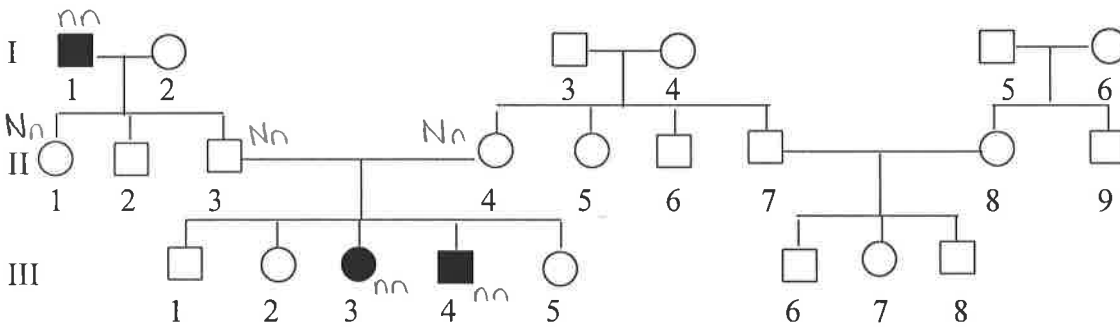


Genetics Pedigree Worksheet

A pedigree is a chart of a person's ancestors that is used to analyze genetic inheritance of certain traits – especially diseases. The symbols used for a pedigree are:

- female, unaffected
- female, affected
- male, unaffected
- male, affected

- Siblings are placed in birth order from left to right and are labeled with numbers.
- Each generation is labeled with a Roman numeral.
 - Example: We would name an individual II-3 if he/she was in the second generation and the 3rd child born.



1. Identify the genotypes of the following individuals using the pedigree above (homozygous dominant, homozygous recessive, heterozygous).
 - I-1: nn - homozygous recessive
 - II-1: Nn - heterozygous
 - II-4: Nn - heterozygous
 - III-3: nn - homozygous recessive

2. How can you know for sure that individuals II-3 and II-4 are heterozygous?

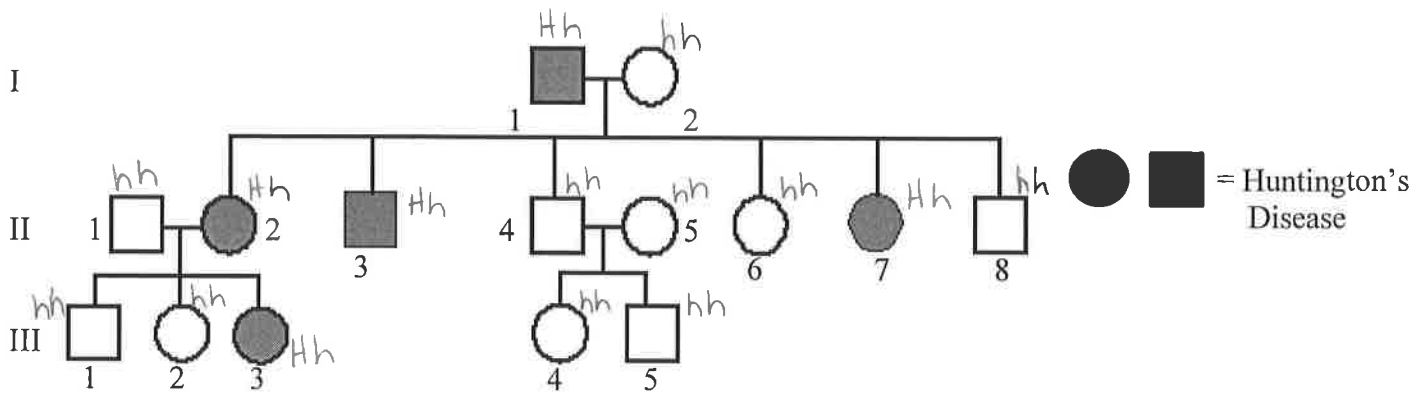
They are unaffected, but have affected children, so they must both carry the allele for the disorder, which makes them heterozygous.

3. Is this trait dominant or recessive? How do you know?

Recessive. Since II-3 and II-4 are heterozygous and unaffected, the unaffected allele is dominant, so the affected allele is recessive.

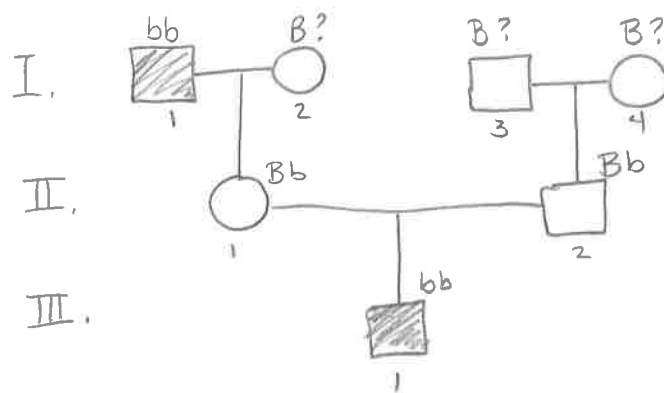
4. Is this trait autosomal or sex-linked? How do you know?

Autosomal. II-3 (male) is unaffected (N), but has an affected daughter. If it was X-linked, his daughter would get his dominant unaffected allele, so she could not be affected.



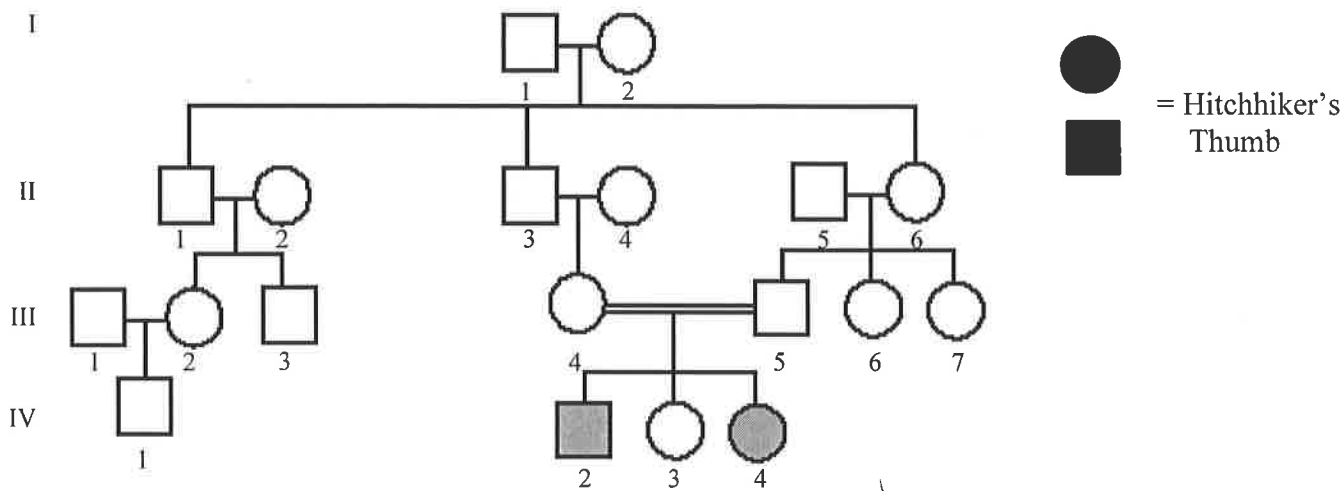
5. Which members of the family above are afflicted with Huntington's Disease? I-1, II-2, 3, 7, III-3
6. There are no carriers for Huntington's Disease- you either have it or you don't. With this in mind, is Huntington's disease caused by a dominant or recessive trait? Dominant
7. Identify the genotypes of the following individuals using the pedigree above. (homozygous dominant, homozygous recessive, heterozygous)
- I-1: Hh - heterozygous
 - II-1: hh - homozygous recessive
 - II-3: heterozygous
 - III-4: homozygous recessive
8. How many children did individuals I-1 and I-2 have? 6
9. How many girls did II-1 and II-2 have? 2 How many have Huntington's Disease? 1
10. How are individuals III-2 and II-4 related? niece & uncle I-2 and III-5? grandmother & grandson

11. Brown eyes are a dominant eye-color allele and blue eyes are recessive. A brown-eyed woman whose father had blue eyes and whose mother had brown eyes marries a brown-eyed man whose parents are also brown-eyed. They have a son who is blue-eyed. Draw a pedigree showing all four grandparents, the two parents, and the son. Label all the genotypes.



B = brown
b = blue

* At least one of I-3 and I-4 must be heterozygous



12. The pedigree above shows a family's pedigree for Hitchhiker's Thumb. Is this trait dominant or recessive? How do you know? Recessive. Unaffected parents (III-4 and III-5) have affected children.

13. Is this trait autosomal or sex-linked? How do you know? Autosomal. Unaffected father (III-5) has an affected daughter, so he must be a carrier.

14. How are individuals III-1 and III-2 related? Cousins/spouses

15. Which 2 individuals have hitchhiker's thumb? IV-2 and IV-4

16. Which 2 individuals must be carriers of hitchhiker's thumb? III-4 and III-5

17. Is it possible for individual IV-3 to be a carrier? How do you know? yes, she could have received the recessive allele from either parent.

18. The pedigree to the right shows a family's pedigree for colorblindness. Is this trait dominant or recessive? How do you know? Recessive

19. With this in mind, is this autosomal or sex-linked? How do you know? II-6 (male) is not a carrier, but has an affected son

20. Why does individual IV-7 have colorblindness? She received a recessive allele from each parent

21. Why do all the daughters in generation II carry the colorblind gene? Dad is colorblind, so they all receive the recessive allele from him

22. Name 2 individuals in generation IV who are colorblind males. IV-1 and IV-5

