Name: Score:

20 Multiple choice questions

Term 1 of 20

What are **mutations**?

- Planned alterations in the RNA sequence for gene therapy.
- Controlled changes in the protein structure for enhancement.
- Deliberate modifications in the cellular DNA for research purposes.
- Random changes in the DNA sequence that make up a gene.

Term 2 of 20

Why don't heterozygous females show the disease?

- The dominant normal allele covers up ("masks") the defective recessive one.
- The recessive allele is expressed equally in heterozygous females.
- The defective recessive allele is enhanced by environmental factors.
- The dominant normal allele is suppressed by the defective recessive one.

Term 3 of 20

Give two examples of a sex-linked disorder.

- Autosomal recessive disorders.
- Males are **XY**, females are **XX**.
- Color blindness and hemophilia.
- Controlled by one gene on each chromosome.

Term 4 of 20

What do the uppercase **N** and lowercase **n** represent?

- N is the mutated gene, and n is the healthy (recessive) gene.
- N is the normal (dominant) gene, and n is the disease or disorder (recessive) gene.
- N is the non-functional gene, and n is the active (dominant) gene.
- N is the recessive gene, and n is the normal (dominant) gene.

Term 5 of 20

What is **nondisjunction**?

- A mistake in meiosis when one gamete gets two of the same chromosome and the other gamete gets none, leading to an abnormal chromosome number.
- A process where chromosomes duplicate twice in meiosis.
- A condition where chromosomes exchange parts during meiosis.
- A mistake in mitosis when cells divide unevenly.

Term 6 of 20

How are either/or traits controlled?

- Controlled by one gene on each chromosome.
- Controlled by multiple genes on one chromosome.
- Controlled by a single gene across multiple chromosomes.
- Controlled by environmental factors on each chromosome.

LIVEWORKSHEETS

Term 7 of 20

Why can only females be homozygous or heterozygous for X-linked traits, but males cannot?

- ○ **Neither allele is dominant; the heterozygote shows an intermediate trait between the two homozygotes (for example, red × white → pink).**
- ○ **Females have two X chromosomes, they can have two alleles for a trait. Males have only one X chromosome (are hemizygous), so they have just one allele.**
- ○ **Because they don't have another X chromosome (to mask the recessive allele.)**
- ○ **Conditions like Turner syndrome, Klinefelter syndrome, or other abnormal sex chromosome numbers.**

Term 8 of 20

In a test cross, what do these offspring ratios mean?

- ○ **50% tall : 50% short** → The unknown plant is **Tt**.
  100% tall : 0% short → The unknown plant is **TT**.
- ○ **The dominant normal allele covers up ("masks") the defective recessive one.**
- ○ **In areas with malaria, because heterozygotes survive better than both homozygotes.**
- ○ **Some traits follow Mendelian inheritance through dominant and recessive alleles.**

Term 9 of 20

She is a carrier female (has one normal and one disease allele).

- ○ **Xnyn**
- ○ **XNY**
- ○ **XNXn**
- ○ **Xhxh**

Term 10 of 20

She is a disordered female.

- ○ **Xnyn**
- ○ **Xhxh**
- ○ **XnXn**
- ○ **XNY**

Term 11 of 20

He is a disordered male.

- ○ **Xhyn**
- ○ **XnY**
- ○ **Xbxb**
- ○ **Xnyn**

Term 12 of 20

What kind of traits did Mendel choose to study?

- ○ **He chose traits influenced by environment (for example, plant size due to sunlight).**
- ○ **He chose either/or traits (for example, purple or white flowers, tall or short plants).**
- ○ **He chose traits that change with age (for example, leaf texture).**
- ○ **He chose traits determined by multiple genes (for example, flower color gradient).**

Term 13 of 20

What can nondisjunction of the X chromosome lead to?

- ○ **50% tall : 50% short** → The unknown plant is **Tt**.
  100% tall : 0% short → The unknown plant is **TT**.
- ○ **A mistake in meiosis when one gamete gets two of the same chromosome and the other gamete gets none, leading to an abnormal chromosome number.**
- ○ **The dominant normal allele covers up ("masks") the defective recessive one.**
- ○ **Conditions like Turner syndrome, Klinefelter syndrome, or other abnormal sex chromosome numbers.**

LIVEWORKSHEETS

Term 14 of 20

How can doctors detect genetic defects in a fetus?

- By analyzing the father's genetic traits and lifestyle.
- By observing the fetus's physical development through ultrasound alone.
- By monitoring the mother's diet and exercise habits.
- By checking family history, the mother's risk factors (age, health, etc.), or using medical tests.

Term 15 of 20

Why are males more likely to show sex-linked recessive disorders?

- They create new traits for natural selection to act on.
- The dominant normal allele covers up ("masks") the defective recessive one.
- Females have two X chromosomes, they can have two alleles for a trait. Males have only one X chromosome (are hemizygous), so they have just one allele.
- Because they don't have another X chromosome (to mask the recessive allele.)

Term 16 of 20

What does it mean to be *homozygous*?

- Having no alleles on each member of a pair of chromosomes. (--)
- Having mixed alleles on a single chromosome. (T/t)
- Having the same allele on each member of a pair of chromosomes. (TT or tt)
- Having different alleles on each member of a pair of chromosomes. (Tt)

Term 17 of 20

Why are mutations called the "raw material of evolution"?

- They create new traits for natural selection to act on.
- They ensure the survival of existing traits.
- They prevent any changes in species characteristics.
- They maintain genetic stability across generations.

Term 18 of 20

What does the law of independent assortment state?

- Genes located on the same chromosome are always inherited together.
- Genes are inherited in a fixed order regardless of chromosome.
- Genes located on different chromosomes are inherited independently of each other.
- Genes on different chromosomes are always linked.

Term 19 of 20

She is a normal female.

- XNYN
- XNXN
- XNY
- XHXH

Term 20 of 20

Under what circumstances can heterozygotes for sickle-cell anemia be favored?

- In places with low sunlight, because heterozygotes produce more vitamin D.
- In regions with high altitude, because heterozygotes have better oxygen absorption.
- In areas with cold climates, because heterozygotes are more resistant to frost.
- In areas with malaria, because heterozygotes survive better than both homozygotes.

LIVEWORKSHEETS