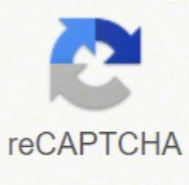




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Open

Mutations Worksheet Name _____ Date: _____ Per. _____

There are three main types of mutations: point missense mutations, point nonsense mutations, and frameshift mutations. In each of the following DNA sequences, you will use the mRNA and amino acid sequences to identify the mutation that occurred and the effects of each on, if any. Look and analyze carefully! 10 points

Original DNA Sequence: T A C A C C T T G G C G A C G A C T
 mRNA Sequence: AUG UGG AAC CGC UGC UGA
 Amino Acid Sequence: Met Trp Asn Arg Cys STOP

Mutated DNA Sequence #1: T A C A T C T T G G C G A C G A C T
 What's the mRNA sequence? AUG UAG AAC CGC UGC UGA (Circle the change)
 What will be the amino acid sequence? Met stop
 Will there likely be effects? Yes, No protein is translated What kind of mutation is this? Substitution Point missense

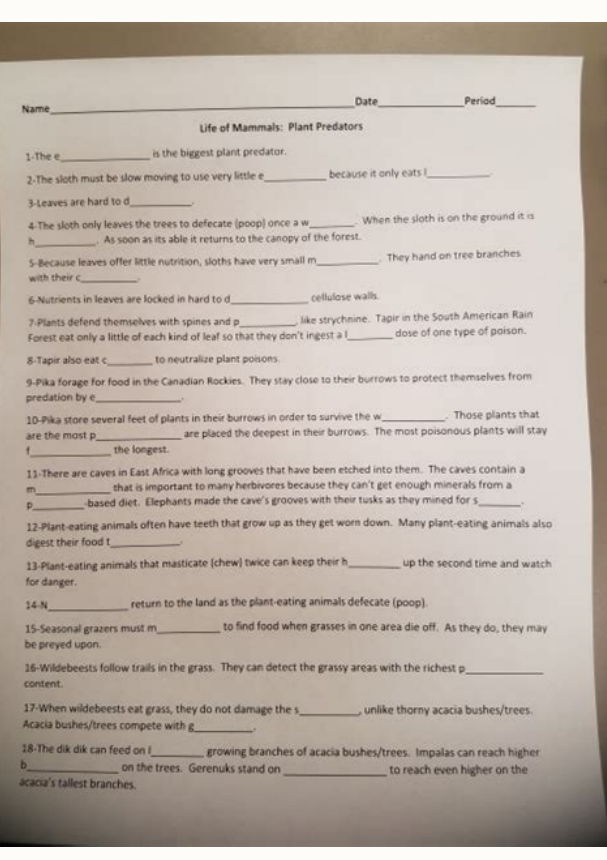
Mutated DNA Sequence #2: T A C G A C C T T G G C G A C G A C T
 What's the mRNA sequence? AUG GUG GAA CCG CUG CUG A (Circle the change)
 What will be the amino acid sequence? Met Leu Glu Pro Leu
 Will there likely be effects? Yes, useless, damaging protein could be produced since there's not stop codon and energy will be sapped. What kind of mutation is this? Insertion, frameshift

Mutated DNA Sequence #3: T A C A C C T T A G C G A C G A C T
 What's the mRNA sequence? AUG UGG AAU CGC UGC UGA (Circle the change)
 What will be the amino acid sequence? Met Trp Asn Arg Cys stop
 Will there likely be effects? NO What kind of mutation is this? Substitution, Silent mutation due to redundancy in codons

Mutated DNA Sequence #4: T A C A C C T T G G C G A C T A C T
 What's the mRNA sequence? AUG UGG AAC CGC UG A (Circle the change)
 What will be the amino acid sequence? Met Trp Asn Arg stop
 Will there likely be effects? Possibly, depends what role that last, one and only missing aa plays in the shape of the protein. What kind of mutation is this? Point, substitution, missense.

Mutated DNA Sequence #5: T A C A C C T T G G A C G A C T
 What will be the corresponding mRNA sequence? AUG UGG AAC CCU GCU GA
 What will be the amino acid sequence? Met Trp Asn Pro Ala
 Will there likely be effects? yes. What kind of mutation is this? POINT, DELETION, MISSENSE, frameshift

1. Which type of mutation is responsible for new variations of a trait? substitution
2. Which type of mutation results in abnormal amino acid sequence? frameshift
3. Which type of mutation stops the translation of the mRNA? Point mutation producing a stop codon after Met.
4. Which type of mutation is responsible for a new trait? _____



CHAPTER 12 Chemical Basis of Genetics
 Extension Making a Protein

The sequence of bases of a DNA molecule directs the formation of proteins. Genes usually make either a single protein or a polypeptide, a sequence of amino acids that make up a large part of the protein molecule.

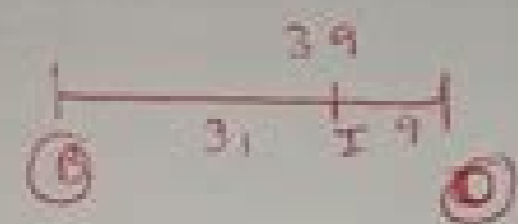
Study the diagrams below. On the right is the genetic code, showing the codons for each amino acid. On the left is the sequence of bases in the gene that makes beef insulin, a protein that breaks down sugar in a cow's blood. Use these two diagrams to fill in the correct sequence of amino acids in the beef insulin molecule shown below.

Second Base in Codon					
	G	C	A	G	
First Base in Codon	U	Phenylalanine	Serine	Tyrosine	Cysteine
	C	Proline	Alanine	Valine	Glutamine
	A	Asparagine	Asparagine	Asparagine	Asparagine
First Base in Codon	U	Leucine	Leucine	Leucine	Leucine
	C	Leucine	Leucine	Leucine	Leucine
	A	Leucine	Leucine	Leucine	Leucine
First Base in Codon	U	Valine	Valine	Valine	Valine
	C	Valine	Valine	Valine	Valine
	A	Valine	Valine	Valine	Valine

Genetics
1. Mendel's laws
2. Chromosomes
3. DNA
4. Mutations
5. Evolution

Here are the recombination frequencies for various loci. Determine the linkage map.
Loci O and B = 39%
Loci O and I = 8%
Loci I and B = 31%

- a. IOB
- b. IBO
- c. BOI
- d. OBI
- e. BIO



10. A woman does not have hemophilia but her father does. She marries a normal man. What is the probability that
a. her child has hemophilia $\frac{1}{4}$
b. her son has hemophilia $\frac{1}{2}$
c. her daughter has hemophilia 0

11. A man is heterozygous for Huntington's disease and is colorblind. He marries a non-Huntington's disease female with normal vision but is a carrier of the color blindness allele.



- a. What is the probability that his son has Huntington's disease AND is colorblind? $\frac{1}{4}$
- b. What is the probability that his daughter is heterozygous for Huntington's disease AND is XcXc? $\frac{1}{4}$

12. Which can't exist and why? XO (O) XXY YY
not at least 1 d

13. As distance between linked genes increases, the frequency of crossing over separating those linked genes
increases/decrease/stays the same

14. Define Mendel's law of independent assortment
each allele pair separates independently of others during gamete formation (meiosis I)

15. The principal of independent assortment is violated by:
a. incomplete dominance
b. mutations
c. heterozygotes
d. homozygotes
e. X-linked genes

16. The probability that two genes will be separated by crossing over is related to:
a. the phenotype they control
b. how far the two genes are from the centromere
c. the distance between the two genes on the chromosome
d. whether the two genes are located on a sex chromosome
e. how far the genes are from the kinetochore

17. Genes that tend to be inherited together are said to be:
a. associated
b. related
c. similar
d. linked
e. alleles

18. A _____ is used to demonstrate the linkage of two genes.
a. monohybrid cross
b. dihybrid cross
c. monohybrid test cross
d. two-allele test cross
e. two-point test cross

19. In genetics, map units express the distance between:
a. chromosomes during metaphase
b. two loci on a chromosome
c. alleles
d. polar bodies
e. none of the above

20. In a two-point test cross, 36 of the offspring were recombinant types. The remaining 64 offspring were parental types. How many map units separate the two loci?
a. 32
b. 36
c. 64
d. 78
e. 100

12

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In cats, short hair(S) is dominant over long hair(s). * Vocabulary including allele, dominant, recessive, genotype, phenotype, homozygous, and heterozygous. I am able to customize vocabulary cards for any topic. Female parent genotype? 14. Homozygous recessive parent genotype? Probability of short hair offspring? What are the phenotypes of the offspring? Correctly shade those 4 individuals in the pedigree. Male parent genotype? How are genes expressed? What is the difference in dominant and recessive alleles? 17. What are the probabilities of the phenotypes of the offspring? A colorblind man and his carrier wife have children. What is a gene? You will receive a teacher page with objectives, benchmarks, pre and post activity questions, and vocabulary. Homozygous dominant parent genotype? Please let me know if you are looking for something specific. What are the genotypes of the offspring? * Punnett squares. 11. Co-dominance: a red flower crossed with a white flower. Teacher page with objectives, Next Generation Science Standards, pre and post activity questions, and much more included! **Superhero Punnett Square Practice Problems** Included: * Superhero traits sheet * Genotype to phenotype problems * Phenotype to genotype problems * Identify homozygous and heterozygous problems * 7 Punnett square practice problems including incomplete dominance and co-dominance Answer key for all problems **Genetics Worksheets** You will receive a PDF of 15 worksheets (*3 worksheets have multiple versions for classroom differentiation giving you a total of 18 worksheets). What are alleles? Probability of carrier offspring? **Test, Review Questions, and Answer Keys** The test is multiple choice, Punnett Square problems, and Pedigree questions. **Superhero Genetics Activity** Students will your prA'prio super-herA'i usando genA © tic! They will flip coins to determine the genotype and phenotype of their super hero. What is the difference between phenotypes and genotypes? Punnett Square practice 10. 13. PPT versions of slide shows have been added to facilitate visualization in the classroom: * 7 weeks of Bellringers * 6 slide shows * Genre © Inheritance and Inheritance * Inheritance Part 1 (Basic Punnett Squares) * Inheritance Part 2 (Incomplete and Co-Dominance, Multiple Alleles) * Inheritance Part 3 (Two Factor Crossings) * Mutations * 3 Activities * Mutation Activity * Genius Activity © tica de Super-HerA'i * Punnett Square Problems * Spreadsheet Pack * 34 vocabulary cards with definitions * Test and response key ** 4 weeks of genius © tica and Heredity Bellringers ** VocA' recereceR; 20 dias de bellringers/warm ups Semana 1: Palavra da semana; GenA © tica Read and Answer; Chromosomes, Genes and Alleles Comparison and Contrast; Problem resolution of recessive and dominant characteristics; Gregor Mendel Week 2: Word of the week; Pedigree reading and response; How to Read a Pedigree Compare and Contrast; Problem resolution of F1 and F1 generations F2; Pedigree problem; Pedigree problem Week 3: Word of the week; Heredity Read and answer; Comparison and Contrast of Genius © tica Mendelian; Problem solving of genotype and phenotype; Genotype and Phenotype Everything Goes; Law of Segregation Week 4: Word of the week; Reading and response of mutation; Protooncogenes and cancer Comparison and contrast; Small mutations and large mutations Problem resolution; Point mutations go all; Chromosomal mutations **3 Weeks of GenA © tica; Inheritance Bellringers ** Will receive 16 days of bellringers/warm ups Week 1: Word of the week; Punnett Square Read and answer; Comparison and contrast of probability; Resolution of homozygous problems and .2 :2 anameS tennuP aSArP ad amelborP :oduT elaV erauqS tennuP eD amelborP O Read and Answer; Compare and Contrast Media; Incomplete Dominance and Co-Dominance Problem Resolution; Incomplete Dominance Problem Resolution; Incomplete Dominance Problem Resolution; Incomplete Dominance Problem Resolution; Sex-Sex Linked Problem Solving; Two-Factor Cross ** Genetics and Heredity Slide Show with 22 slides** This 22 slide PPT covers * Genetics and Heredity * Gregor Mendel * The laws of Mendelian Genetics * Law of Dominance, Segregation, * Mendel's work with pea plant traffic * Genes and alleles * Recessive and dominant traSos * Genotypes and phenotypes * Chromosomes and proteins * Mutations * Career pedigree ** HeranAsa Part 1 Slide Show with 41 slides** This 41 slide PPT covers ** Basic genetics and hereditary background including Gregor Mendel and Reginald Punnett. Probability of colorblind? What is© the probability of descent of type B blood? 3. Explain why individual I and J, although they are brothers, do not share the color blindness type. Where do you find the genetic material that©passed© from the father to the offspring 7. Correctly shadow these 3 individuals in the pedigree. 9. Individuals C, G and J are carriers. 16. 12. "if (isCorrect) text += "else text += "" if (isMap.charAt(answerIndex) == "1") { if (responseText.length == 0) responseText = ""; text += " + responseText + "; } text += " In order to continue enjoying our site, we ask that you confirm your identity as a human being. 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