Human Mendelian Traits

Mendelian Traits are those traits which follow Mendel's rules of only 2 possible versions (1 dominant, 1 recessive). There are many examples of this in humans.

1. Use the chart below to determine your phenotype (appearance) and possible genotypes (a pair of alleles). Since you cannot do a genetic test right now, if you have the dominant phenotype, you should include both the homozygous and heterozygous genotypes—see the examples on Tongue Rolling on the first row.

[Note: Review each trait to ensure that students know what to look for. If possible, provide example images of each trait.]

Trait	Possible alleles	Your Phenotype	Your Genotype(s)
Tongue Rolling	Able to roll (R) Unable to roll (r)	Ex., able to roll	RR (homozygous) or Rr (heterozygous)
Freckles	Have freckles (F) No freckles (f)		
Widow's peak	Widow's peak (W) Straight (w)		
Earlobe	Free hanging (A) Attached (a)		
Cleft chin	Have cleft (C) No cleft (c)		
Thumb	Hitchhiker's (H) Straight (h)		
Dimples	Dimples (D) No dimples (d)		
Interlocking fingers (when hands are clasped)	Left thumb on top (L) Right thumb on top (l)		

2. Did you have mostly dominant or recessive traits? _____

[Note: Discuss with students what may affect the balance between the number of dominant and recessive traits. Use the class data to point out that a dominant gene isn't always the most common trait observed. For example, your students' data may show that there are less people with dimples even though it is a dominant trait.]

3. Compare your findings with other students.

[Note: This is to help students practice applying the terms, dominant and recessive. Clarify so that students understand these dominant and recessive traits do not indicate that one is better than the other. If needed, have student consider how recessive gene although not apparent in a parent can be passed to offspring keeping the recessive gene in the pool.]

   a. For which trait where most students dominant?

   b. For which trait where most students recessive?

4. First complete the Punnett Square on the right using your own genotype for each trait. If you have both heterozygous and homozygous genotypes for having a dominant trait, choose one to use. The other person's genotype is provided. After completing the Punnett Square, identify possible phenotypes of offspring and the probability of each phenotype in percentage.
[Note: Use the following exercises to assess students' proficiency and provide additional instructions so that they become proficient in using the Punnett Square.]

a) Freckle genotypes: Yours ____ & the other person's _Ff
List possible Phenotypes % (Probability of inheritance)

b) Tongue rolling genotypes: Yours ____ & the other person's _rr
List possible Phenotypes % (Probability of inheritance)

c) Dimple genotypes: Yours ____ & the other person's _DD
List possible Phenotypes % (Probability of inheritance)

d) Widow's peak genotypes: Yours ____ & the other person's _Ww
List possible Phenotypes % (Probability of inheritance)
