

Background information

Pedigree charts are very important because they help scientists understand the genetic patterns of diseases. It is important to be able to interpret pedigree charts in order to learn the pattern of a disease or condition. Using a pedigree chart you can tell if the disease or condition is autosomal, X-linked, carrier, dominant, or recessive.

Before you start define the following terms:

Autosomal – trait carried on one of the other 44 chromosomes (NOT one of the sex chromosomes)

X-linked – trait carried on one of the sex chromosomes (X chromosome usually because it is larger) – Mostly affect males because they inherit only one copy of the X-chromosome while females inherit 2 copies

Carrier – someone who carried one recessive copy of a trait. They don't express the trait but can pass it on to an offspring

Dominant – “stronger” of the alleles, covers up the recessive trait, only need to inherit one to express the trait

Recessive – “weaker” of the alleles, must inherit 2 recessive alleles

Review the following pedigree symbols: - color in the carrier males and females halfway before running copies!



Unaffected Male



Affected Male



Carrier Male



Unaffected Female



Affected Female



Carrier Female

Activity:

1. First you need to become comfortable in reading and making a pedigree chart. Complete the following examples

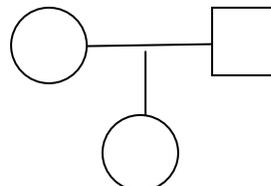
- a. How can you tell if a couple is in a child-bearing relationship on a pedigree? Write a description and draw an example.

They are joined by a horizontal line

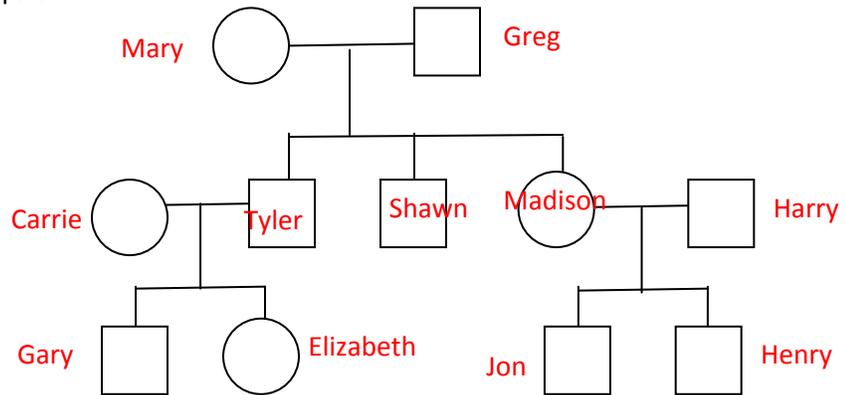


- b. How can you tell if a couple has had children on a pedigree? Write a description and draw an example.

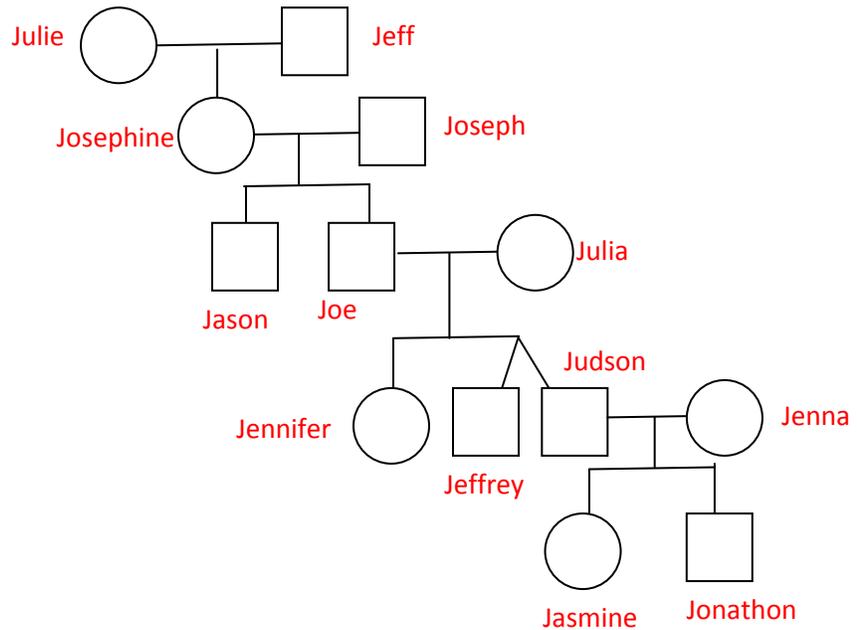
There is a vertical line descending from a couple



- c. Draw a pedigree that represents Mary married to Greg with 2 sons (Tyler and Shawn) and 1 daughter Madison. Their son Tyler married Carrie and had a son, Gary, and a daughter, Elizabeth. Their daughter Madison married Harrison and had a son, Jon, and another son, Henry. Please label the pedigree with the names of the people.

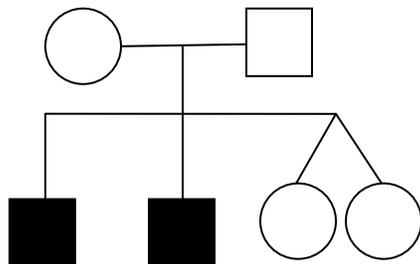


- d. Draw a pedigree that represents Julie married to Jeff, with one daughter, Josephine. Josephine married Joseph and had 2 sons, Jason and Joe. Joe married Julia and had Jennifer and twin boys, Jeffrey and Judson. Judson married Jenna and had Jasmine and Jonathon. Please label the pedigree with the names of the people.



2. Examine each of the following pedigree charts and answer the questions about each.

a.

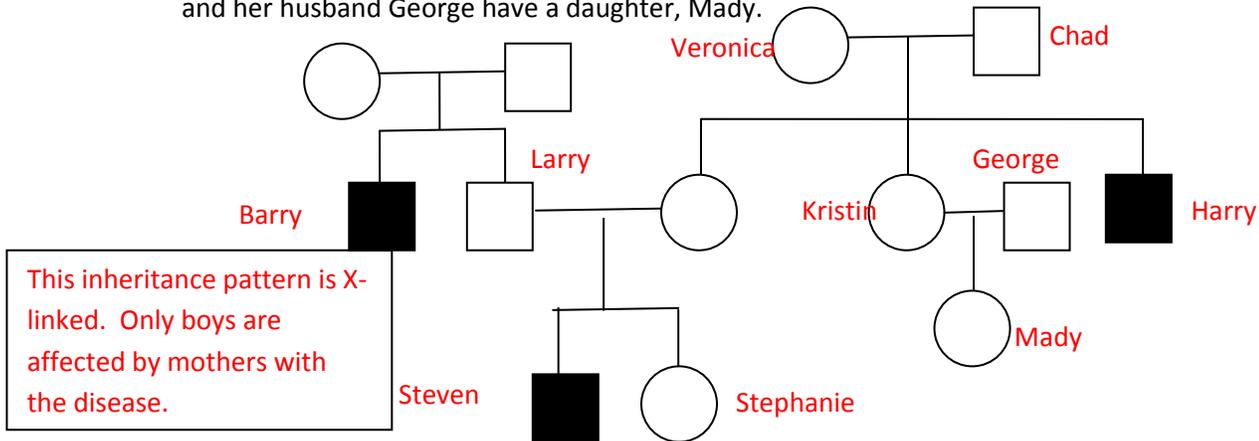


X-linked – a mother without the trait passes it on to two of her sons who do express the trait. They inherited their “bad” X-chromosome from their mother. Her daughters do not express the trait although they may be carriers

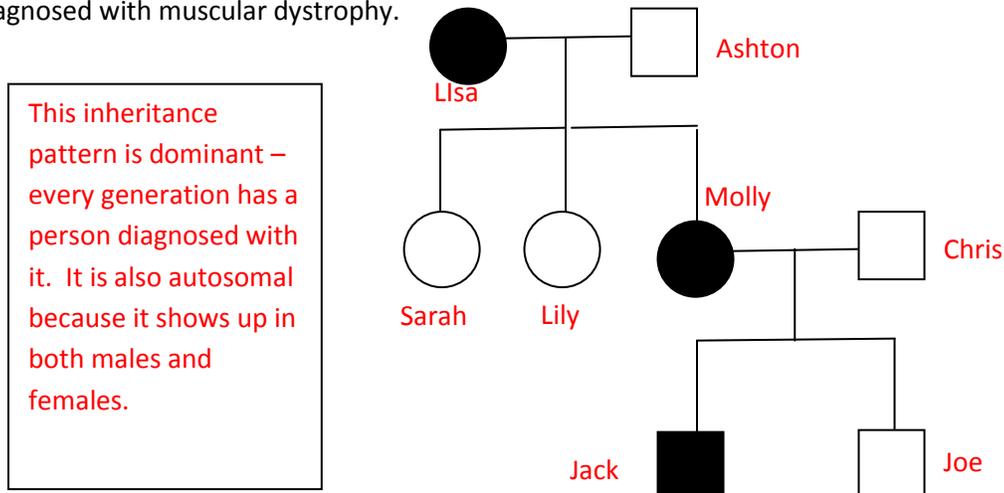
Does the above pedigree show an autosomal or X-linked pattern of inheritance? How can you tell?

3. Now you must make a pedigree chart from the descriptions given. Label the pedigree with names and color in affected and carrier individuals appropriately. Tell whether it is autosomal or X-linked and explain how you know this. Also tell if it is inherited in a dominant or recessive pattern.

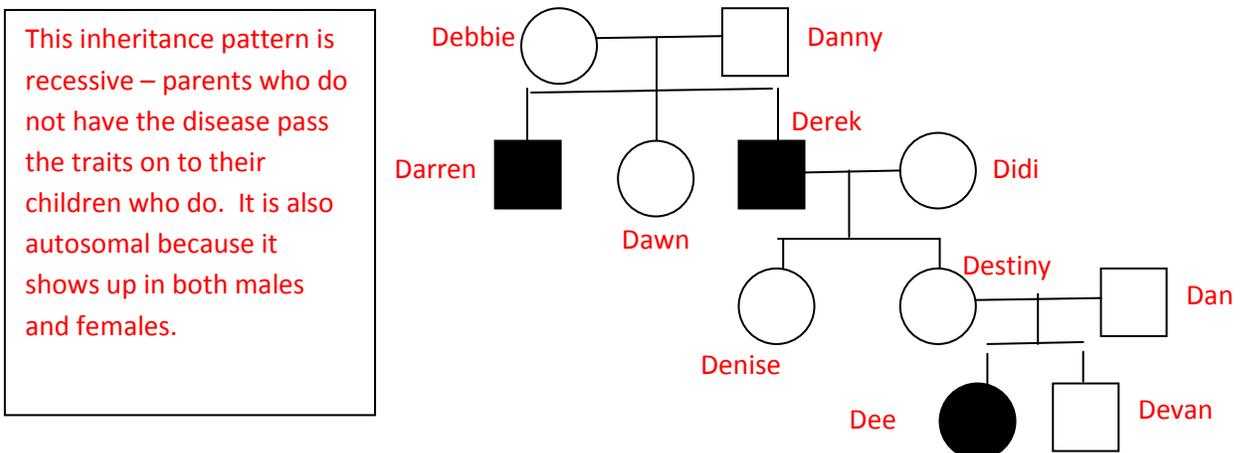
- a. Chad and Veronica are married and have Brittany, Kristin, and Harry. It was discovered that Harry had muscular dystrophy. Brittany married Larry and had Steven and Stephanie. Steven also had muscular dystrophy. Larry's brother Barry also had muscular dystrophy, but neither of their parents had it. Kristin and her husband George have a daughter, Mady.



- b. Lisa and Ashton get married and have 3 girls, Sarah, Lily, and Molly. It was discovered that Lisa had muscular dystrophy. Molly married Chris and had two boys, Jack and Joe. Molly and Jack were also diagnosed with muscular dystrophy.



- c. Debbie married Danny. They had 3 children, Darren, Dawn, and Derek. Darren, and Derek were both diagnosed with muscular dystrophy. Derek married Didi and had 2 girls, Denise and Destiny. Denise married Dan. Of their 2 children, Dee and Devan, Dee was also diagnosed with muscular dystrophy.



Name _____

Pedigree Chart Worksheets

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Before you start define the following terms:

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Carrier

Dominant

Recessive

Review the following pedigree symbols:



Unaffected Male



Affected Male



Carrier Male



Unaffected Female



Affected Female



Carrier Female

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 - a. How can you tell if a couple is in a child-bearing relationship on a pedigree? Write a description and draw an example.

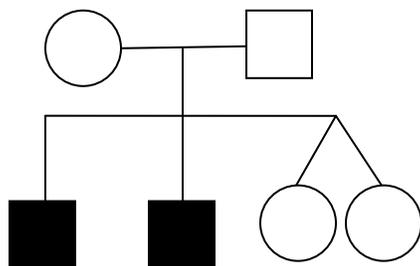
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c. Draw a pedigree that represents Mary married to Greg with 2 sons (Tyler and Shawn) and 1 daughter Madison. Their son Tyler married Carrie and had a son, Gary, and a daughter, Elizabeth. Their daughter Madison married Harrison and had a son, Jon, and another son, Henry. Please label the pedigree with the names of the people.

d. Draw a pedigree that represents Julie married to Jeff, with one daughter, Josephine. Josephine married Joseph and had 2 sons, Jason and Joe. Joe married Julia and had Jennifer and twin boys, Jeffrey and Judson. Judson married Jenna and had Jasmine and Jonathon. Please label the pedigree with the names of the people.

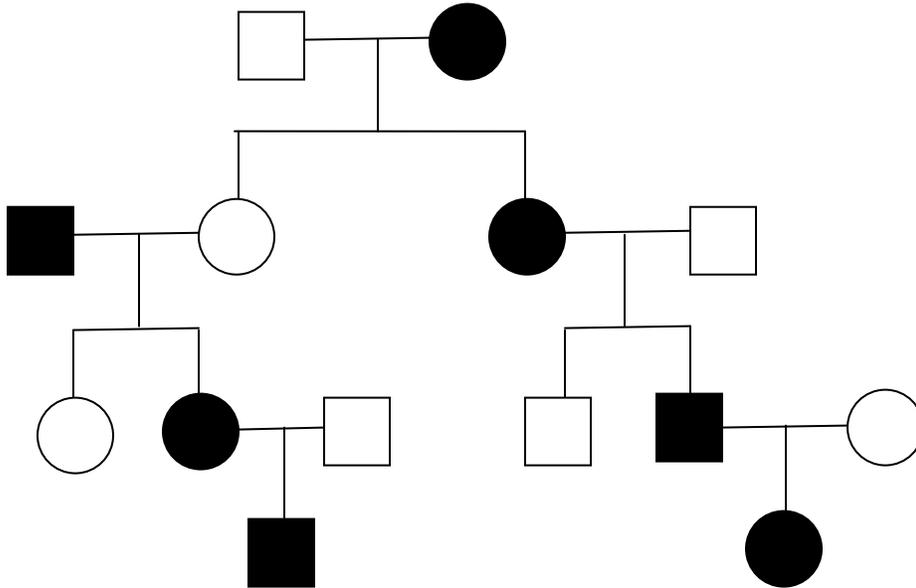
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Does the above pedigree show an autosomal or X-linked pattern of inheritance? How can you tell?

b.

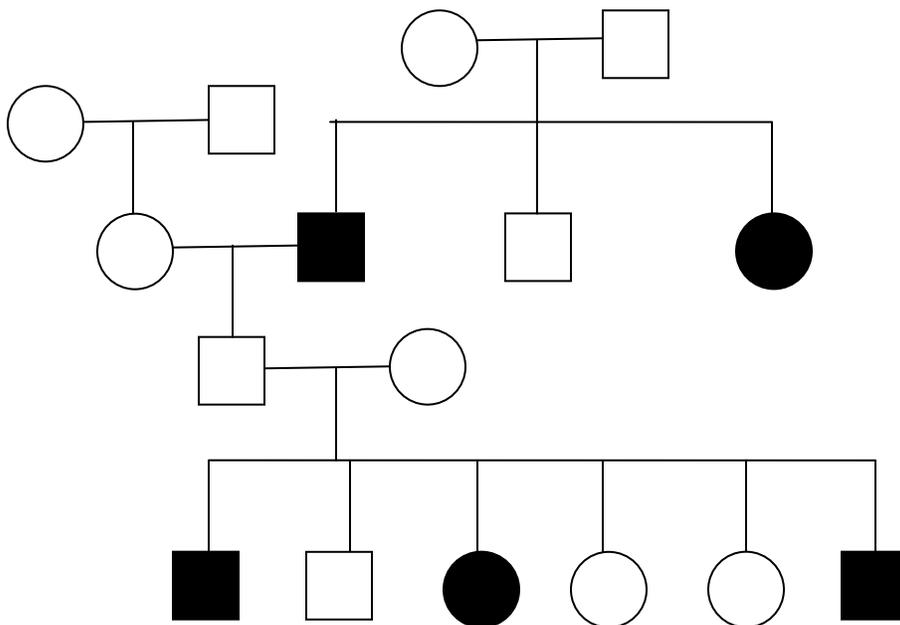


Does the above pedigree show an autosomal or X-linked pattern of inheritance? How can you tell?

Does the above pedigree show a dominant or recessive pattern of inheritance? How can you tell?

Can any of the people be considered carriers of the trait? If yes, color them in appropriately.

c.



Does the above pedigree show an autosomal or X-linked pattern of inheritance? How can you tell?

Does the above pedigree show a dominant or recessive pattern of inheritance? How can you tell?

Can any of the people be considered carriers of the trait? If yes, color them in appropriately.

