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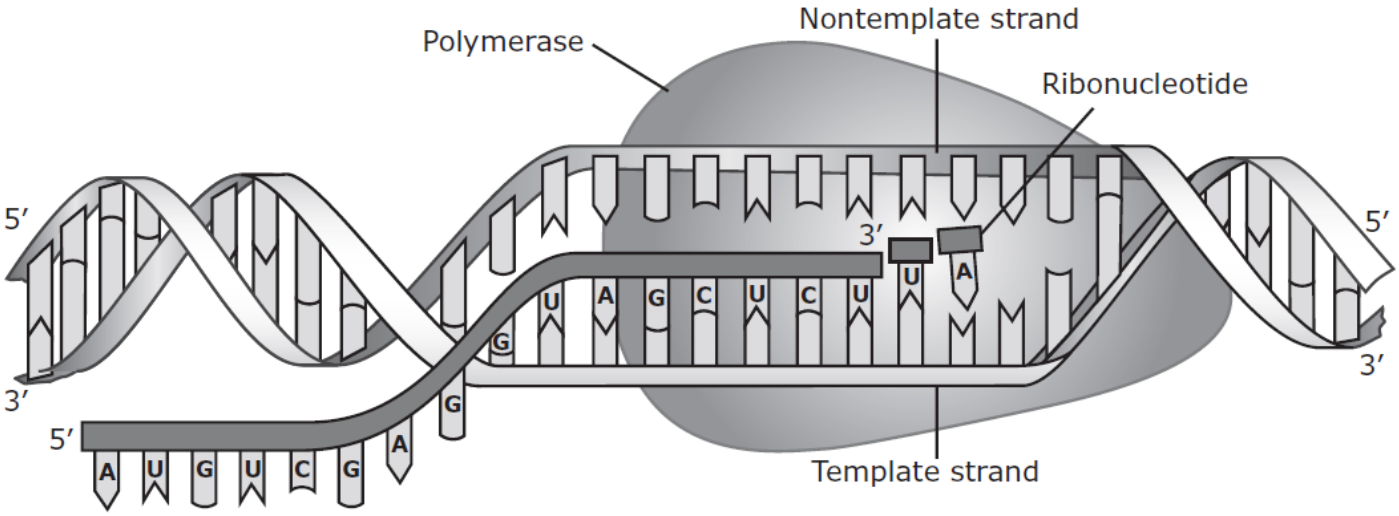
4 The technique known as chromosome painting is the result of scientific research. Scientists use chromosome painting to mark the locations of genes on human chromosomes with fluorescent tags. It is also possible to apply this technique to the chromosomes of many different species. Chromosome painting allows for which of the following? **(S6H)**

F A comparison of the genomes of different species
G The sequencing of proteins from many species
H An increase in mutations in many species
J The extraction of amino acids from different species

11 A section of a nucleic acid is shown below. **(S6C)**



The process represented in the diagram produces a molecule that is complementary to the template strand of DNA. What type of molecule is produced?

A New DNA
B Polypeptide
C Messenger RNA
D Carbohydrate

13 If several pea plants with the genotype TTYy are crossed with pea plants with the genotype Ttyy, what percentage of the offspring will be expected to have the TTYy allele combination? **(R6F)**

A 25%
B 40%
C 50%
D 75%

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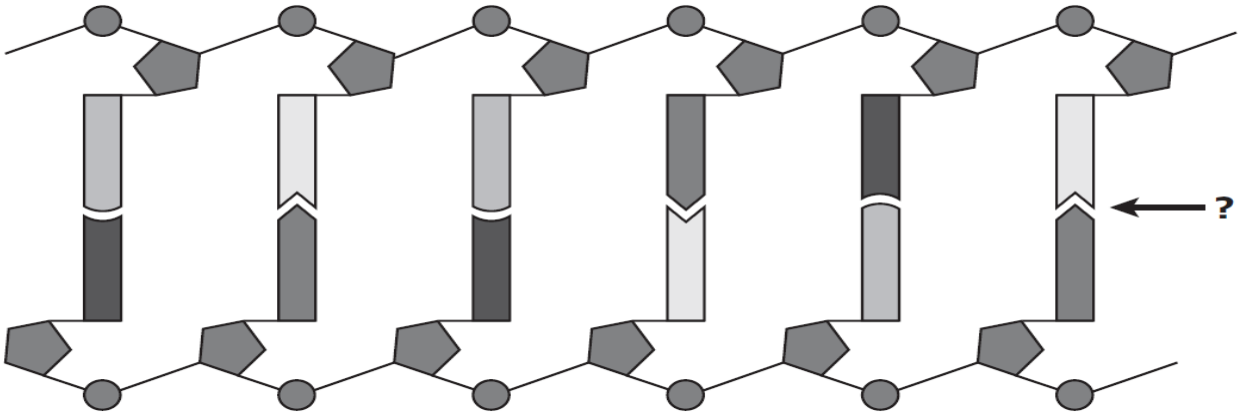
18 A model of a DNA molecule is shown below. **(R6A)**



The arrow indicates —

F the bond between adjacent phosphate and deoxyribose molecules
G the junction of introns and exons in the sense strand of DNA
H the hydrogen bond between complementary nucleotides
J the junction of a codon and a DNA triplet

21 A codon chart is shown below. **(R6E)**

First Letter	Second Letter: U	Second Letter: C	Second Letter: A	Second Letter: G	Third Letter
U	Phenylalanine	Serine	Tyrosine	Cysteine	U
	Phenylalanine	Serine	Tyrosine	Cysteine	C
	Leucine	Serine	(STOP)	(STOP)	A
	Leucine	Serine	(STOP)	Tryptophan	G
C	Leucine	Proline	Histidine	Arginine	U
	Leucine	Proline	Histidine	Arginine	C
	Leucine	Proline	Glutamine	Arginine	A
	Leucine	Proline	Glutamine	Arginine	G
A	Isoleucine	Threonine	Asparagine	Serine	U
	Isoleucine	Threonine	Asparagine	Serine	C
	Isoleucine	Threonine	Lysine	Arginine	A
	Methionine (START)	Threonine	Lysine	Arginine	G
G	Valine	Alanine	Aspartate	Glycine	U
	Valine	Alanine	Aspartate	Glycine	C
	Valine	Alanine	Glutamate	Glycine	A
	Valine	Alanine	Glutamate	Glycine	G

Which of these changes to the DNA triplet 3' GCT 5' will affect the protein produced?

A GTT
B TCT
C TCC
D GCA

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26 Crossing-over between nonsister chromatids during meiosis is significant in heredity. This process most likely leads to an increase in which of the following? **(S6G)**

F The expression of dominant traits
G Number of gametes
H The occurrence of polyploidy
J Genetic variation*

30 Characteristics such as a widow's peak or attached earlobes are determined by the genetic code. Which components of DNA are referred to as the genetic code? **(R6A)**

F Phosphate groups
G Nitrogenous bases
H Deoxyribose sugars
J Hydrogen bonds

43 How does DNA in cells determine an organism's complex traits? **(R6A)**

A DNA contains codes for proteins, which are necessary for the growth and functioning of an organism.
B DNA separates into long single strands that make up each part of an organism.
C DNA produces the energy an organism needs in order to grow.
D DNA folds into the nucleus of each of the cells of an organism.

49 The fact that a strain of yeast with a certain defective gene can use the human version of the gene to repair itself is evidence that yeast and humans — **(S6B)**

A depend on the same food supply
B share a genetic code
C both have eukaryotic cells
D have identical genomes

53 A mutation that occurs in the gametes of an organism will most likely be transferred to which of the following? **(R6E)**

A The siblings of the organism
B The offspring of the organism
C The other organisms living nearby
D The mating partner of the organism