bNames \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_

**Sex-Linked Inheritance Practice (11)**

1. **Sex- linked traits**: traits determined by genes on the **X chromosome**

 In humans, **hemophilia** is a **recessive trait** on the **X chromosome.** A heterozygous unaffected woman that is a carrier for hemophilia marries a man that has hemophilia and wants to know the chances of having a child affected with hemophilia. Cross the female and male to determine the possible genotypes and phenotypes of their offspring. **Show your work!**

Chances Daughter without Hemophilia \_\_\_\_\_\_\_\_\_\_

Chances Daughter with Hemophilia \_\_\_\_\_\_\_\_\_\_\_

Chances Son without Hemophilia \_\_\_\_\_\_\_\_\_\_

Chances Son with Hemophilia \_\_\_\_\_\_\_\_\_\_\_

2. In humans, **muscular dystrophy(MD)** is a **recessive trait** inherited on the **X chromosome**. A woman that does not have muscular dystrophy (but who had an uncle with MD) and a man that does not have muscular dystrophy have four children: two normal daughters (the second one has a son with MD), a normal son, and a son with MD. Write the possible genotypes of each of the people in this family:

Mom \_\_\_\_\_\_\_\_\_\_ Dad \_\_\_\_\_\_\_\_

Daughter 1 \_\_\_\_\_\_ Daughter 2 \_\_\_\_\_\_\_\_\_ Normal Son \_\_\_\_\_\_\_\_ MD Son \_\_\_\_\_\_\_

Cross Daughter 2 with her husband who does not have MD to determine the chances of them having any more children with muscular dystrophy. **Show your work!**

Chances non-MD daughter \_\_\_\_\_\_\_\_\_\_\_\_

Chances MD daughter \_\_\_\_\_\_\_\_\_\_

Chances non- MD son \_\_\_\_\_\_\_\_\_\_\_

Chances MD son \_\_\_\_\_\_\_\_\_

**Pedigree Practice:** used to track a certain genetic trait through a family.

3. The pedigree to the left tracks a **recessive sex linked trait** inherited on the **X chromosome**.

1. Write the genotypes for each individual under their symbol.
2. Why are some symbols only half shaded? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Trait**: Hemophilia

**Forms of the Trait**:

* The **dominant gene** on the X chromosome results in a person **not having hemophilia**. This person will have normal blood clotting. A person may be considered a ***carrier*** if they are **heterozygous**.
* The **recessive gene** on the X chromosome results in a person **having hemophilia**. A person with hemophilia lacks certain blood clotting factors and thus have a hard time clotting blood and stopping bleeding.

Below is a pedigree for a family that carries hemophilia: A few (but not all) genotypes have been written to help you.



4. Which family members are dominant and do not have hemophilia? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Which family members are recessive and do have hemophilia? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Which family members are heterozygous carriers of hemophilia? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why are all the heterozygous carriers female? (Hint: think about which chromosome this trait is inherited on)

7. What is the possible genotype of person I-2? \_\_\_\_\_\_\_\_ 12. What is the possible genotype of person II-2? \_\_\_\_\_\_\_\_\_

8. What is the possible genotype of person III-3? \_\_\_\_\_\_\_14. What is the possible genotype of person III-4? \_\_\_\_\_\_\_\_\_

9. If person III-6 marries a person with the same genotype as II-1 (you can assume they are homozygous dominant), what is the chance that one of their children will have hemophilia? **Show your work with a Punnett square.**

10. If person III-2 marries a person with the same genotype as I-1, what is the chance that one of their children will have hemophilia? **Show your work with a Punnett square.**