

## INTRODUCTION

Reebops are imaginary creatures with colorful traits inherited through complete, incomplete and co-dominant models of inheritance. AS you create baby Reebops from marshmallows and other objects, they can help you see how the visible traits of a baby are related to the combination of genes that it inherited from its mom and dad (and why all the kids in the family don't always look alike.) Have fun Reebopping!

## MATERIALS

- An envelope containing one set of red and one set of green chromosomes.
- Boxes at the front of the room containing Reebop body parts:
  - 4 different colored marshmallows (small)
  - Large white marshmallows
  - Toothpicks
  - Nails
  - Thumbtacks
  - Pipe cleaner

## PROCEDURES **Note: If you find any words in the instructions below that you do not understand check out the included genetic glossary.**

You and your lab partner will receive an envelope that contains 14 red chromosomes that belong to Mom Reebop and 14 green chromosomes that belong to Dad Reebop. Decide which of you will act as Mom and which as Dad. Place your chromosomes on the table in front of you, **letter side down**. Your lab partner should do the same with other set of chromosomes.

**Arrange only your own 14 chromosomes into pairs by length and width.** Select one chromosome from each of your seven pairs and place it in a special "gamete" (egg or sperm) pile.

Your lab partner should do the same. The leftover chromosomes should now be returned to the envelope.

- What type of cell division has just occurred? (Answer on your data collection sheet).

Combine the several red and seven green chromosomes from the two gamete piles to form a "baby" pile. Now each Reebop will have 14 chromosomes just like Mom and Dad did. But half will be red and half green, indicating that half came from Mom and half came from Dad.

Line up the chromosomes contributed to the baby by Mom and Dad in pairs of similar size, and turn them letter side up. You will see that each chromosome in the pair carries a gene of similar type (same letter of the alphabet). Some chromosome pairs might carry the same allele (either both capital letters or both lower case), indicating that the baby is homozygous (has two alleles of the same type) for the kind of gene carried on that chromosome. Other chromosome pairs might carry one dominant (capital letter) allele and one recessive (lower case) allele, indicating that the baby is heterozygous (has two alleles of different type) for the kind of gene carried on that chromosome. The combination of genes carried on these seven chromosomes pairs defines your Reebop baby's genotype (genetic makeup).

- Record this genotype on the lines under data collection on your paper.

Refer to the Reebop Genotype-Phenotype Conversion Table to determine your baby's phenotype.

- Record the phenotype on the lines under data collection on your own paper.

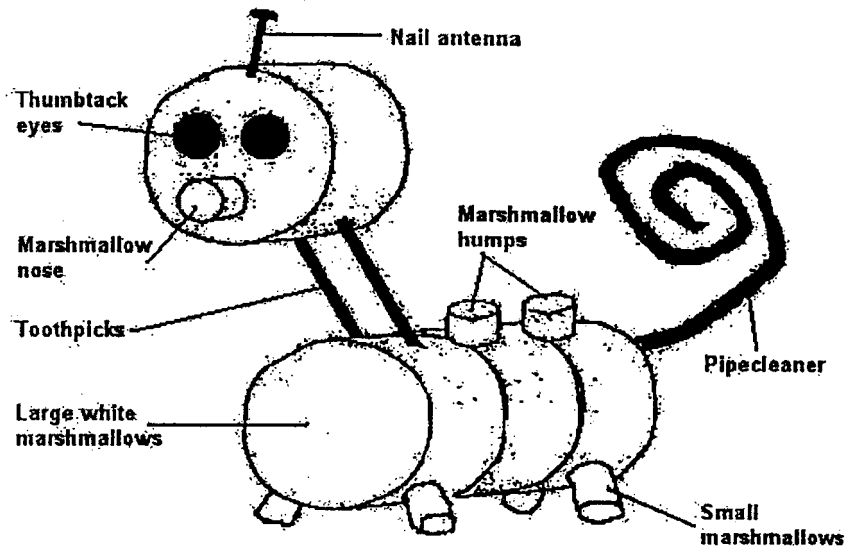
You are now ready to construct your Baby Reebop.

Collect the body parts that you will need and return to your desk to build your baby.

REEBOP GENOTYPE - PHENOTYPE  
CONVERSION TABLE

Genotype	Phenotype
DD	Three body segments
Dd	Three body segments
dd	Two body segments
AA	Two antennae
Aa	One antenna
aa	No antenna
NN	Green nose
Nn	Green nose
nn	Yellow nose
EE	Two eyes
Ee	Two eyes
ee	One eye
MM	Two green humps
Mm	One green, One yellow hump
mm	Two yellow humps
TT	Curly tail
Tt	Curly tail
tt	Straight tail
LL	Four red legs
Ll	Four Orange legs
ll	Four Yellow legs

MODEL REBOP



GENETIC GLOSSARY

- Allele:** One of two or more forms of a gene that can exist at a single locus.
- Chromosome:** A structure in the nucleus of a eukaryotic cell that contains a linear array of many genes. A chromosome is composed of a single DNA double helix molecule wound around many protein molecules that stabilize it and regulate its function.
- Co-dominant:** Refers to a pair of alleles, both of which exert on the phenotype when they are present together. In co-dominance, the heterozygote has a phenotype different from that of either homozygote and sometimes (but not always) is intermediate in phenotype.
- Diploid:** Having two complete sets of chromosomes, one set derived from the mother and one from the father.
- Dominant:** Refers to an allele that has the same effect on the phenotype whether it is present in the homozygous or heterozygous condition. (Thus, if A is a dominant allele, individuals with the AA and Aa genotypes have the same phenotype.)
- Genotype:** The specific combination of alleles that an individual possesses at one or more loci.
- Haploid:** Having only one set of chromosomes (as in a sperm or egg nucleus)
- Heterozygous:** Having two different alleles at a particular locus.
- Homozygous:** Having two identical alleles at a particular locus.
- Incomplete dominance:** The heterozygote is about halfway between the homozygotes in phenotype. (For example, if homozygous plants have red or white flowers and the heterozygous plant has pink flowers, the situation is sometimes called incomplete dominance.)
- Locus:** A region of chromosome or DNA molecule where a particular kind of gene, coding for a particular kind of protein, is located. Different variations at a single locus are known as alleles.