Title: Corn Genetics

Purpose:

to determine the genetic characteristics of hybrid corn
to determine the genotypes of parents and offspring in monohybrid (single factor) and dihybrid (two factor) crosses

Background:

Please read Chapters 8 in Holt *Biology*

Materials:

Purple-Yellow segregating corn (monohybrid)
Purple-Smooth: Purple-Wrinkled: Yellow-Smooth: Yellow-Wrinkled corn (dihybrid)
Marker pins

Procedure:

Monohybrid (Single Factor)

1. Work in pairs
2. Obtain ear of corn
3. Assume parents are heterozygous:
   Draw a Punnet square to predict the ratio of dominant to recessive alleles
   (use R for dominant and r for recessive)
4. Count and record in Table 1 the numbers of purple and yellow kernels
   (count by rows…put a pin at the end of a row to mark your starting place)
   (1 person counts, the other records)
5. Determine the ratio of the most abundant type to the least abundant type
   (Divide the larger number by the smaller number. This will equate the values to 1.)
6. What can you conclude about the P_1?
   (What are the genotypes and phenotypes of the parents?)
7. Which color is dominant? Which Color is recessive?

Dihybrid Cross:

1. Work in pairs
2. Obtain ear of corn
3. Assume parents are heterozygous for both traits
   Draw a Punnet square to predict the ratio of dominant to recessive alleles
   (use R and T for dominant and r and t for recessive)
4. Count and record in Table 2 the numbers of purple-smooth, purple-wrinkled, yellow-smooth, yellow-wrinkled kernels
   (count by rows…put a pin at the end of a row to mark your starting place)
   (1 person counts, the other records)
5. Determine the ratio of each type
   (Divide all numbers by lowest number: This will equate all values to 1!))
6. What can you conclude about the P_1?
   (What are the genotypes and phenotypes of the parents?)
7. Which of the traits are dominant and which are recessive?

Results:

Construct the Punnet Squares and Fill in Tables 1 and 2.

Show your calculations!

Table 1: Monohybrid Cross

	Number Purple Kernels		Number Yellow Kernels	
	Tally	#	Tally	#
Actual Count				
Total # of Kernels (total # you counted)				
Ratio				
Expected Ratio (parents heterozygous)				
Expected Count (expected ratio x total #)				

Table 2: Dihybrid Cross

	Purple-Smooth		Purple-Wrinkled		Yellow-Smooth		Yellow-Wrinkled	
	Tally	#	Tally	#	Tally	#	Tally	#
Actual Count								
Total # of Kernels (total # you counted)								
Ratio								
Expected Ratio (parents heterozygous)								
Expected Count (expected ratio x total #)								

Discussion:

See Lab Grading Guidelines: http://www.jdenuno.com/PDFfiles/LabGuide1.PDF
Include in discussion an analysis of why the actual and expected results were (or were not) in agreement.
You may want to refer to Background Information in Chapter 11 of your textbook.

Conclusion:

Dominant Color is _____
Dominant Texture is _____
Monohybrid results *agree with (do not agree with)* expected results.
Dihybrid results *agree with (do not agree with)* expected results.

Reflection:

See Lab Grading Guidelines: http://www.jdenuno.com/PDFfiles/LabGuide1.PDF