

Name:

Student number/homeroom:

**“Love is Colorblind”**

LO: Describe the role of DNA in inheritance. SLE: Meet NGSS.

Maria and Mario want to have children together. Both Maria and Mario have normal vision; however, Maria’s father has red-green colorblindness.

The ability to distinguish between red and green is determined by a gene on the X chromosome. We can use  $X^R$  for the dominant allele and  $X^r$  for the recessive allele. A person can distinguish between red and green if they have at least one  $X^R$  allele.

1. What is Maria’s genotype?
2. What is Mario’s genotype?
3. Consider Maria’s reproductive cells (egg cells). What are the possible genotypes carried by these cells, in what proportions?
4. Consider Mario’s reproductive cells (sperm cells). What are the possible genotypes carried by these cells, in what proportions?
5. Draw a Punnett square to show the possible children that Maria and Mario could have together.
6. What are the possible genotypes of Maria and Mario’s male children, in what proportions?
7. What are the possible phenotypes of Maria and Mario’s male children, in what proportions?
8. What are the possible genotypes of Maria and Mario’s female children, in what proportions?
9. What are the possible phenotypes of Maria and Mario’s female children, in what proportions?
10. Explain why recessive traits whose genes are on the X chromosome are usually displayed by males, not females.