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| Name:  | Date:  |

Graded Assignment

Lab Report

The Lab Report contains special characters that may be difficult to enter into the online document. You may complete the Lab Report by printing it and writing directly on it, or you may type the information into the document. You may wish to construct the Punnett squares on your Student Guide before you fill in the Punnett squares on the Lab Report. When you are finished, submit this assignment to your teacher by the due date for full credit.

**Part 1: Incomplete Dominance—Predicting Flower Color in Snapdragons**

Snapdragons are popular garden plants that produce brightly colored flowers. When a plant that is homozygous for white flowers is crossed with a plant that is homozygous for red flowers, all offspring are pink. Snapdragons are an example of a plant that exhibits an inheritance pattern called *incomplete dominance.*

(2 points)

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1. Determine the genotype of each parent plant and write them below. Use *W* to indicate the allele for white flowers and *R* to indicate the allele for red flowers.

Answer:

Genotype of homozygous parent plant with white flowers:

Genotype of homozygous parent plant with red flowers:

(4 points)

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1. Next, think about the gametes each parent plant will produce. List the alleles in each gamete.

Answer:

Parent plant with white flowers:

Gamete 1:

Gamete 2:

Gamete 3:

Gamete 4:

Parent plant with red flowers:

Gamete 1:

Gamete 2:

Gamete 3:

Gamete 4:

(2 points)

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1. The two parent plants are the P generation, or parent generation. Create a Punnett square to show their offspring, the F1 generation.

Answer:

**Part 1 Punnett Square**

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1. What pattern do you notice in the genotypes of the F1 generation snapdragons?

Answer:

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1. What are the phenotypes of the F1 generation snapdragons?

Answer:

**Part 2: Incomplete Dominance—Predicting Flower Color in F2 Generation Snapdragons**

Now, set up a cross of the offspring of the F1 generation and predict the traits of the F2 generation.

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1. What are the genotypes of the F1 parent plants?

Answer:

Genotype of F1 parent plant 1:

Genotype of F1 parent plant 2:

(4 points)

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1. Next, think about the gametes each parent plant will produce. List the alleles in each gamete.

Answer:

F1 parent plant 1:

Gamete 1:

Gamete 2:

Gamete 3:

Gamete 4:

F1 parent plant 2:

Gamete 1:

Gamete 2:

Gamete 3:

Gamete 4:

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1. Create a Punnett square showing a cross between the two F1 parent plants. Their offspring are the F2 generation.

Answer:

**Part 2 Punnett Square**

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1. What are the genotypes of the F2 generation?

Answer:

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1. What are the phenotypes of the offspring from this cross?

Answer:

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1. Calculate the percentages of the phenotypes of the F2 generation.

Answer:

**Part 3: Multiple Alleles—Predicting Blood Types of Offspring**

As you read in the online lab, human blood type is determined by multiple alleles that show a type of inheritance called *codominance.* Recall that the alleles that determine blood type are *IA*, *IB*, and *i.* *IA* and *IB*are both dominant over *i,* while neither *IA* nor *IB*is dominant when they combine. Use this table to help you determine the genotypes associated with each blood type.

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| --- | --- | --- | --- |
| **Blood Type** | **Allele** | **Possible Genotype(s)** | **Possible Allele(s)** |
| A | *IA* | AA or AO | *IAIA or IAi* |
| B | *IB* | BB or BO | *IBIB or IBi* |
| AB | *IAIB* | AB | *IAIB* |
| O | *i* | OO | *ii* |

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1. Imagine that you are studying two parents who are considering having children. One parent is has the genotype *IAi* and the other has the genotype *IBi*. Create a Punnett square to calculate the possible genotypes of their children.

Answer:

**Part 3 Punnett Square**

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1. Look at the table at the beginning of Part 3. What are the possible phenotypes (blood types) of the children?

Answer:

**Part 4: Sex-Linked Inheritance—Predicting Color Blindness in Offspring**

Recall that females have two X chromosomes: one from the mother and one from the father. Males have one X chromosome and one Y chromosome; the X chromosome comes from the mother, and the Y chromosome comes from the father. Traits associated with genes located on the sex chromosomes are called *sex-linked traits*.

The dominant allele for normal color vision is *N*. Individuals with the sex-linked condition called *red-green color blindness* do not perceive the colors red and green. Red-green color blindness is caused by the **recessive** allele *n* and is carried on the X chromosome*.* When an X chromosome contains the **dominant** allele, the allele is written as *XN.* When an X chromosome contains the **recessive** allele, the allele is written as *Xn.*

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1. What is the genotype of a male with red-green color blindness?

Answer:

(1 point)

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1. What is the genotype of a female who is not color-blind but is a **carrier** of red-green color blindness?

Answer:

(2 points)

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1. Even though red-green color blindness is a recessive trait, can a female have red-green color blindness? Explain.

Answer:

(2 points)

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1. A man who is color-blind marries a woman who is not color-blind and is not a carrier of the allele for color blindness. Create a Punnett square to predict the possible genotypes of their children.

Answer:

**Part 4 Punnett Square**

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1. Will all of the female children be carriers of the color-blind allele, or will none be carriers? Explain.

Answer:

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1. Will all of the male children be color-blind, or will none be color-blind? Explain.

Answer:

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| Your Score | \_\_\_ of 32 |