww
- D. more offspring are needed

10. In hamsters, long tails (L) are dominant to short tails (l). A student wishes to perform a test cross to determine whether a female long-tailed hamster is homozygous or heterozygous for long tail length. She mates the hamster with a male long-tailed hamster & studies the offspring, which are 100% long-tailed. She concludes that the female hamster's genotype is "LL". What mistake(s) did the student make?

- A. she should have mated the female hamster with a male that was known to be hybrid
- B. she should have mated the female hamster with a short-tailed male hamster
- C. she should have mated the female hamster with another long-tailed female
- D. she has to mate members of the litter before she can make a conclusion

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1. In African-violet plants, purple flowers are dominant to white flowers. You purchase an African-violet plant with white flowers. Its genotype could be represented as:

PP purple  
Pp purple  
pp white  
pp white

- A. PP
- B. Pp
- C. pp
- D. PP

2. To discover whether an animal showing the dominant trait is homozygous or heterozygous, it must be crossed with an animal that is:

- A. homozygous dominant
- B. homozygous recessive
- C. heterozygous
- D. choices B & C

DD or Dd ?

DD x dd    Dd x dd

test cross

3. Two tall pea plants are crossed, producing 105 tall plants & 32 short plants. The genotypes of the tall parent plants are:

- A. Tt & Tt
- B. TT & Tt
- C. Tt & tt
- D. tt & tt

105 : 32 → 3 : 1 ratio

\* Rule of thumb

Tt x Tt → 3 : 1 tall : short

4. A spotted dalmation is mated with a pure-white dalmation (ss) to determine whether its genotype is SS or Ss for spots. These puppies are born all with spots. We can conclude that the spotted dalmation is SS.

SS x ss

S-spotted  
A-white

SA x SA  
SA SA  
SA SA  
SA SA

5. In mice brown (B) is dominant to white (b). A brown mouse is mated with a white mouse. Twelve brown mice are produced. The brown mouse's genotype is:

- A. BB
- B. Bb
- C. bb
- D. a reliable conclusion can't be reached

Brown x white

BB x bb

B - brown

b - white

12 brown born

B B

b Bb / Bb

b Bb / Bb

Brown x Brown

6. Two brown-eyed parents have a child with blue eyes. The best explanation is:  
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D. after mating with a black guinea pig, 4 black guinea pigs were produced

B - black  
b - white

BB x bb  
B B

b Bb / Bb

b Bb / Bb

Bb x Bb

B B

B BB / Bb

b Bb / bb

8. Individuals with the same phenotype have the same genotype.

- A. true
- B. false

DD - dominant phenotype

Dd - dominant phenotype

dd - recessive phenotype

dd - Recessive phenotype

Ww or ww heterozygous (Ww) for long wings, 7 long-winged flies & 1 short-winged-fly are produced. Which is a valid conclusion?

A. the unknown fruit fly is WW

B. the unknown fruit fly is Ww

C. the unknown fruit fly is ww

D. more offspring are needed

WW x ww

W W

w Ww / ww

w Ww / ww

Ww x ww

W w

w Ww / ww

w Ww / ww

10. In hamsters, long tails (L) are dominant to short tails (l). A student wishes to perform a test cross to determine whether a female long-tailed hamster is homozygous or heterozygous for long tail length. She mates the hamster with a male long-tailed hamster & studies the offspring, which are 100% long-tailed. She concludes that the female hamster's genotype is LL. What mistake(s) did the student make?  
A. she should have mated the female hamster with a male that was known to be hybrid  
B. she should have mated the female hamster with a short-tailed male hamster  
C. she should have mated the female hamster with another long-tailed female  
D. she has to mate members of the litter before she can make a conclusion

L - long  
l - short

L - long ♀ x O → offspring 100% long

l - short ♀ x O → offspring 100% long

What is the rule for doing a test cross?

\* Always mate each dominant genotype x recessive genotype

LL x ll OR Ll x ll