

Name _____

Per. ____

Who Gets the Money?

Purpose: To solve a mystery involving genetics.

Concepts involved:

- Punnett squares
- Incomplete dominance
- Sex-linked characteristics
- Monohybrid cross
- Co-dominance

Background

This story recently appeared in the local newspaper:

Mr. and Mrs. Jones died in a tragic farm accident when the tractor they were riding on overturned in a ditch. Authorities found one million dollars hidden in a feed bin in the chicken coop. The couple is known to have a son, from whom they are estranged. This man is the sole heir to the Jones fortune.

Five men show up, each claiming to be the Jones's long lost son who had run away to become a circus clown. You are called in as a genetics expert to decide who the rightful heir is. This mystery will be solved in three parts.

Procedure: Complete parts one two and three of Who Gets the Money? Worksheets as directed.

Definitions:

1. Monohybrid cross – A cross between parents heterozygous for a single characteristic
2. Co-dominance – Both alleles of a trait are expressed. Ex. AA X BB = AB Blood
3. Sex-linked Characteristics – Alleles controlling the expression of certain genotypes are located on sex chromosomes (XX or XY). This location is referred to as sex-chromosome linkage or sex-linkage.
4. Incomplete dominance – Neither allele is dominant over the other. The characteristics expressed by the heterozygous offspring is different form, or intermediate to either homozygous parent. Ex. Strait hair X Curly hair = wavy hair.

Who Gets the Money? Worksheet 1

Part One: Monohybrid Cross

Brown eyes are dominant over blue eyes, free earlobes are dominant over attached earlobes.

Mr. Jones	Heterozygous free earlobes, and homozygous brown eyes
Mrs. Jones	Heterozygous free earlobes and heterozygous brown eyes
Carl	Homozygous brown eyes and homozygous attached earlobes
Ray	Homozygous free earlobes and homozygous blue eyes
Dale	Heterozygous free earlobes and homozygous brown eyes
Earl	Heterozygous free earlobes and heterozygous brown eyes
Robert	Homozygous free earlobes, homozygous blue eyes

In the space below, draw two Punnett squares showing the possible offspring of Mr. and Mrs. Jones: one for eye color and one for earlobes.

Write each person's genotypes in the chart below.

Person	Eye Color	Earlobes	Can be eliminated? Yes/No
Mr. Jones			
Mrs. Jones			
Carl			
Ray			
Dale			
Earl			
Robert			

Explain your reasoning for each man who can be eliminated.

Who Gets the Money? Worksheet 2

Part Two: Co-dominance and Incomplete dominance

Now that _____ have been eliminated, lawyers order blood tests to try to prove their claims. The lawyers have also done some research and read that hair texture is inherited.

Type "A" and type "B" are co-dominant over type "O"

Rh+ blood is dominant over Rh- blood

Hair texture exhibits incomplete dominance. Homozygous dominants (HH) have curly hair, homozygous recessives (hh) have straight hair, & heterozygotes (Hh) have wavy hair.

Mr. Jones	Homozygous type A blood, heterozygous Rh+, straight hair
Mrs. Jones	Heterozygous type B blood, homozygous Rh+, wavy hair
Carl	Heterozygous type A blood, heterozygous Rh+, wavy hair
Dale	Heterozygous type A blood, homozygous Rh+, wavy hair
Earl	Type O blood, Rh-, straight hair

In the space below, draw three Punnett Squares showing the possible offspring of Mr. and Mrs. Jones: for blood type, Rh type, and hair texture.

Write each person's genotype in the space below.

Person	Blood Type	Rh Factor	Hair Texture
Mr. Jones			
Mrs. Jones			
Carl			
Dale			
Earl			

Which men can be eliminated now? Justify your answers for each man.

Who Gets the Money? Worksheet 3

Part Three: Sex-linked Inheritance

We're down to just _____. The lawyer now orders that a vision test be performed to test for red-green color blindness.

Mr. Jones	Color blind
Mrs. Jones	Homozygous for normal vision
Carl	Color blind
Dale	Normal vision

In the space below, draw a Punnett Square to show the possible offspring of Mr. and Mrs. Jones for color blindness.

Write the genotypes of the persons in the table below:

Person	Vision
Mr. Jones	
Mrs. Jones	
Carl	
Dale	

SO: WHO GETS THE MONEY? (Don't forget to justify your answer!)