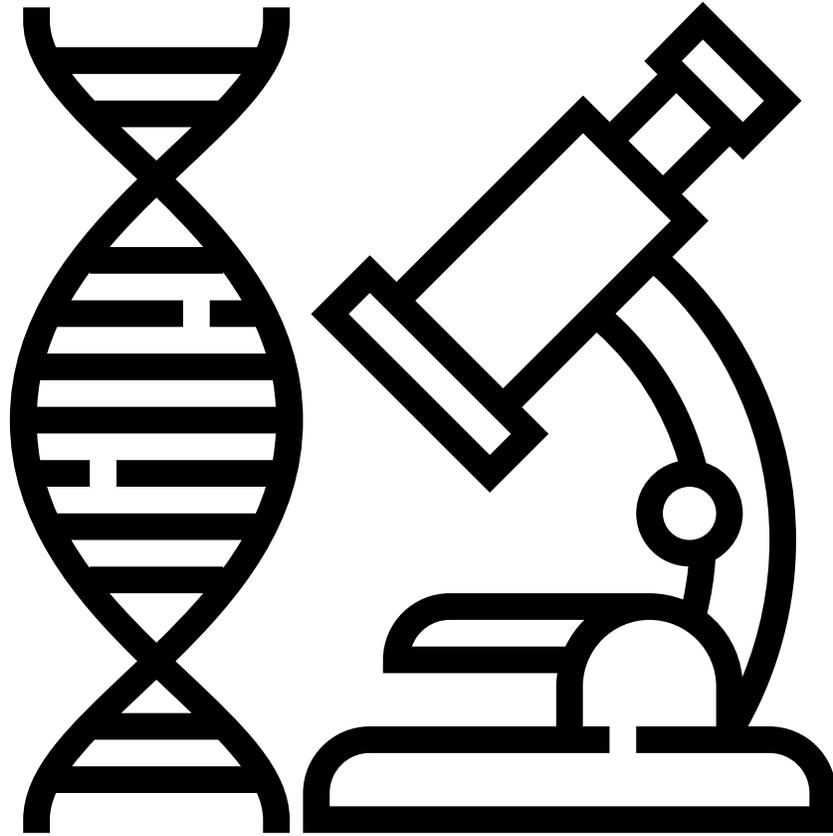


HEREDITY B



TEST

TEAM NAME: _____ # _____

DISCLAIMER: Multiple questions for one part each have their separate part. For questions asking to choose multiple, the whole question is considered wrong even if you guessed one of them correct. Blank spaces between questions are workspace. Good luck and have fun! This logo was made by Euclapse.

MULTIPLE CHOICE

1. Out of the possible options, which of these can be classified as a pyridine?
 - a. Nucleotides
 - b. Nucleosomes
 - c. Nucleic Acids
 - d. Nucleosides
 - e. Nucleobases

2. Who is referred to as the father of heredity?
 - a. Thomas Hunt Morgan
 - b. Aristotle
 - c. Hugo de Vries
 - d. Gregor Mendel
 - e. Carl Correns
 - f. William Bateson
 - g. Oswald Avery
 - h. Walter Fiers

3. What happens in meiotic metaphase 1?
 - a. Homologous chromosomes line up in the cleavage plate
 - b. Chromatids line up in the middle of the cell
 - c. Pairs of chromosomes line in up in the middle of the cell
 - d. Chromatids line up in the cleavage plate
 - e. Chromosomes are pulled apart by the centrosomes, leaving chromatids
 - f. Chromatids are split apart by the centrosome
 - g. Chromatids get split apart by the centrioles
 - h. C & E
 - i. D & G

4. When 2 non-homologous chromatids bond, what is it called?
 - a. Non-reciprocal translocation
 - b. Robertsonian translocation
 - c. Reciprocal translocation
 - d. Nonhomologous translocation

5. Which of these is a human monosomy?
 - a. Palau Syndrome
 - b. Turner Syndrome
 - c. Down Syndrome
 - d. Edward's Syndrome

6. Which of these are stop codons?
 - a. UCA
 - b. TGA
 - c. TCC
 - d. AUG

- e. UGC
- 7. What is the role of the Topoisomerase?
 - a. To unzip the DNA
 - b. To attach the RNA primer
 - c. To attach each base to its corresponding pair
 - d. To unwind the DNA molecule

TRUE OR FALSE

1. Tryptophan is the most commonly used amino acid.
2. tRNA is created through transcription.
3. Nonsense codons are another name for stop codons
4. Gregor Mendel used beans for his genetic experiments.
5. The original parents are called the F1 generation.
6. Purines have 1 molecular ring.
7. The kinetochore is the center of a chromosome
8. Uracil pairs with Thymine
9. The number of chromatids in a gamete is the same as the number of chromosomes in a diploid
10. Cytokinesis results in the process of creating a new nucleus.
11. HUGO graphed 100% of the human genome

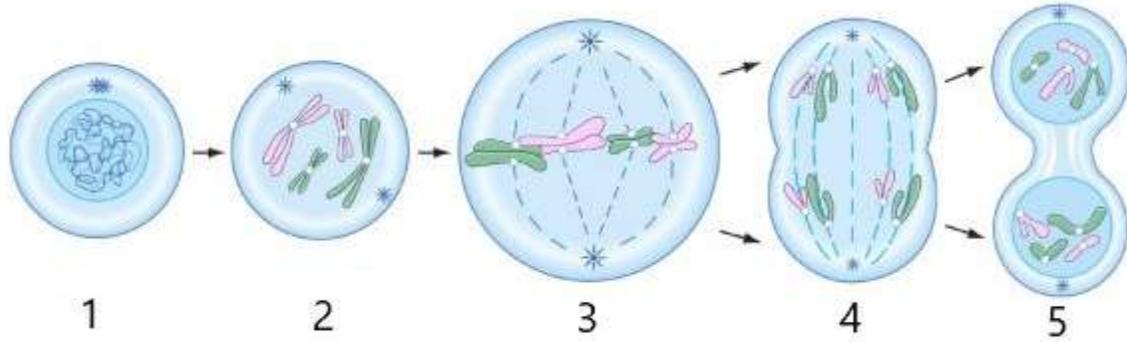
SHORT ANSWER

1. What are 4 types of RNA?
2. Define the law of independent assortment.
3. Name 2 examples of aneuploidy in humans.
4. How long did the HUGO project take?
5. What is a somatic cell? If a cell doesn't carry DNA, is it still somatic?
6. What stage of the cell cycle is needed to prepare for reproduction?
7. Name 2 examples of non-mendelian inheritance
8. What is the difference between an intron and an exon?
9. What types of antigens & antibodies does a person with blood type O have?
10. What is the difference between deoxyribose and ribose?
11. Define epigenetics.

COMPREHENSIVE QUESTIONS

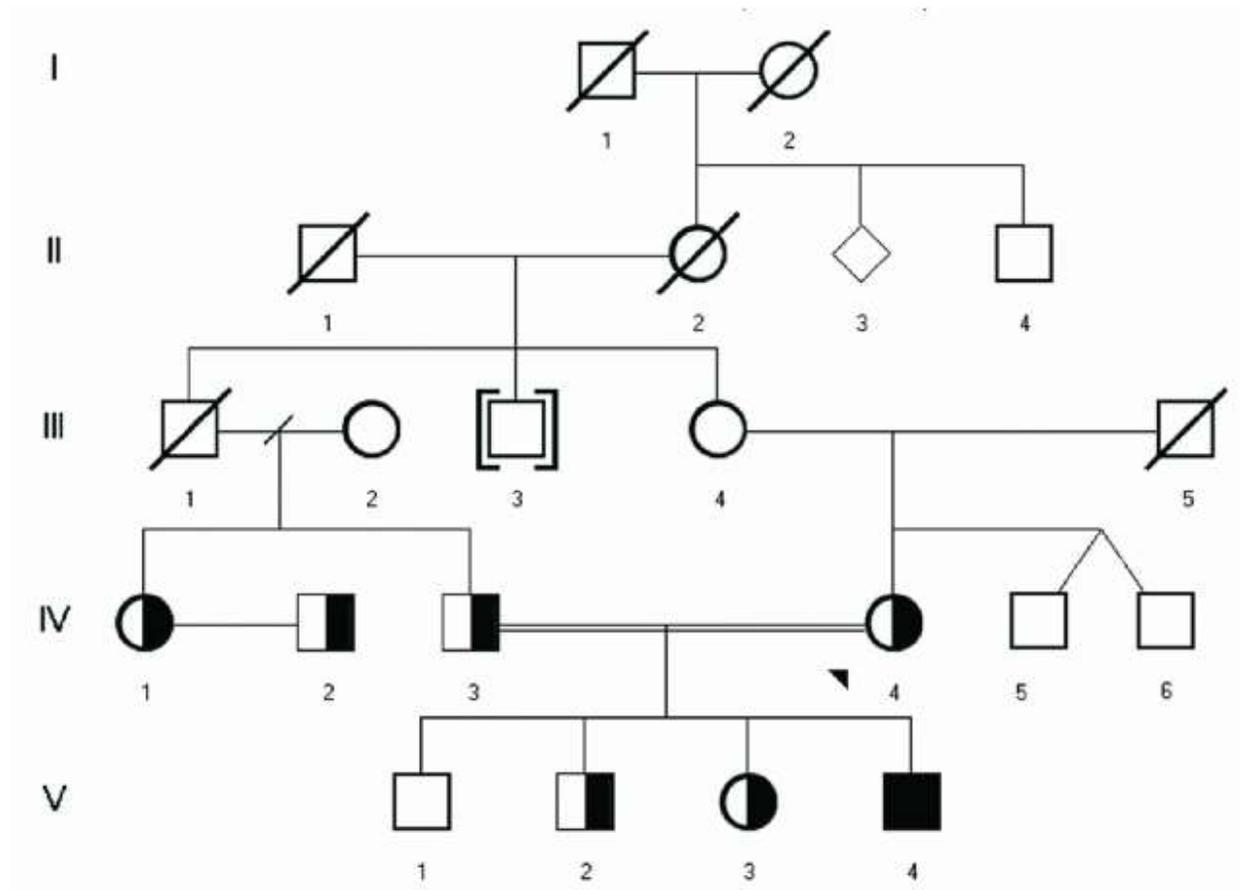
1. Transcribe the following DNA strands into RNA strands
 - i. 5' ATGCGAAATTC 3'
 - ii. 3' AAAGTATCGTG 5'
 - iii. 5' ATGGATTAGCCA 3'
2. Using your previous answers from #1, translate each of these into amino acids.

3. Label each stage of mitosis.



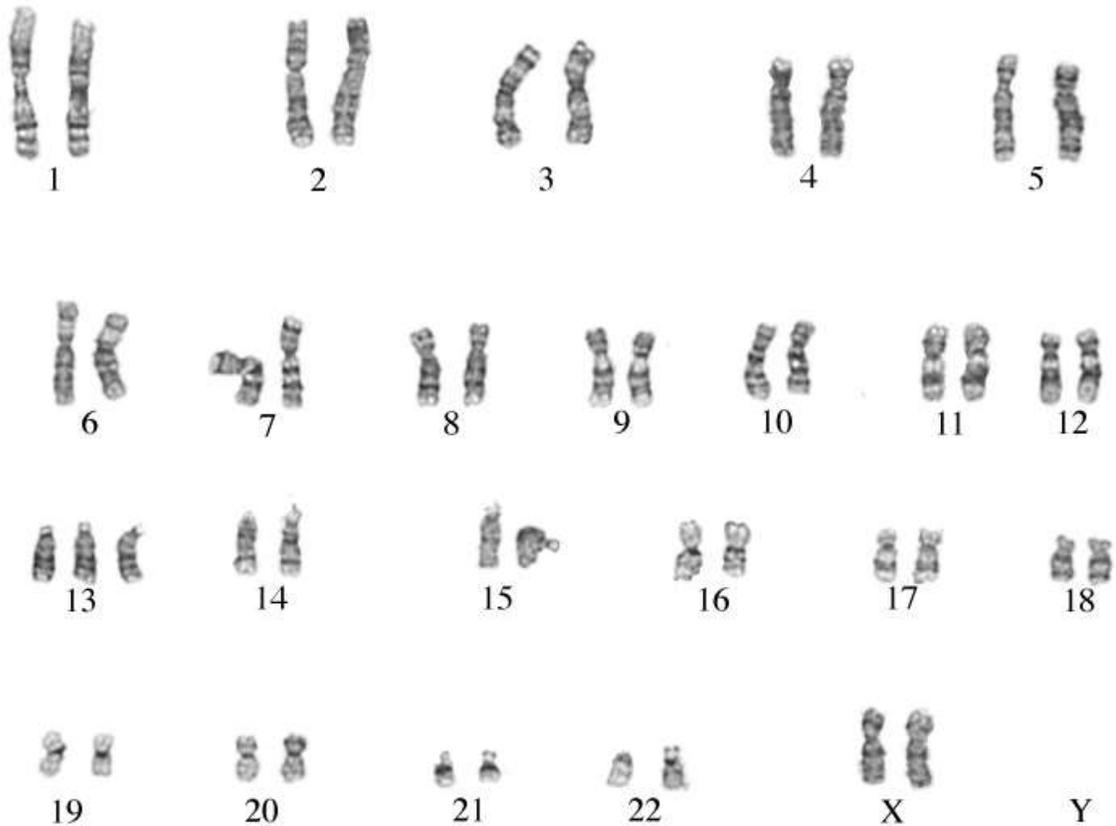
4. Jaiden wants to know what blood type she has. Her mom's blood type is B, and she also knows Jaiden's grandpa's, which is O. Her dad has forgotten his blood type, but he knows that both of his parents have AB as their blood type. What are the chances that Jaiden's blood type is A?

Look at the following image for questions 5-10.



5. What is the relationship between IV 3 and IV 4?
6. What is the relationship between IV 5 and IV 6?
7. How many females are present in this family?
8. How many males are present in this family?
9. What do the brackets around III 3 mean?
10. Why is II 3 a different shape?
11. An isolated population in a remote island was examined for a certain gene by a university. They discovered that 32 people out of the 2453 people expressed the gene, while the rest did not. This gene is believed to be recessive, and the population is being assumed to be in a Hardy-Weinberg equilibrium. Around how much of the population has the gene?

Use the following image to answer questions 12-16



12. What gender is the specimen shown?
 13. Does this specimen have aneuploidy?
 14. Look at chromosome 7. Name any problems associated with this chromosome if are present.
 15. Look at chromosome 15. Name any problems associated with this chromosome if any are
 16. Are there any other noticeable disorders? Name them if so.
-
17. A couple is having a baby, so they come to you as their counselor in order to figure out what their baby will be like. This is what they told you.
 - I. The dad has a history of red-green colorblindness (x-linked recessive) in his pap's family, as his papa had it, but he is unsure he has it. The mom knows for a fact that she carries Hemophilia A (x-linked recessive) but doesn't seem to suffer from it.
 - II. Both parents are carriers for cystic fibrosis, but none of them suffer from it.
 - III. The dad knows his parent's blood types (O and AB) but seemed to forget his. The mom knows her blood type is AB.

- IV. The dad suffers from Marfan Syndrome, even though he's heterozygous. The mom's family never encountered it.
- V. The mom has a history of down syndrome in her family, but she doesn't seem to have it.

Now, out of all of these traits, which traits does the baby has 50% or more of inheriting?

You are the discoverer of a new species of wildflower which carries 4 alleles for its color, white, pink, blue, and some which never bloom. When they crosspollinated, you found that the whites when cross-pollinated with each other create only blue and white, the pinks created only pinks and blues, and the blues created only blues. When you cross-pollinated white and pink, you found that the flower never bloomed, or was blue.

- 18. Solve a possible cross between a non-blooming flower and a blue flower. List the genotype ratio.
- 19. What type of dominance is present in this example?

20. Dan was given the task of finding the cross of $tU \times Ttu$. T is a recessive X-linked and U is autosomal dominant. Here is Dan's work. Is he right? If not, explain what he did wrong.

	tU	tU	tU	tU
Tu	TtUu	TtUu	TtUu	TtUu
tu	ttUu	ttUu	ttUu	ttUu
Tu	TtUu	TtUu	TtUu	TtUu
tu	ttUu	ttUu	ttUu	ttUu