Pool Canvas

Add, modify, and remove questions. Select a question type from the Add Question drop-down list and click **Go** to add questions. Use Creation Settings to establish which default options, such as feedback and images, are available for question creation.

Add Calculated Formula GO | Creation Settings

Name TestBanks Chapter 1: The Genetics Revolution in the Life Sciences
Description Question pool for TestBanks Chapter 1: The Genetics Revolution in the Life Sciences
Instructions

Modify

Add Question Here

Question 1 **Multiple Choice** **0 points** Modify Remove

Question
A sample of normal double-stranded DNA was found to have a guanine content of 18%. What is the expected proportion of adenine?

Answer
- 9%
- ✓ 32%
- 36%
- 68%
- 82%

Add Question Here

Question 2 **Multiple Choice** **0 points** Modify Remove

Question
In one strand of DNA the nucleotide sequence is 5'-ATGC-3'. The complementary sequence in the other strand must be

Answer
- 3'-ATGC-5'.
- ✓ 3'-TACG-5'.
- 5'-ATCG-3'.
- 5'-CGTA-3'.
- 5'-TACG-3'.

Add Question Here

Question 3 **Multiple Choice** **0 points** Modify Remove

Question
How many different DNA molecules eight nucleotide pairs long are theoretically possible?

Answer
- 24
- 32
- 64
- 256
- ✓ 65,536

Add Question Here

Question 4 **Multiple Choice** **0 points** Modify Remove

Question
Wild cats (*Felis silvestris*) and common mice (*Mus musculus*) are diploid. In wild cats $2n = 38$, while in common mice $2n = 40$. Based on this information, we can conclude that wild cat cells have

Answer
- less DNA than common mouse cells.
- smaller genomes than common mouse cells.
- ✓ fewer DNA molecules than common mouse cells.
- fewer genes than common mouse cells.
- fewer sets of chromosomes than common mouse cells.

Add Question Here

Question 5 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following *is* a component of DNA?

Answer
- Alanine
- Arginine
- Cysteine
- ✓ Guanidine
- Tyrosine

Add Question Here

Question 6 **Multiple Choice** **0 points** Modify Remove

Question
Beside DNA, which of the following are major components of chromatin?

Answer
- Carbohydrates
- Genes
- Lipids
- Phosphates
- ✓ Proteins

Add Question Here

Question 7 **Multiple Choice** **0 points** Modify Remove

Question
A gene is transcribed into an mRNA and this mRNA is 110 nucleotides long. Which of the following proteins could it encode?

Answer
- An enzyme that is 330 amino acids long
- A ribosomal protein that is 360 amino acids long
- A regulatory protein that is 36 amino acids long
- ✓ A signalling protein that is 10 amino acids long
- A structural protein that is 110 amino acids long

Add Question Here

Question 8 **Multiple Choice** **0 points** Modify Remove

Question
The nuclear genome of a mouse nerve cell is compared to that of a mouse skin cell. What differences can we expect to see between these two cells' nuclear genomes?

Answer
- The two cells have almost identical genomes, but the nerve cell has more nerve-specific genes.
- The two cells have almost identical genomes, but the skin cell has more skin-specific genes.
- The two cells have different genomes: The nerve cell has nerve-specific genes but not skin-specific genes, and the skin cell has skin-specific genes but no nerve-specific genes.
- The two cells have similar genomes, but the nerve cell has more nerve-specific genes and the skin cell has more skin-specific genes.
- ✓ The two cells have the same genome; there will be no differences.

Add Question Here

Question 9 **Multiple Choice** **0 points** Modify Remove

Question
You have come across a dog (named Cindy) that does not have a tail. Interestingly, all the puppies produced by this dog don't have a tail either. If the lack of tail is caused by a genetic mutation, where has this mutation most likely taken place?

Answer
- ✓ In Cindy's gametes
- In the cells that should normally have given rise to Cindy's tail
- In the cells that should normally have given rise to Cindy's and her puppies' tails
- In all of Cindy's cells (including her gametes)
- In a gamete of one of Cindy's parents

Add Question Here

Question 10 **Multiple Choice** **0 points** Modify Remove

Question
Using molecular techniques, researchers have knocked out both copies of gene "*G*" in a series of genetically identical mouse embryos. These mice develop normally, except for their forelimbs, which are missing several small bones. What can be concluded from the results of this experiment?

Answer
- Gene "*G*" encodes a protein that is a crucial component of forelimbs' small bones in mice.
- Gene "*G*" encodes a protein that is normally only present in the forelimb cells of developing mice.
- ✓ Gene "*G*" is necessary for proper development of forelimbs' small bones in mice.
- Gene "*G*" is normally only present in the forelimb cells of developing mice.
- Gene "*G*" is normally only transcribed in the forelimb cells of developing mice.

Add Question Here

Question 11 **Essay** **0 points** Modify Remove

Question
A researcher isolated several DNA sequences from a variety of *Drosophila* cells. The researcher has labeled each one of them with a radioisotope, and she will use them as probes on several DNA and RNA samples.

Below are a list of all the probes generated by the researcher (probes A through F) and a list of all the DNA and RNA samples that she will analyze (samples 1 through 6).
Beside each sample, write the letters corresponding to all the probes that will bind to a complementary sequence in that sample. If you think that no probe will bind to a complementary sequence in a certain sample, write an "X" beside it.

List of probes
Probe A: promoter sequence of a gene that is only expressed in the nervous system
Probe B: promoter sequence of one of the genes encoding a histone protein
Probe C: coding sequence of a gene that is only expressed in the nervous system
Probe D: coding sequence of one of the genes encoding a histone protein
Probe E: intron of a gene that is only expressed in the nervous system

List of samples
Sample 1: DNA extracted from adult *Drosophila* epidermal cells _____
Sample 2: DNA extracted from adult *Drosophila* nervous system cells _____
Sample 3: DNA extracted from adult *Drosophila* eye cells _____
Sample 4: RNA extracted from adult *Drosophila* epidermal cells _____
Sample 5: RNA extracted from adult *Drosophila* nervous system cells _____
Sample 6: RNA extracted from adult *Drosophila* eye cells _____

Answer
Samples 1, 2, 3: A, B, C, D, E
Sample 4: D
Sample 5: C, D
Sample 6: D

Add Question Here

Question 12 **Essay** **0 points** Modify Remove

Question
Adenine and thymine are held together by two hydrogen bonds while guanine and cytosine are held together by three hydrogen bonds. If you were to slowly heat a piece of DNA rich in GC base pairs—in order to denature it—would you expect the melting temperature to be higher or lower than a piece of DNA rich in AT base pairs?

Answer The melting temperature would be higher for DNA rich in GC, owing to the three hydrogen bonds that must be broken in order for it to denature.

Add Question Here

Question 13 **Essay** **0 points** Modify Remove

Question
Arabidopsis thaliana is a diploid plant model organism with 2*n* = 10.
a) How many copies of each gene does each *Arabidopsis thaliana* cell have?
b) How many sets of chromosomes does the nucleus of an *Arabidopsis thaliana* leaf cell contain?
c) How many pairs of homologous chromosomes does the nucleus of an *Arabidopsis thaliana* leaf cell contain?

Answer a) 2 b) 2 c) 5

Add Question Here

Question 14 **Essay** **0 points** Modify Remove

Question
Explain what it means to say that the genetic code is redundant. How does this redundancy help protect against mutations?

Answer The genetic code is redundant because some of the amino acids are encoded by more than one triplet (codon). This protects against the effects of mutation since a change in the nucleotide base may not cause a different amino acid to be inserted.

Add Question Here

Question 15 **Essay** **0 points** Modify Remove

Question
Using a concept map, indicate all the relationships that exist among the following: chromosomes, DNA, genes, genomes, proteins, histones, chromatin, nucleus, and mitocondria.

Answer Example:
- chromosomes: [are comprised of] DNA, histone (proteins)
[carry] genes
[are located in] the nucleus, in mitochondria
(each “term” should be related to at least three other terms)

Add Question Here

Question 16 **Essay** **0 points** Modify Remove

Question
Mutations are often viewed as negative events and they are nearly always bad for an organism. Paradoxically, without mutations there would be no evolution, and so they are essential. Explain how this is so.

Answer Variation is introduced. So even though mutations are often viewed as negative events, all variation that we see around us originally came from mutations.

Add Question Here

Question 17 **Essay** **0 points** Modify Remove

Question
Explain the difference between forward and reverse genetics in the genetic study of traits and biological characteristics.

Answer Forward genetics utilizes differences between wild type and mutant phenotypes. Crosses are made (in model organisms) or pedigrees are studied (in humans) to understand the genes involved in the phenotypic expression. Reverse genetics starts with the DNA information and tries to find out what phenotypic effects result if the DNA is changed.

Add Question Here

OK