# **Apple Genetics**

Name			

## Part 1: Comparing Royal Gala and Braeburn Apples

Look  Explain what you observe on the outside and inside of this particular app Write down what you notice, stem structure, seed layout, and coloring  Outside of Apple  Inside of Apple  Smell  Explain what you observe using your sense of smell.	
Outside of Apple  Inside of Apple	
Inside of Apple	
Inside of Apple	
Smell Explain what you observe using your sense of smell.	
Outside of Apple	
Inside of Apple	
	•
Touch Explain what you observe about the texture of the apple. i.e. skin, meat, so	eed,
Outside of Apple	
(Texture)	
(Texture)	
Inside of Apple	
(Number of seeds	
and seed shape)	
Taste Explain what you observe when you taste your apple.	
Tartness	
Sweetness	
Sweetness	
Juiciness	
Crunchiness	

#### Part 2: Analyzing the Data:

1. Explain what similarities you found in the Royal Gala and Braeburn appl	1.	Explain what similarities	you found in the Ro	oyal Gala and Braeburn	apples?
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2. Explain what differences you found in Royal Gala and Braeburn apples?

#### **Part 3: Completing Punnett Squares**

When making observations in Part 1, you described traits for each apple such as color, juiciness, or sweetness. These traits are determined by the genes in the apple. If we were to crossbreed blossoms on a Royal Gala apple tree with pollen from a Braeburn apple tree, the resulting fruit would look, smell, taste, and feel like a Royal Gala apple, but the seeds inside would possess genes from both of these parents. The seeds could be planted and grown into a new hybrid with fruit that has traits of both the Royal Gala and Braeburn apple.

In this activity, we will imagine that the traits you observed are determined by Mendelian inheritance in which a single gene determines a trait. Each trait is dominant or recessive and the alleles passed down from the parents determine whether the trait will be observed in the offspring. Below are examples of genotypes that the Gala and Braeburn apples may possess. **NOTE: These genotypes are to be used as examples only and do not represent accurate genotypes.** You will use this information to complete Punnett Squares on the following page and calculate probabilities for each genotype.

- a. Tartness is recessive (Gala's genotype is TT, Braeburn's genotype is tt)
- b. Sweetness is recessive (Gala's genotype is ss, Braeburn's genotype is SS)
- c. Juiciness is dominant (Gala's genotype is JJ, Braeburn's genotype is JJ)
- d. Crunchiness is dominant (Gala's genotype is Cc, Braeburn's genotype is CC)
- e. Red skin coloring is dominant (Gala's genotype is RR, Braeburn's genotype is Rr)
- f. Smooth skin texture is dominant (Gala's genotype is Bb, Braeburn's genotype is Bb)

Complete the Punnett Squares and calculate the probability of each genotype for all traits.

Tartness: (Example) **Sweetness** Т S t Tt Tt Τt Tt S t Probability of offspring genotypes: Probability of offspring genotypes: TT=\_\_\_\_0%\_\_ SS= \_\_\_\_\_ Tt= \_\_\_\_100%\_ Ss= \_\_\_\_\_ tt=\_\_\_\_0%\_\_ ss= \_\_\_\_\_ Juiciness Crunchiness  $\mathsf{C}$ С J  $\mathsf{C}$ J  $\mathsf{C}$ J Probability of offspring genotypes: Probability of offspring genotypes: JJ= \_\_\_\_\_ CC= \_\_\_\_\_ Jj= \_\_\_\_\_ Cc= \_\_\_\_\_ **Red Skin Coloring Smooth Skin Texture** R R В b R В Probability of offspring genotypes: Probability of offspring genotypes: BB= \_\_\_\_\_ RR= \_\_\_\_\_ Rr= \_\_\_\_\_ Bb= \_\_\_\_ bb= \_\_\_\_

## Part 4: Jazz Apple Observation: Observe and record the traits of the Jazz apple.

	Jazz Apple Observations
Look	Explain what you observe on the outside and inside of this particular apple.
LOOK	Write down everything you notice, stem structure, seed layout, and coloring.
Outside of Apple	
Inside of Apple	
Smell	Explain what you observe using your sense of smell.
Outside of Apple	
Inside of Apple	
Touch	Explain what you observe about the texture of the apple. i.e. skin, meat, seed, stem
Outside of Apple	
Inside of Apple	
Taste	Explain what you observe when you taste your apple.
Tartness	
Sweetness	
Juiciness	
Crunchiness	

## Part 5: Comparing Royal Gala, Braeburn, and Jazz Apples

Sin	nilarities and differences found:
1.	Describe similarities you found among all 3 apple varieties.
2.	Describe differences you found among all 3 apple varieties.
	ossbreeding apples  Which of the three apples was your favorite? Why?

2. Why do apple breeders crossbreed apple varieties?