Student worksheet answers

1.8 Alleles on the sex chromosomes produce sex-linked traits

Pages 18–21

Sex-linked traits

1 What are autosomes?

Non-sex chromosomes. In humans, chromosomes 1–22 are autosomes.

2 What are sex chromosomes?

The chromosomes that determine the sex of an organism.

3 What sex chromosomes does a human male have?

X and Y

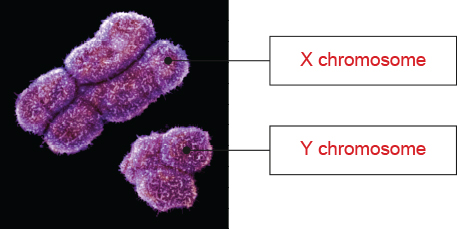
4 Does a human male’s Y chromosomes come from his mother or his father? Why?

His father. A female has 2 X chromosomes. Therefore, she can only give her offspring an X chromosome. A male can give either an X (to his daughter), or a Y (to his son).

5 Fill in the blanks.

In humans, the genotype of a female is XX and the genotype of a male is XY.

6 Identify which is the X chromosome and which is the Y chromosome in the image below:



7 Name the term used to describe traits and genes that are carried on the sex chromosomes.

Sex-linked

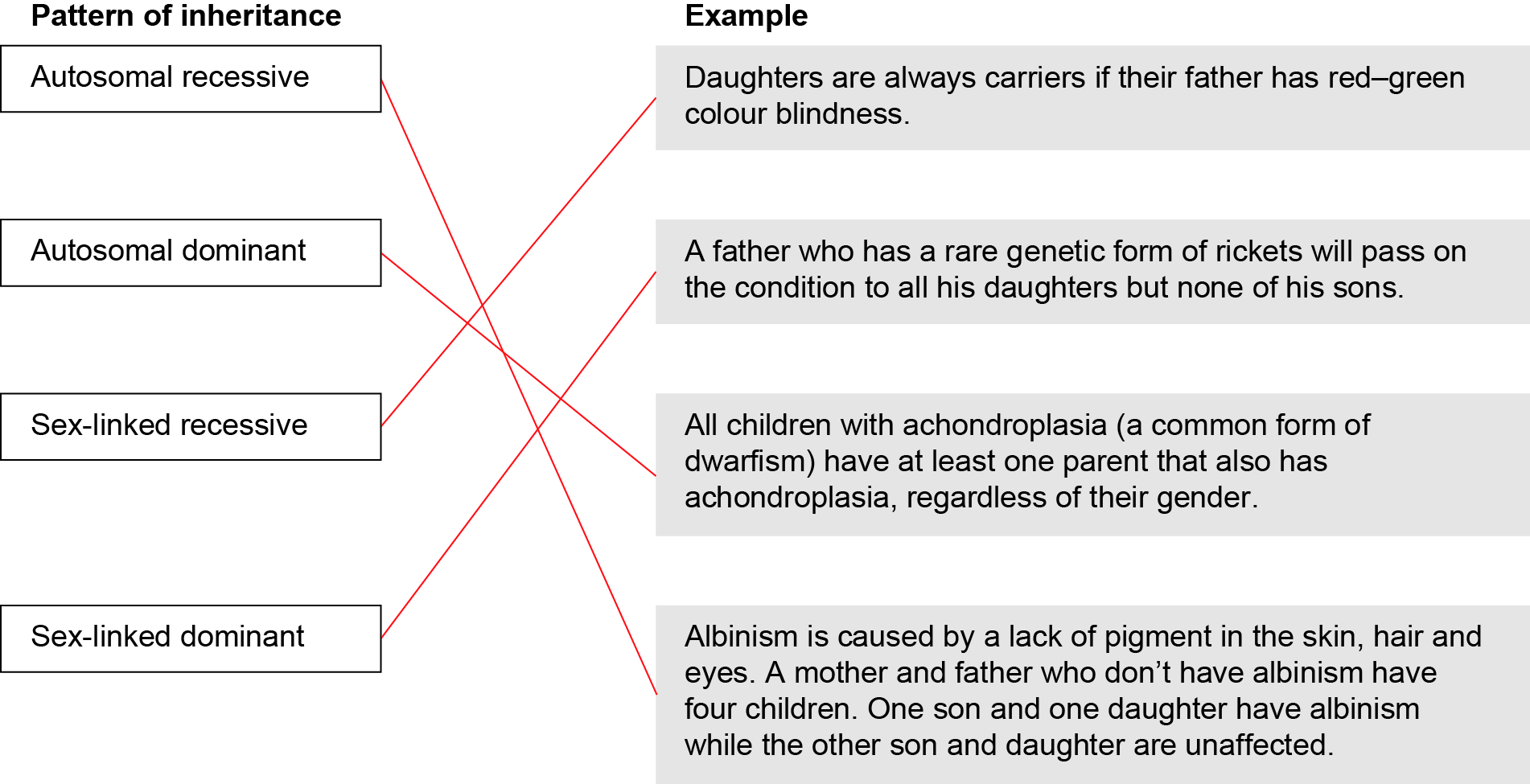
8 Give ONE example of a non-sexual trait that is carried on the human X chromosome.

*Answers may vary.* Examples include red–green colour vision and blood clotting.

9 Explain why there is a greater percentage of males than females that have red–green colour blindness.

Red–green colour blindness is an X-linked recessive trait. This means the gene is located on the X chromosome. Because males only have one X chromosome, it means if this allele is present they will have the trait. They cannot be carriers.

10 Match the patterns of inheritance with the correct example.



11 Suggest how a man and woman, both with normal sight, could have children that have red–green colour blindness. Include a Punnett square in your answer.

The woman must be a carrier with the genotype XcX. The male has normal sight so must have the genotype XY. This means they could have daughters with normal sight (XcX and XX) and sons both normal (XY) and affected (XcY).

Extend your understanding

12 Suggest why sex-linked traits are more frequently found on the X chromosome than on the Y chromosome, and explain how this affects the inheritance of these traits differently in males and females.

The X chromosome is much larger than the Y chromosomes and contains many more genes, therefore more sex-linked traits are found on the X chromosome. Females can be heterozygous for any traits found on the X chromosome while males only have one allele for these genes located on their single X chromosome.