

Name \_\_\_\_\_ Hour \_\_\_\_\_ Date \_\_\_\_\_

### Sex-Linked Traits Worksheet

#### Background Information:

Sex-linked traits are those whose genes are found on the X chromosome but not on the Y chromosome. In humans the X chromosomes are much larger than the Y chromosome and contains thousands of more genes than the Y chromosome. For each of the genes that are exclusively on the X chromosomes, females, who are XX, would obviously have two alleles. Males, who are XY, would have only one allele. Thus females with one recessive allele and one dominant allele, for a gene that is unique to the X chromosome, will always display the dominant phenotype. However, a male with a recessive allele for a gene unique to the X chromosome will always exhibit that recessive trait because there is no other corresponding allele on the Y chromosome.

In humans, each of two different sex-linked genes has a defective recessive allele that causes a disease. The diseases are hemophilia and colorblindness. In hemophilia, the defective allele prevents the synthesis of a factor needed for blood clotting. In colorblindness, the defective allele prevents a person from seeing certain colors.

Use the information below to answer the following questions.

$X^H$  - X chromosome with normal dominant allele (no hemophilia)

$X^h$  - X chromosome with recessive hemophilia allele

Y - Y chromosome (does not contain comparable gene)

$X^B$  - X chromosome with normal dominant allele (not colorblind)

$X^b$  - X chromosome with recessive colorblind allele

Y - Y chromosome (does not contain comparable gene)

1. Write the genotypes for the following phenotypes of red-green color blindness.

a. normal male \_\_\_\_\_

b. normal female carrying no colorblind alleles (Homozygous) \_\_\_\_\_

c. colorblind male \_\_\_\_\_

d. normal female carrying the colorblind allele (Heterozygous) \_\_\_\_\_

e. colorblind female \_\_\_\_\_

2.  $X^B X^B$  x  $X^b Y$

a. What probability of the male children are colorblind? \_\_\_\_\_

b. What probability of the female children are colorblind? \_\_\_\_\_


3.  $X^B X^b$  x  $X^B Y$

a. What probability of the male children are colorblind? \_\_\_\_\_

b. What probability of the female children are colorblind? \_\_\_\_\_
