

30. Each strand of RNA is composed of introns and exons. The introns are not necessary, and get cut out of the sequence.
31. RNA is translated on ribosomes outside of the nucleus.
32. Proteins are made up of a chain of amino acids called a polypeptide.
33. The order of amino acids determines the type of protein being created.
34. Each three nucleotide set in RNA is known as a codon. Each codon instructs the enzymes to add a particular amino acid to the protein.
35. Several different codons can code for the same amino acid.
36. There are 3 "stop" codons that signal the end of protein synthesis.
37. Each strand of tRNA carries a specific amino acid and is matched to a specific codon by its anticodon.
38. When the sequence of nucleotides that make up out genetic library is altered, the result is a mutation.
39. There are two main types of mutations: gene and chromosome.
40. Gene mutations are the result of a point, which involves a change in a single, or a few, nucleotides.
41. Substitution: only one nucleotide is changed, resulting in a slightly different protein.
42. Insertion or deletion: (a.k.a. "frameshift mutations") involve adding or removing a nucleotide and can have a much more drastic effect on the protein that is produced.
43. Chromosomal mutations can have even more drastic effects; there are four main possibilities: deletion (a segment is removed); duplication (a segment is copied); inversion (the order of a section get switched around); translocation (a segment gets swapped with another chromosome).
44. Having extra sets of chromosomes, or polyploidy, is often beneficial to plants.

Genetic Engineering & Human Genomics

1. For thousands of years, humans have used selective breeding to allow plants and animals with desired characteristics to produce the next generation.
2. Genetic engineering is the process of making changes in the DNA code of living organisms.
3. During DNA extraction, the cells are opened up, and DNA is separated from other cell components using enzymes and filtration.
4. DNA molecules from most organisms are very large, so we must cut them using restriction enzymes, which are chemicals that cut DNA at specific sequences, just like tiny scissors.
5. In gel electrophoresis, a mixture of DNA fragments is placed at one end of a porous gel, and an electric current is passed through.
6. Because DNA is negatively charged, it moves toward the positive end. Smaller DNA fragments move farther and faster. Result - "bands" are separated and can be compared to patterns of other individuals.
7. The polymerase chain reaction (PCR) technique allows biologists to make many copies of a DNA sequence or gene.
8. In the lab, foreign DNA is joined to small circular piece of DNA called a plasmid.
9. GMO's, or genetically modified organisms, have had their genetic material altered by genetic engineering.
10. Transgenic organisms have genes from other species.
11. Transgenic bacteria have been used to produce human insulin.
12. Transgenic plants have been produced to be more resistant to disease and to provide more nutrition.
13. A clone is a genetic copy of an organism.

Nervous System

1. Homeostasis is the process by which organisms keep internal conditions relatively constant.
2. Environmental changes "feedback" or inhibit the original stimulus.
3. There are three major types of neurons: 1) Sensory, which respond to heat, light, pressure, chemicals, etc. and carry impulses from the sense organs to the CNS; 2) Motor, which carry impulses from the brain and spinal cord to the muscles and glands; and 3) Interneurons which connect sensory and motor neurons.
4. In a neuron, dendrites are short, branched extensions that carry impulses to the cell body.
5. The long, slender projection that carries impulses away from the cell body is called an axon.
6. The myelin sheath is a layer of lipids and proteins that insulate the axons of some neurons in order to speed up transmission of nerve impulses.