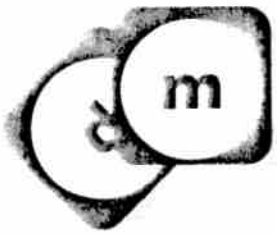

Descendent Discs

A Human Genetics Simulation Game
Question Worksheet

On a separate answer sheet, write **your name and your bag type/number** (Female #1, for example) **and your partner's name and bag type /number.** Now, write the answers to these questions on your answer sheet, as instructed by your teacher.

1. How many genotypes in your disc set produce a DOMINANT phenotype? What are "your" dominant traits?

2. For how many traits are you HOMOZYGOUS? List the HOMOZYGOUS genotypes and the phenotypes they produce.

3. For how many traits are you HETEROZYGOUS? List the HETEROZYGOUS genotypes and the phenotypes they produce.

4. On the basis of your Descendent Discs, are you a male or female? How do you know? (Because it says so on your bag is not a good enough answer!)

5. Did both you and your partner decide on the same phenotype for each of the gene pairs in both sets of discs? IF YOU ANSWERED "NO" TO THIS QUESTION, DO NOT CONTINUE WITH THIS EXERCISE UNTIL YOU REACH AN AGREEMENT ON THE COMPLETE MALE AND FEMALE PHENOTYPE.

6. Find your functional trait discs (orange) and structural trait discs (green). How many functional traits in your "gamete" are DOMINANT? How many are RECESSIVE? How many structural traits in your "gamete" are DOMINANT? How many are RECESSIVE? (NOTE: You will answer this question twice; once for "Gamete 1- Sperm" and once for "Gamete 2 - Egg.")

7. Does your gamete show the same number of DOMINANT and RECESSIVE traits as your complete genotype does? Explain why or why not. (NOTE: You will answer this question twice; once for "Gamete 1 - Sperm" and once for "Gamete 2 - Egg.")

8. Is your baby a boy or a girl?

9. For how many traits does your baby "take after Mom?" (In other words, how may of the baby's traits are like the phenotype of the female parent?) Which traits are they?

10. For how many traits does your baby "take after Dad?" (In other words, how may of the baby's traits are like the phenotype of the male parent?) Which traits are they?

11. Does your baby have any traits which neither parent had? If so, what are they? Explain how the baby got those traits. If there were no "new" traits, why not?

12. CLASS COMPARISON

    A. How many sets of partners are in your class?

    B. Answer **only one** of the parts of question 12-B.

    EITHER:

    1. If each set of partners had one child, how many male babies would you expect to get in a class of this size? How many female babies? Explain your answers.

    OR:

    2. If each set of partners had two children, how many male babies would you expect to get in a class of this size? How many female babies? Explain your answers.

C. How many boy babies did your class actually produce? How many girl babies? If the actual numbers of boys and girls were the same as you expected, explain why. If the actual numbers of boys and girls were not the same as you expected, explain why.

D. The frequency of various blood types in the total population of the United States is as follows:

Type/Frequency	Type/Frequency
O positive - 37.4%	A negative - 6.3%
A positive - 35.5%	AB positive - 3.4%
B positive - 8.5%	B negative - 1.5%
O negative - 6.6%	AB negative - .6%

Find out the blood types of all the individuals in this genetic simulation game - including the "parents" (the students in your class) and their "children." Write down the number of people of each blood type in the class. Divide the number for each blood type by the total number of individuals involved in the simulation. Multiply the answers by 100. Compare this number to the percentages in the chart above. Which blood types were close to the actual percentage of the U.S.'s general population? Which blood types were not?

E. How many color blind males did the class produce? How many color blind females? How many hemophiliac males did the class produce? How many hemophiliac females? How many males with muscular dystrophy (MD) did the class produce? How many MD females? Why would you suspect more affected males of each of these types to be produced? Explain why it would be very difficult for a female hemophiliac to have children.

F. Being myopic (nearsighted) is an autosomal dominant trait. Were most of the children produced in your classroom nearsighted? Why or why not?

G. How many babies with dimples did the class produce? Was there a difference in the number of boys and girls with dimples? Explain why you would not expect a difference to occur. Use a Punnett square to show how two parents with dimples could produce a child without dimples.

H. What type of earlobes would a dealer in pierced earrings like most people to have? Why would you say that? Did most of the babies produced by the class make the earring dealer happy?

I. Explain why a mother with straight hair and a father with curly hair should not be able to have a child like either one of them.

J. What are the chances of a non-bald father and a non-bald mother having a bald son? (You may assume that one parents has one copy of the bald gene.) Would you expect the same chance to hold for producing a bald girl? Explain.

K. Could the first baby your team produced roll its tongue? If yes, where did it get that ability from? If not, why not?

L. How many babies produced by the class had longest big toes? Could two parents whose big toes were their longest produce a baby with long second toes? Use a Punnett square to show why or why not.

M. How many babies produced by your class were tone deaf? Imagine a situation where a teenager's parents accuse him/her of being "tone deaf" because of the type of music he/she listens to. Write down an explanation that the teenager might use to explain to his/her parent how he/she might have inherited that tone deafness! Include a Punnett square for emphasis. What are the chance of two normal tone hearing parents producing a tone deaf baby?