

GRADE 12 BIOLOGY

Mid Term Practice

Name: _____

Date: _____

Instructions:

The Mid-Term will NOT Be open Book! Have a cheat sheet prepared!

Open responses require proper grammatical construction (spelling, punctuation, grammar, ..)

CELLS

1. The two " new " cells produced from cell division are called
 - a. mother cells
 - b. daughter cells
 - c. son cells
 - d. father cells

2. The process of **asexual** reproduction:
 - a. is a form of spontaneous biogenesis requiring no parent(s)
 - b. uses two parent cells
 - c. produces offspring having the same genetic information as the parent
 - d. produces offspring having different genetic information as the parent

3. Explain the difference between Mitosis and Meiosis.

GENETICS

1. What is a Punnett Square? How many 'options' are on a **monohybrid** cross? (2 marks)

For the following; Brown eyes is dominant (B) over Blue (b)

2. **Calculate.** If a heterozygous brown-eyed woman had children with a homozygous blue-eyed man, what is the chance of any of their children having blue eyes. [Show the Punnett Square, express answer as %]. (2 marks)

3. **Sex-Linked.** In fruit flies, the eye colour is a sex-linked trait. **Red** is dominant, **white** recessive. If a heterozygous Red-eyed female mates with a White eyed male, *calculate* what percentage of the **male** children can be expected to be Red-Eyed. (2 marks)

4. **Explain.** What is the difference between a dominant and recessive gene?

5. **Explain.** What is the difference between genotype and phenotype?

6. **Explain.** What is the difference between heterozygous and homozygous genotypes? If an organism is true breeding for a trait explain also the genotype for that trait.

7. Give an example of Codominance.

8. Give an example of incomplete dominance.

9. Give an example of a polygenic trait.

10. Give an example of a trait that involves multiple alleles.

FILL IN THE BLANKS with a correct vocabulary word (1 mark each)

4. Characteristics of organisms are controlled by

_____ on chromosomes.

7. The _____ refers to the organism's displayed characteristic traits, such as purple or white flowers.

9. The position of a gene on a chromosome is called its

_____.

10. The law of _____ states that there are two factors controlling a given characteristic and these factors separate and go to different gametes during meiosis.

MULTIPLE CHOICE (1 mark each question)

1. Looking at your dog will give information concerning:

- a. the dog's genotype.
- b. the dog's phenotype.
- c. the dog's recessive alleles.
- d. the dog's heterozygous alleles.

2. An **Aa** individual

- a. has a homozygous genotype.
- b. has a heterozygous phenotype.
- c. has a heterozygous genotype.
- d. has a homozygous phenotype.

4. Circle the letter of *each* sentence that is true about Mendel's principles.

- a. The inheritance of biological characteristics is determined by genes that are passed from parents to their offspring in organisms that reproduce sexually.
- b. Two or more forms of the gene for a single trait can never exist.
- c. The copies of genes are segregated from each other when gametes are formed.
- d. The alleles for different genes usually segregate independently of one another.

5. Circle the letter of the probability that five flips of a coin will come up all heads.

- a. 100 %
- b. 75 %
- c. 50 %
- d. 3 %

6. If there is only a 25% chance of each of your offspring having blue eyes, is it possible to have all four of your children with blue eyes?

- a. yes
- b. no
- c. with help of the milkman
- d. never

1. An AA individual:

- a. has a homozygous genotype.
- b. has a heterozygous phenotype.
- c. has a heterozygous genotype.
- d. has a homozygous phenotype.

2. Jennie knows she is a carrier for a certain trait; there is a 25% chance her offspring will get it from her and her partner. Her first two children do not have the trait. The probability her third child has the trait is:

- a. 100 % b. 75 % c. 25 % d. 0%

1. A pedigree is:

- a. a diagram or documentation that depicts the biological relationships between an organism and its ancestors.
- b. documentation of the orthomorphic, anthropogenic and dyslexic tendency of an extinct extoplastic organism
- c. a certificate for graduating university with a degree in Biology.
- d. no longer relevant ever since the Cambrian era explosion of life on the planet.

7. It is the female gamete that determines the gender of an offspring (True or False). Explain your answer.

EVOLUTION

Explain in your own words:

1. How are adaptations important in evolution?
2. Summarize Darwin's theory of natural selection.
3. There exists a species of spider that looks like an ant. Explain this evolutionary adaptation.

Multiple Choice (circle the **one** correct or best response)

- | | |
|---|---|
| 1. The assumption of Lamarck's theory that proved to be incorrect was | 2. A zygote is: |
| (1) the law of segregation | a. a popular candy bar |
| (2) the inheritance of acquired characteristics | b. produced in the male and transferred to the female |
| (3) the process of natural selection | c. the result of the fertilization of an egg by a male gamete |
| (4) that reproduction must be random | d. the crossover phase of meiosis. |

3. If dark-coloured birds and light-coloured birds were introduced into an environment that predominately contained trees with dark coloured bark:

- (1) both types of birds would have the same chance of escaping predators
- (2) individual light-coloured birds would try to change their colour to dark colour
- (3) light-coloured birds would have a better chance of survival
- (4) light coloured birds would be more easily seen by predators

4. Characteristics of a species that make its members better able to live and reproduce in their environment are known as :

- (1) abiotic factors
- (2) biotic factors
- (3) favorable adaptations
- (4) homologous structures

True/False Section: Indicate whether the following statements are true or false based on your knowledge of the living environment and study of evolutionary theories.

___ 1. The concept of biological evolution is that the Earth's present-day species developed from earlier, distinctly different species.

___ 2. Individuals with advantageous adaptations to the environment tend to increase in numbers. (Funny wording!)

___ 3. The great diversity of organisms is thought by evolutionists to be the result of billions of years of evolution that has filled the earth's niches with available life forms.

___ 4. Extinction of species is relatively uncommon. Most of the species that have lived on the earth are currently still alive.

___ 5. Biological evolution is thought to account for the diversity of species developed through processes over many generations.

___ 6. There has been at least five known extinction events on the planet where most life had to start all over again.

6. Circle the letter of **each** sentence that is true about artificial selection:

- a. It is also called selective breeding.
- b. It occurs when humans select natural variations they find useful.
- c. It eventually, after many generations, produces organisms that look very different from their ancestors.
- d. It is no longer used today.

7. Which cross will result in all of the offspring being hybrids for both traits?
(two answers)

- a. **RRYY x RRYY**
- b. **RRYY x rryy**
- c. **RrYy x RrYy**
- d. **rryy x rryy**

13. If one parent has type B blood, and the other type AB, the child's blood type is

- a. A or O
- b. B or O
- c. A or B
- d. A, B, AB

14. A man with blood type AB could not be the father of a child with the blood type

- a. A
- b. B
- c. AB
- d. O

15. If a human being inherits two X chromosomes, this individual will be:

- a. Female
- b. male
- c. colour-blind
- d. sterile

16. The exchange of DNA between chromosomes during meiosis is known as:

- a. Chromatic aberration
- b. Crossing over
- c. Genetic inheritance
- d. Sperm production

Match each term with its definition by letter.

Terms	Definitions
_____ fitness	a. Any inherited characteristic that increases an organism's chance of survival
_____ adaptation	b. Survival of the fittest
_____ natural selection	c. The ability of an individual to survive and reproduce in its specific environment

7. **Explain** what Darwin meant by the phrase 'survival of the fittest'.

8. There are many lines of **evidence** that support the theory of evolution, that we are all living organisms descended from common ancestors. Explain two of them.

True or False. Evolution requires that there be slight variation in the individual members of a species.

Completion Fill in the blanks with terms from Chapter 17.

5. Any change in the relative frequency of alleles in a population is called:

6. A gene pool consists of all the genes in a(an): _____ -

7. The two main sources of genetic variation are gene shuffling and

8. A random change in allele frequency is called: _____

9. When birds cannot interbreed because they have different mating songs, they are characterized by _____ isolation.

10. A situation in which allele frequencies change as a result of the migration of a small subgroup of a population is known as the

11. Research on Galápagos finches by Peter and Rosemary Grant showed that a type of natural selection called _____ selection was occurring.

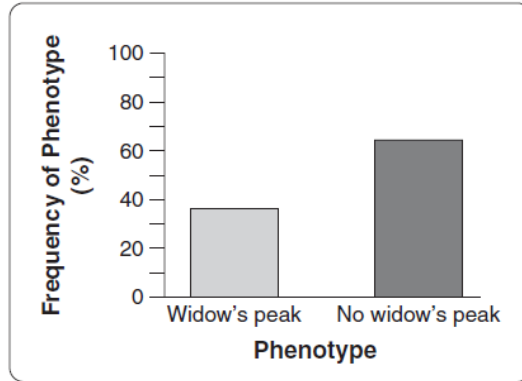
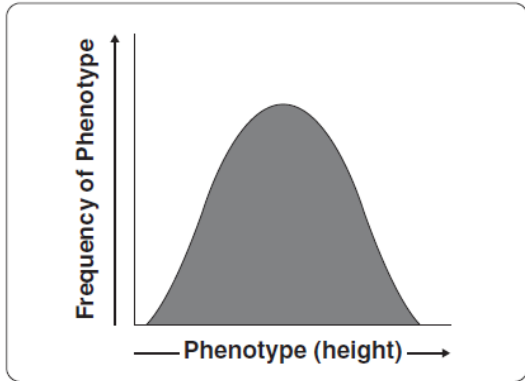
12. Two related species that live in the same area but mate during different seasons are separated by _____ isolation.

Single-Gene and Polygenic Traits

14. Is the following sentence true or false? The number of phenotypes produced for a given trait depends on how many genes control the trait

15. Is the following sentence true or false? Most traits are controlled by a single gene. _____

16. Label the two graphs to show which one represents a single-gene trait and which one represents a polygenic trait.



BONUS QUESTIONS (extra marks if you need them)

1. Show an example of a **dihybrid** cross Punnett square! For the dominant traits of Brown eyes (**B**) and Dark hair (**D**). The recessive trait being Blue eyes, the **b** allele, and light hair, the **d** allele. Assume the Father is genotype **BBDd** and the mother is genotype **Bbdd** [6 marks total; 2 for table, 1 each other]

What percentage of offspring are:

- a. Brown Eyes, dark hair? _____
- b. Brown Eyes, light hair? _____
- c. Blue Eyes , dark hair? _____
- d. Blue Eyes, light hair? _____

2. The pedigree below shows a family's pedigree for colourblindness.
- Which sex can be carriers of colourblindness and not have it?
 - With this in mind, what kind of trait is colourblindness ?
 - Why does individual IV-7 have colourblindness?
 - Why do all the daughters in generation II carry the colorblind gene?
 - Name two generation IV colorblind males.

