Punnett's Squares a study in Mendelian Genetics

Target audience: 7-12

Notes:
Background information can be found at these great websites;
http://web.mit.edu/esgbio/www/mg/crosses.html
http://www.biology.arizona.edu/mendelian_genetics/mendelian_genetics.html

Knowledge and skills:

- Students should know that eukaryotic organisms have pairs of genes that code for specific traits.
- Students should be able to distinguish between genotypes and phenotypes.

Fundamental understanding:

- Parental characteristics are passed down through generations via genes located on chromosomes that segregate with a predictable probability.

Essential Questions:

- How are our characteristics passed on through generations of progeny?

National standard (s):

- Content Standard C: As a result of their activities in grades 9-12, all students should develop understanding of: Molecular basis of heredity and Biological evolution**.**

State standard(s):

- North Carolina Standard Course of Study for Biology Objective 2.03: Interpret and use the laws of probability to predict patterns of inheritance.

Purpose: to determine genotypes and phenotypes of different hybrid crosses.

Materials;

- Punnett square worksheet

Questions:

1. What is a genotype?
2. What is a phenotype?
3. What is a gene?
4. If two heterozygotes are crossed, what is the resulting genotypic ratio?

References and Resources:
Books:

1. Kreuzer, Helen and Massey, Adrianne. “Recombinant DNA and Biotechnology: A Guide for Teachers.” American Society for Microbiology Press. 1325 Massachusetts Avenue, N.W. Washington D.C. 20005. Copyright 1996. ISBN: 1-55581-101-9
2. Micklos, David A. and Freyer, Greg, A., “DNA Science”: A First Course in Recombinant DNATechnology. Cold Spring Harbor Press and Carolina Biological Supply Company. 1990. ISBN 0-89278-411-3

Websites:

http://web.mit.edu/esgbio/www/mg/crosses.html
http://www.biology.arizona.edu/mendelian_genetics/mendelian_genetics.html

PUNNETT Squares

In the following crosses between male and female parents determine the genotype and phenotype of the progeny.

T is dominant for tongue rolling
t is recessive for tongue rolling

Cross 1: TT male x tt female

	Male T	Male T
Female t		
Female t		

List all genotypes and phenotypes in the offspring:

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____

Cross 2: Tt male x Tt female

	Male T	Male t
Female T		
Female t		

List all genotypes and phenotypes in the offspring:

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____

R is the dominant Red flower color.
r is the recessive white flower color.

Cross 3: RR male x Rr female

	Male R	Male R
Female R		
Female r		

List all genotypes and phenotypes in the offspring:

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____

Cross 4: Cross Rr male x rr female

	Male R	Male r
Female r		
Female r		

List all genotypes and phenotypes in the offspring:

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____

KEY

Cross 1

	All genotypes	Phenotypes
1	Tt	Can Roll Tongue
2	Tt	Can Roll Tongue
3	Tt	Can Roll Tongue
4	Tt	Can Roll Tongue

Cross 2

	All genotypes	Phenotypes
1	TT	Can Roll Tongue
2	Tt	Can Roll Tongue
3	Tt	Can Roll Tongue
4	tt	Cannot Roll Tongue