Name; _____ Class: _____ Date: _____

Martian Mallow Mobots

Learner outcomes:
Investigate the transmission of characteristics from parents to offspring, and identify examples of characteristics in offspring that are:
- The same as the characteristics of both parents
- The same as the characteristics as one parent
- Different from both parents

Identify examples of dominant and recessive characteristics and recognize that dominance and recessiveness provide only a partial explanation for the variation of characteristics on offspring.

Key Terms:

Trait	Dominant	Phenotype
Purebred	Recessive	Genotype
Hybrid	Incomplete dominance	

Purpose: How does the random interaction of the genetic traits of two sexual reproducing parents, produce 'Mobot' offspring?

Materials:

Marshmallows	Various Candies	Pretzels
Coin	Toothpicks	Cheezies

Procedure:
1. Find a partner. One of you will be the baby Mobot's mother and the other will be the Mobot's father.

2. All Mobots receive an X chromosome from their mother. The father can give an X or Y chromosome. Flip a coin to determine which sex chromosome the father will pass on. Record the chromosome pairing on your data sheet.

3. Using a coin you will determine your baby's genotype. For each trait, you will flip a coin once, to represent the allele you will pass on to your baby. Use

the decoder to find the letter symbols for each allele and record each result on the data sheet – this will complete the baby's genotype
   a. Dominant Alleles – Heads
   b. Recessive Alleles – Tails

Baby Mobot Decoder Key

Important Note
Remember that a dominant trait is represented by a capital letter and a recessive trait is represented by a lower case letter.

Gene For:	Alleles
Antennae	2 Antennae (a) 1 Antenna (A)
Humps	3 Humps (h) 2 Humps (H)
Nose	Square Nose (r) Round Nose (R)
Tail	Straight Tail (c) Curly Tail (C)
Eyes	2 Eyes (e) 3 Eyes (E)
Legs	Long Legs (l) Short Legs (L)
Body Segments	2 Segments (s) 3 Segments (S)

4. From the recorded genotypes, determine your baby's phenotype. Record what trait your baby will exhibit when "born."
5. Once your table has been completed and you have determined what your baby will look like, bring your table to the "Martian Anatomy Store" to collect your baby's body parts.
6. Build your baby Mobot, and compare your baby with that of your classmates. Were they all the same? Why or why not?

This activity was adapted from:
http://www.cccoe.net/tdf/Marchese/mmm/lesson.html

Observations:

Baby Mobot Data Table

Trait/Chromosome	Genotype combination of alleles / chromosomes received from each parent	Phenotype the trait that is exhibited in the baby
Sex	____ ____	
Antenna	____ ____	
Humps	____ ____	
Nose	____ ____	
Tail	____ ____	
Eyes	____ ____	
Legs	____ ____	
Body Segments	____ ____	

Baby Body Parts	Candy Piece	Number Required
Head and Body Segments	Large Marshmallows	
Body Humps and Nose	Small Marshmallows	
Legs	Pretzels	
Tail	Popcorn twist OR cheezie	
Antennae	Licorice	
Eyes	M&Ms	
Joints	Toothpicks	

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Analysis:

1. What were the genotypes of each of your parent mallow bots for each trait? How do you know? What do you call this?

2. Did all of the baby "Mobots" in the class look the same? Why or why not?

3. What would happen if one of the parents had all recessive genes (lower case versions) and the other had all dominant genes (upper case versions)? What would the babies look like?

4. What if both parents had all recessive genes?

5. What if both parents had all dominant genes?

6. How is inheriting traits left somewhat up to chance? How did we show that in this investigation?

Conclusion:

Extension:

Repeat this activity, but assume one parent is a hybrid for all traits and the other parent is recessive for all traits.