

# Wilbur's and Wilma's Family, Part I

## Overview

Students will look at a second generation alien, Wilbur, and his stowaway girlfriend, Wilma, and speculate on what their offspring might be like if they were to get married and have children. To do this, students will work with Punnett squares to look at the various combinations of alleles and how they would appear in the phenotypes of the next generation.

## Textbook References

### McDougal Littell

Unit C Chapter 4, pp. 101-107, Living Things Inherit Traits in Patterns

### Prentice Hall

Chapter 14, Section 3 pp. 530-535, Mendel's Work

Chapter 14, Section 4 pp. 538-545, Probability and Heredity

## Materials

\*Materials to be supplied by the teacher or the students are marked with an asterisk.

### Materials for the whole class

- 1 transparency of *Wilbur and Wilma—Possible Offspring Traits I*
- 1 transparency of *Wilbur and Wilma—Possible Offspring Traits II*
- 1 transparency of *Wilbur and Wilma Genetic Test Results*

### Materials for small groups

- 1 Wilbur alien card (from aliens card set)
- 1 Wilma alien card (yellow card)

### Materials for individual students

- 1 *Wilbur and Wilma Genetic Test Results*
- 1 *Wilbur and Wilma—Possible Offspring Traits I*
- 1 *Wilbur and Wilma—Possible Offspring Traits II*

## Procedure

1. “We have just learned that Wilbur snuck his girlfriend, Wilma, on board the space ship. They are interested in getting married and having a family. However, Wilma is concerned about what her children might look like after seeing Wilbur's family. She and Wilbur need your help in letting them know what they might expect their children to look like.”
2. Have each pair of students retrieve the Wilbur card from the alien card set used in the **Aliens Have Landed** exercise. Hand out Wilma's alien card (yellow). Ask the students to look them over and predict in their notebooks what features they would expect their children to have. Share the results.

3. *“In order to help Wilbur and Wilma determine what their children might look like, genetic testing was done and here are the results.”* Hand out the *Wilbur and Wilma Genetic Test Results* sheet.
4. *“Using these genetic test results and a new tool called a Punnett square, we can predict which characteristics their children could have. We can also predict the likelihood that a particular characteristic might show up.”*

*“The Punnett square is a diagram used by biologists to determine the probability of an offspring having a particular genotype.”*

5. Hand out *Wilbur and Wilma—Possible Offspring Traits I and II* worksheets.
6. Start with the Antlers trait. Have the students fill in the worksheet first and then fill in the transparency for everyone to see.
  - a. Fill in the genotypes for Wilbur and Wilma first (from the genetics test results).
  - b. From this information fill in the possible sex cells that each can create. (Remind students about meiosis from the previous exercise.)
  - c. Show the class how to complete the Punnett square. Explain that each box in the square is one possible outcome that can be created from the two parents.
  - d. Analyze the cross and complete the percentages in the spaces provided. Students may need to be reminded how to calculate the percentages.
7. Do this same procedure for each of the traits.
8. Before you begin the eyebrows trait. Explain that while conducting the genetic testing, it was determined that the eyebrows are a way to determine the sex of an alien. Aliens with large eyebrows are always girls, while boys always have small eyebrows. The genotypes work the same as they do in humans. Males are XY and females are XX.
9. Ask the students to use the information in the Punnett squares to write a short paragraph explaining to Wilbur and Wilma what they might expect their children to look like.

# Wilbur's and Wilma's Genetic Test Results

Wilbur  
224 Earth-years old

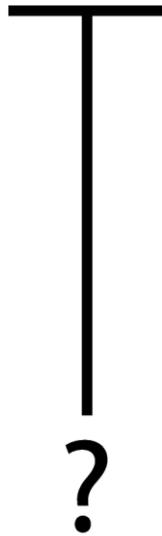


Trait	Genotype
A = Antlers	$A^B A^S$
M = Mouth	Mm
P = Ears	Pp
H = Head	$H^N H^W$
N = Nose	NN
E = Eyes	Ee
Eyebrows (X,Y)	XY

Wilma  
221 Earth-years old



Trait	Genotype
A = Antlers	$A^B A^S$
M = Mouth	MM
P = Ears	pp
H = Head	$H^N H^W$
N = Nose	nn
E = Eyes	Ee
Eyebrows (X,Y)	XX



## Alien Traits -- Dominant/Recessive

Trait	Symbols	Dominant Phenotype	Recessive Phenotype
Mouth	M, m	large	small
Ears	P, p	pointed	rounded
Nose	N, n	small	large
Eyes	E, e	large	small

## Alien Traits -- Incomplete Dominance/Other

Antlers	$A^B A^B$ = large, branched	$A^S A^S$ = short, not branched	$A^B A^S$ = medium, not branched
Head	$H^N H^N$ = narrow	$H^W H^W$ = wide	$H^N H^W$ = round
Eyebrows	XX = large eyebrows, female	XY = small eyebrows, male	



# Wilbur and Wilma -- Possible Offspring Traits I

Name \_\_\_\_\_  
Date \_\_\_\_\_

## Trait: Antlers

Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% large, branched \_\_\_\_\_  
% medium, not branched \_\_\_\_\_  
% small \_\_\_\_\_

## Trait: Ear shape

Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% pointed \_\_\_\_\_  
% rounded \_\_\_\_\_

## Trait: Mouth

Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% large \_\_\_\_\_  
% small \_\_\_\_\_



# Wilbur and Wilma -- Possible Offspring Traits II

Name \_\_\_\_\_  
Date \_\_\_\_\_

Trait: Head shape Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% narrow \_\_\_\_\_  
% round \_\_\_\_\_  
% wide \_\_\_\_\_

Trait: Eyes Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% large \_\_\_\_\_  
% small \_\_\_\_\_

Trait: Nose Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% small \_\_\_\_\_  
% large \_\_\_\_\_

Trait: Eyebrows Wilma's genotype \_\_\_\_\_

Possible sex cells	( ) ( )	( ) ( )
( )		
( )		

Wilbur's genotype \_\_\_\_\_

% large, female \_\_\_\_\_  
% small, male \_\_\_\_\_



# Wilbur and Wilma -- Possible Offspring Traits I

Name \_\_\_\_\_  
Date \_\_\_\_\_

## Trait: Antlers

Wilma's genotype  $A^B A^S$  \_\_\_\_\_

Possible sex cells	( $A^B$ ) ( $A^S$ )
( $A^B$ )	$A^B A^B$ $A^B A^S$
( $A^S$ )	$A^B A^S$ $A^S A^S$

Wilbur's genotype  $A^B A^S$  \_\_\_\_\_

% large, branched \_\_\_\_\_ 25%  
% medium, not branched \_\_\_\_\_ 50%  
% small \_\_\_\_\_ 25%

## Trait: Mouth

Wilma's genotype  $MM$  \_\_\_\_\_

Possible sex cells	( $M$ ) ( $M$ )
( $M$ )	$MM$ $MM$
( $m$ )	$Mm$ $Mm$

Wilbur's genotype  $Mm$  \_\_\_\_\_

% large \_\_\_\_\_ 100%  
% small \_\_\_\_\_ 0%

## Trait: Ear shape

Wilma's genotype  $pp$  \_\_\_\_\_

Possible sex cells	( $p$ ) ( $p$ )
( $P$ )	$Pp$ $Pp$
( $p$ )	$pp$ $pp$

Wilbur's genotype  $Pp$  \_\_\_\_\_

% pointed \_\_\_\_\_ 50%  
% rounded \_\_\_\_\_ 50%



# Wilbur and Wilma -- Possible Offspring Traits II

Name \_\_\_\_\_  
Date \_\_\_\_\_

## Trait: Head shape

Wilbur's genotype  $H^N H^W$  Wilma's genotype \_\_\_\_\_

Possible sex cells	( $H^N$ )	( $H^W$ )
( $H^N$ )	$H^N H^N$	$H^N H^W$
( $H^W$ )	$H^N H^W$	$H^W H^W$

Wilbur's genotype  $H^N H^W$

% narrow \_\_\_\_\_ 25%  
% round \_\_\_\_\_ 50%  
% wide \_\_\_\_\_ 25%

## Trait: Eyes

Wilbur's genotype  $Ee$  Wilma's genotype \_\_\_\_\_

Possible sex cells	( $E$ )	( $e$ )
( $E$ )	$EE$	$Ee$
( $e$ )	$Ee$	$ee$

Wilbur's genotype  $Ee$

% large \_\_\_\_\_ 75%  
% small \_\_\_\_\_ 25%

## Trait: Nose

Wilbur's genotype \_\_\_\_\_ Wilma's genotype  $nn$

Possible sex cells	( $n$ )	( $n$ )
( $N$ )	$Nn$	$Nn$
( $N$ )	$Nn$	$Nn$

Wilbur's genotype  $NN$

% small \_\_\_\_\_ 100%  
% large \_\_\_\_\_ 0%

## Trait: Eyebrows

Wilbur's genotype \_\_\_\_\_ Wilma's genotype  $XX$

Possible sex cells	( $X$ )	( $X$ )
( $X$ )	$XX$	$XX$
( $Y$ )	$XY$	$XY$

Wilbur's genotype  $XY$

% large, female \_\_\_\_\_ 50%  
% small, male \_\_\_\_\_ 50%