

Heredity Mix 'n Match

*Read each step carefully, all the way through,
and then do what the directions tell you to do.*

Then reread the directions to make sure you completed all parts correctly.

When you are done with a step, put a check in the box next to it.

- ☐ At this point you should have eight jelly beans in front of you. Sort these into four pairs of alleles that belong together. In other words, put the two tongue rolling alleles together, and the two eye lash alleles together, and the two eye color alleles together, etc. Make sure you have recorded your genotype for all four pairs of these alleles.

- ☐ Now you are almost ready to find out which alleles your “baby” will get from you. As you know, when egg and sperm cells are created, they only get one allele of a gene. So what you need to do is put your two tongue rolling alleles (jelly beans) into the paper bag. Shake the bag a little, and then without looking into the bag, reach in and choose one of the jelly beans. This is the allele you will give to your baby.

- ☐ When both you and your partner have chosen a tongue rolling jelly bean, record its genotype and phenotype.

- ☐ You were given a toothpick earlier, and now you should carefully push the tongue rolling jelly bean onto it. Slide the jelly bean down so it is about ½” from the bottom of the toothpick. Your partner should do the same with his or her toothpick and jelly bean.

- ☐ Next remove your unused tongue rolling jelly bean from the bag and save it for later. Then put your two jelly beans for the eye lash length trait in the bag, shake it, and remove one of them without peeking. Slide it onto the toothpick so it is now in position just above the tongue rolling jelly bean. Your partner should do the same.

- ☐ Repeat this procedure with the pair of jelly beans representing the eye color alleles. Then do the same with the last pair of jelly beans representing the earlobe alleles.

- ☐ Now obtain a sheet of construction paper for you and your partner to share. Turn it sideways so its longest sides are across the top and bottom of the sheet. Then, in the top center of the top half of the sheet, arrange the two chromosomes you have made so that they are side by side. Place them so that the tongue rolling alleles are at the top of the toothpick and the earlobe alleles are at the bottom. Also, put the chromosome that was made from the mother’s alleles on the left, and the chromosome that was made from the father’s on the right. When you have doubled checked that they are placed correctly, use transparent tape to attach them to the construction paper.

- ☐ Now you are ready to construct your own chromosomes. This time you will need two toothpicks and eight jelly beans. You should already have four jellybeans. These are the ones that did not go into the chromosome you “gave” your baby. You will now need to figure out which allele is missing from each trait, by looking back at the information you recorded earlier for your own genotype. Once you have identified the missing alleles,

return to the paper bags you originally drew from and collect them. (This time you are allowed to look into the bags!)

▮ Use your eight jelly beans to assemble two chromosomes representing the alleles you have for each of the four traits. For example, if you originally selected one pink jelly bean and one red jelly bean, place the pink jelly bean on one toothpick and the red jelly bean on the other. Then continue in the same way with the other pairs of alleles, placing them on the toothpicks in the same order that you used for your baby's chromosomes. Of course, your partner should be doing the same thing with his or her jelly beans.

▮ When you and your partner have assembled your chromosomes and checked that they are correct representations of your genotypes, place them on the construction paper below your baby's chromosomes. Put the mother's chromosomes on the left side of the paper and the father's on the right. (That way they match up with the baby's two chromosomes.)

▮ Write each parent's first name above or below his or her chromosomes. If one parent had to pretend to be a member of the opposite sex, you may want to change the name slightly. For example, if Lucy had to play the part of the father, she may want to use the name Luke instead, followed by the name Lucy in parentheses.

▮ Choose a name for your baby, and write it above or below the baby's chromosomes.

▮ Last of all, create a neat listing of the baby's complete genotype and phenotype. Do the same for each parent. These can be put directly on the construction paper, or they can be on a separate sheet of paper.