Martian Babies!

Mr. and Mrs. Martian are about to have a child. It is up to you determine what their child will look like. Remember that the appearance of an organism (i.e. phenotype) is the result of its genotype and the combination of dominant and recessive alleles. Luckily, Martian genetics are simple, there are only seven traits; each is coded by one gene and each gene has two forms (a.k.a. alleles). Both Mr. and Mrs. Martian are heterozygous for each Martian trait.

Part A: Determine the Traits

1) Obtain two pennies (or other coins); one will be for Mrs. Martian (partner A), the other for Mr. Martian (partner B).
2) Draw the below data table in your lab notebook.
3) Flip the coins for each parent. Heads will represent the dominant allele (the capital letter), and tails indicates the recessive allele (the lower case letter). Record the allele that gets passed to the child in the Genotype column. Repeat for each trait.
4) Once the genotypes are determined, figure out the resulting phenotype.

Trait	Mrs. Martian	Mr. Martian	Genotype	Phenotype
Neck Length	N n	N n		
Eye Number	E e	E e		
Tail Length	T t	T t		
Leg color	B b	B b		
Nose color	R r	R r		
Hump Number	H h	H h		
Body segments	S s	S s		

Part B: Create the baby Martian

Draw your baby Martian on a separate sheet of paper according to the phenotypes on your table and the following trait chart:

Characteristic:	Dominant allele:	Recessive allele:
Neck Length	Long neck (N)	Short neck (n)
Eye Number	Two eyes (E)	Three eyes (e)
Tail Length	Long tail (T)	Short tail (t)
Leg Color	Blue legs (B)	Red legs (b)
Nose Color	Red nose (R)	Yellow nose (r)
Humps on Head	One hump (H)	Two humps (h)
Body Segments	Three segments (S)	Two segments (s)

Martian Babies – Wrapping it up!

How does your Martian compare to the ones created by your classmates? Pick two Martians near yours and compare seven traits. Recreate the below data table in your lab notebook and write in the phenotype for traits:

Trait	My Martian	Martian by: Benny	Martian by: The Jets
Neck Length		Long	Long
Eye Number		Two	Three
Tail Length		Long	Long
Leg color		Red	Blue
Nose color		Red	Red
Hump Number		Two	Two
Body segments		Three	Three

Questions:

Answer the following questions in complete sentences in your lab notebook

1) Which Martian has the most dominant traits?
2) Which Martian has the most recessive traits?
3) What is the probability that a Martian will have three eyes? (*Hint*: a Punnett square may be helpful) _____ out of _____ or _____%
4) Assume 3 out of 13 of your classmates had three eyes. What is the percentage of three eyes?
5) How does the predicted probability for three eyes (#3) compare to the actual results (#4)?
6) How would the Martian babies change if one of the parents were homozygous dominant for all the traits while the other was heterozygous?
7) How would the Martian babies change if one of the parents were recessive for all the traits while the other was heterozygous?

Going Further

(You will need to create Punnett squares for the following questions, in your lab notebook)

1) Uncle Martian, who is heterozygous three body segments, married a woman with two body segments. Both of them have always wanted a large family! If they were to have 12 children, how many of the children would have three body segments? How many would have two?
2) Grandma and Grandpa Martian are heterozygous for two eyes. If one of their heterozygous children married a girl with three eyes, what percentage of their grandchildren should have two eyes? What percentage would have three eyes?
3) Baby Martian has a long tail, but neither of her parents do! Show how this is possible.