**Station: Lineage**

1) Women have sex chromosomes of **XX**, and men have sex chromosomes of **XY**.  
Which of a man's grandparents could not be the source of any of the genes on his**Y**-chromosome?

**A.**Father's Mother.

**B.**Mother's Father.

**C.**Father's Father.

**D.**Mother's Mother, Mother's Father, and Father's Mother.

**E.**Mother's Mother.

2) Women have sex chromosomes of **XX**, and men have sex chromosomes of **XY**.

Which of a women's grandparents could not be the source of any of the genes on either of her **X**-chromosomes?

**A.**Mother's Father.

**B.**Father's Mother.

**C.**Mother's Mother.

**D.**Father's Father.

**E.**Mother's Mother and Mother's Father.

**Station: Investigating Sex-linked Genotypes**

3) What is the genotype of a red-eyed, yellow-bodied female fruit fly who is homozygous for the eye colour allele?  
Red eyes (w+) and tan bodies (y+) are the dominant alleles. (Both traits are **X** chromosome linked).

**A.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04aorange.gif

**B.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04bblack.gif

**C.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04cblack.gif

**D.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04dblack.gif

**E.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04eblack.gif

4) What is the genotype of a red-eyed, yellow-bodied female fruit fly who is heterozygous for the eye colour allele?  
Red eyes (w+) and tan bodies (y+) are the dominant alleles. (Both traits are **X** chromosome linked).

**A.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04aorange.gif

**B.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04bblack.gif

**C.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04cblack.gif

**D. **

**E.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/04eblack.gif

5) The alleles for eye colour and for body colour are on the **X** chromosome of Drosophila, but not on the **Y**. Red eye colour (w+) is dominant to white eye colour (w), and tan body colour (y+ ) is dominant to yellow body colour (y).

What is the genotype of a tan-bodied, white-eyed male?

**A.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02ablack.gif

**B.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02borange.gif

**C.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02cblack.gif

**D.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02dblack.gif

**E.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02eblack.gif

6) The alleles for eye colour and for body colour are on the **X** chromosome of Drosophila, but not on the **Y**. Red eye colour (w+) is dominant to white eye colour (w), and tan body colour (y+ ) is dominant to yellow body colour (y).

What is the genotype of a yellow-bodied, white-eyed male?

**A.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02ablack.gif

**B.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02borange.gif

**C.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02cblack.gif

**D.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02dblack.gif

**E.**http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance_2/graphics/02eblack.gif

**Station: Investigating sex-linked Phenotypes by breeding (gender-specific)**

7) In a cross between a white-eyed female fruit fly and red-eyed male, what percent of the female offspring will have white eyes? (White eyes are X-linked, recessive)

**A.**100%

**B.**25%

**C.**50%

**D.**75%

**E.**0%

8) In a cross between a pure bred, red-eyed female fruit fly and a white-eyed male, what percent of the male offspring will have white eyes? (white eyes are **X**-linked, recessive)

**A.**100%

**A.**75%

**C.** 50%

**D.** 25%

**E.**0%

**Station: Investigating sex-linked Phenotypes by breeding (determining ratios of offspring)**

9) A white-eyed, yellow body female fruit fly is crossed with a red-eyed and tan-body male. Red eyes are dominant, tan body is dominant, and both are **X**-linked. What are the expected phenotypes of the offspring?

|  |  |
| --- | --- |
| **A.** | All of the females will have red eyes and tan bodies; half of the males will have red eyes and yellow bodies, and half of the males will have white eyes and yellow bodies. |
| **B.** | All of the females and all of the males will have white eyes and yellow bodies. |
| **C.** | All of the females will have red eyes and tan bodies; all of the males will have white eyes and yellow bodies. |
| **D.** | All of the females and all of the males will have red eyes and tan bodies. |
| **E.** | All of the females will have white eyes tan bodies; half of the males will have red eyes and yellow bodies, and half of the males will have white eyes and tan bodies. |

10) Hemophilia in humans is due to an **X**-chromosome mutation. What will be the results of mating between a normal (non-carrier) female and a hemophilac male?

|  |  |
| --- | --- |
| **A.** | half of daughters are normal and half of sons are hemophilic. |
| **B.** | all sons are normal and all daughters are carriers. |
| **C.** | half of sons are normal and half are hemophilic; all daughters are carriers. |
| **D.** | all daughters are normal and all sons are carriers. |
| **E.** | half of daughters are hemophilic and half of daughters are carriers; all sons are normal. |

11) A human female "carrier" who is heterozygous for the recessive, sex-linked trait causing hemophilia, marries a normal male. What proportion of their male progeny will be hemophiliac?

**A.**100%

**B.**75%

**C.**50%

**D.**25%

**E.**0%

**Station: Putting it all together**

12) Remember: Red eye colour (w+) is dominant to white eye colour (w)

Tan body colour (y+) is dominant to yellow body colour (y).

Two flies were crossed both with unknown genotypes. However, the phenotype of the female was red eyed with a tan body and the male was also red eyed with a tan body. All the female came out with red eyes and tan bodies. Half the males came out with red eyes and a tan body, and the other half had white eyes with a yellow body.

What was the genotype of the original parents?

13) Two flies were crossed both with unknown genotypes. However, the female had red eyes and tan body and the male had white eyes and yellow body

The offspring came out in the following numbers:

|  |  |  |
| --- | --- | --- |
| Sex | Phenotype | Number of offspring |
| Female | Red eyes, tan body | 33 |
| Red eyes, yellow body | 31 |
| White eyes, tan body | 0 |
| White eyes, yellow body | 0 |
| Male | Red eyes, tan body | 28 |
| Red eyes, yellow body | 34 |
| White eyes, tan body | 0 |
| White eyes, yellow body | 0 |

What were the genotypes of the original parents?