Name:_____

GENETICS TEST STUDY GUIDE

Multiple-Choice

Circle the letter of the correct choice.

1. . Genetics is the science of
    a. pea plants.
    b. heredity.
    c. pollination.
    d. probability.
2. . Which theory was disproved by Mendel's first set of experiments?
    a. evolutionary theory
    b. genetic theory
    c. blending theory
    d. none of the above
3. . When Mendel crossed a purple-flowered plant with a white-flowered plant, the F2 generation had
    a. only purple flowers.
    b. only white flowers.
    c. purple flowers and white flowers.
    d. pink flowers.
4. . For each trait Mendel studied, why did one form of the trait seem to disappear in the F1 generation?
    a. The allele for that form of the trait is recessive.
    b. The trait is controlled by multiple alleles.
    c. That form of the trait is codominant.
    d. The trait is a polygenic trait.
5. . Mendel's second set of experiments led to the law of
    a. independent assortment.
    b. segregation.
    c. inheritance.
    d. codominance.
6. . Incomplete dominance occurs when
    a. both alleles are completely dominant.
    b. both alleles are completely recessive.
    c. both alleles are expressed equally in the phenotype.
    d. the dominant allele is not entirely dominant.
7. . The ABO blood type gene has three common alleles. How many possible genotypes are there?
    a. three
    b. four
    c. six
    d. nine
8. . A polygenic trait is controlled by
    a. one gene with two alleles.
    b. one gene with multiple alleles.
    c. one gene with codominant alleles.
    d. more than one gene.

True or False

Write true if the statement is true or false if the statement is false.

_____ 1. Mendel studied the ABO blood type.

_____ 2. Offspring always have a blend of their parents' characteristics.

_____ 3. Seeds are the male gametes in plants.

_____ 4. In his first set of experiments, Mendel observed a 75:25 phenotype ratio in the F1 generation.

_____ 5. In his second set of experiments, Mendel studied two traits at a time.

_____ 6. Mendel's work was virtually unknown until 1900.

_____ 7. All traits have the simple inheritance patterns studied by Mendel.

_____ 8. An example of codominance occurs with the ABO blood type.

_____ 9. Skin color is an example of a polygenic trait.

_____ 10. The environment can affect how the genotype is expressed.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

1. The "father of genetics" was _____.

2. Fertilization in plants is known as _____.

3. Offspring from a cross between two different plants are called _____.

4. The law of _____ states that factors controlling the same characteristic go to different offspring.

5. The law of _____ states that factors controlling different characteristics are inherited independently of each other.

6. The position of a gene on a chromosomes is its _____.

7. Different versions of the same gene are called _____.

8. Phenotype is the expression of an organism's _____.

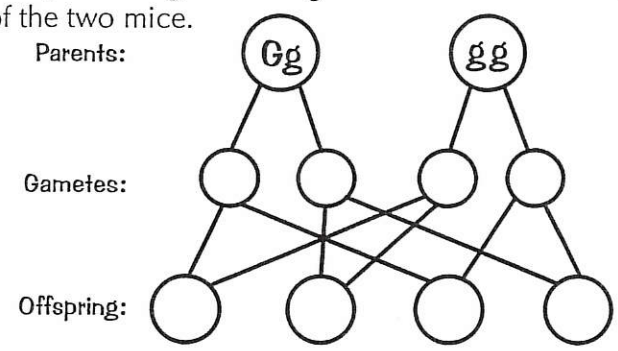
9. The chance that a certain event will occur is its _____.

10. A(n) _____ is a chart for predicting genotypes of offspring.

More Genetic Diagrams

Q1 An allele for the colour grey (**G**) in mice is dominant over the allele for the colour white (**g**). A hybrid grey mouse (**Gg**) was bred with a thoroughbred white mouse (**gg**).

a) Complete the genetic diagram below to show the potential combinations of alleles in the offspring of the two mice.



'Hybrid' = an organism which has two different alleles for the same characteristic, e.g. Hh.

Thoroughbred = an organism which has two identical alleles for a characteristic, e.g. HH or hh.

b) What is the likely ratio of colours in any litters of offspring (grey : white)?

.....

c) If the mice had 12 babies, how many would there be **likely** to be of each colour?

.....

Q2 Sally is investigating the inheritance of **flower colours**. She knows that the allele for the colour **red** is **dominant** over the allele for the colour **white**.

Sally has two of the same plant, one with **red** flowers and one with **white** flowers. Suggest how Sally can find out whether the plant with red flowers is thoroughbred red (**RR**) or hybrid red (**Rr**).

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Q3 An allele for the long hair (**H**) in cats is dominant over the allele for the short hair (**h**). A homozygous long-haired cat (**HH**) was bred with a homozygous short-haired cat (**hh**).

a) In the space below, draw a genetic diagram to show the potential combinations of alleles in the offspring of the two cats.

b) What is the probability of their offspring having:

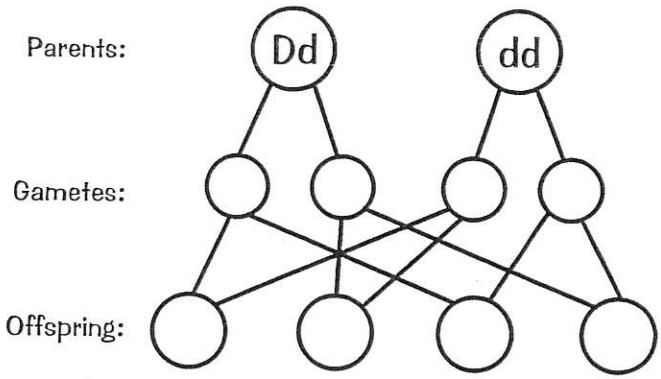
i) long hair? .....

ii) short hair? .....

Genetic Disorders

Q3 **Polydactyly** is a **genetic disorder** which causes a baby to be born with **extra fingers or toes**. Polydactyly is caused by a **dominant** allele.

a) i) Complete the genetic diagram below showing the inheritance pattern of polydactyly. The dominant allele for polydactyly is **D**, and the recessive allele is **d**.



ii) In the above genetic diagram, what is the probability that a child will be polydactyl?

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b) Will a person with the alleles **Dd** be a **sufferer**, a **carrier** or **neither**? Explain your answer.

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c) State the probability that of a child of two parents with the alleles **DD** and **dd** will be polydactyl.

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Q4 During in vitro fertilisation (IVF) a cell can be removed from an embryo and **screened** for **genetic disorders**. If a faulty allele is present, the embryo is destroyed.

a) Explain why some people think embryo screening is a **bad** thing.

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b) Explain why some people think embryo screening is a **good** thing.

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