

- \_\_\_\_\_ was a bacteriologist studying pneumonia. He discovered 2 types of colonies: \_\_\_\_\_ and \_\_\_\_\_.
- He injected mice with the different types of bacteria and discovered that mice injected with the smooth colonies \_\_\_\_\_.
- Griffith concluded that the smooth colonies caused disease, and wondered if those bacteria contained a \_\_\_\_\_.
- He then tried heating the bacteria from the smooth colonies, then injecting the heat-killed bacteria into the mice. The mice \_\_\_\_\_!
- Next, he mixed the heat-killed, disease causing bacteria with the harmless live bacteria. He found that the mice \_\_\_\_\_.
- Griffith concluded that bacteria had \_\_\_\_\_ from the harmless into the deadly type.
- Griffith's experiments were repeated by a group of scientists lead by \_\_\_\_\_.
- In Avery's experiments, organic compounds (\_\_\_\_\_, lipids, proteins, \_\_\_\_\_ and DNA) were destroyed one by one. It was determined that in all cases, R-type bacteria were transformed into S-type unless \_\_\_\_\_ was destroyed.
- In 1952, \_\_\_\_\_ and \_\_\_\_\_ set out to prove that DNA was the transforming factor.
- Hershey and Chase studied \_\_\_\_\_, viruses that infect bacteria.
- In their experiment, colonies were grown with \_\_\_\_\_ isotopes of \_\_\_\_\_ and \_\_\_\_\_.
- They concluded that \_\_\_\_\_ was injected into the bacteria cells, but not \_\_\_\_\_.
- DNA is made up of long chains of small molecules called \_\_\_\_\_.
- There are four types of nucleotides: \_\_\_\_\_ (A), \_\_\_\_\_ (G), \_\_\_\_\_ (T) and \_\_\_\_\_ (C).
- Erwin \_\_\_\_\_ discovered that the amount of A = \_\_\_\_\_, and the amount of C = \_\_\_\_\_.
- Rosalind \_\_\_\_\_ used \_\_\_\_\_ to determine the pattern of crystallized DNA.
- \_\_\_\_\_ and \_\_\_\_\_ finally determined the structure of DNA. They called it a \_\_\_\_\_.
- Eukaryotic chromosomes contain both DNA and \_\_\_\_\_, tightly packed together into a substance called \_\_\_\_\_.
- In chromatin, DNA is coiled around \_\_\_\_\_ proteins.
- Together, the DNA and histones form a \_\_\_\_\_.
- During DNA replication, the two \_\_\_\_\_ strands of DNA must unwind from each other.
- Each parental strand then serves as a \_\_\_\_\_ that determines the order of the bases along a new complementary strand.
- The nucleotides are connected to form the \_\_\_\_\_ backbone of the new strand.
- DNA replication is done by a number of different \_\_\_\_\_.
- One of the major enzymes involved is DNA \_\_\_\_\_, which is responsible for building the new strand, and \_\_\_\_\_ the new copies to ensure there are no mistakes.

26. The two strands of a DNA molecule are \_\_\_\_\_; this means that the strands run in opposite directions.
27. Each \_\_\_\_\_ is a sequence of DNA on a particular chromosome. Humans have about 20 000 - 25 000 protein-encoding genes.
28. In order to be able to "read" a DNA sequence, the cell must first create a \_\_\_\_\_ copy of the gene.
29. There are three types of RNA: \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
30. The process of creating RNA is called \_\_\_\_\_, and is controlled by RNA \_\_\_\_\_.
31. Each strand of RNA is composed of \_\_\_\_\_ and \_\_\_\_\_. The introns are not necessary, and get cut out of the sequence.
32. RNA is \_\_\_\_\_ on ribosomes outside of the nucleus.
33. Proteins are made up of a chain of amino acids called a \_\_\_\_\_.
34. The order of \_\_\_\_\_ determines the type of protein being created.
35. Each three nucleotide set in RNA is known as a \_\_\_\_\_. Each codon instructs the enzymes to add a particular amino acid to the \_\_\_\_\_.
36. Several different codons can code for the \_\_\_\_\_ amino acid.
37. There are \_\_\_\_ "stop" codons that signal the end of protein synthesis.
38. Each strand of \_\_\_\_\_ carries a specific amino acid and is matched to a specific codon by its \_\_\_\_\_.
39. When the sequence of nucleotides that make up our genetic library is altered, the result is a \_\_\_\_\_.
40. There are two main types of mutations: \_\_\_\_\_ and \_\_\_\_\_.
41. Gene mutations are the result of a \_\_\_\_\_, which involves a change in a single, or a few, nucleotides.
42. \_\_\_\_\_: only one nucleotide is changed, resulting in a slightly different protein.
43. \_\_\_\_\_ or \_\_\_\_\_: (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.
44. Chromosomal mutations can have even more drastic effects; there are four main possibilities: \_\_\_\_\_ (a segment is removed); \_\_\_\_\_ (a segment is copied); \_\_\_\_\_ (the order of a section get switched around); \_\_\_\_\_ (a segment gets swapped with another chromosome).
45. Having extra sets of chromosomes, or \_\_\_\_\_, is often beneficial to plants.
46. GMO's, or \_\_\_\_\_, have had their genetic material altered by genetic \_\_\_\_\_.
47. \_\_\_\_\_ organisms have genes from other species.
48. Transgenic \_\_\_\_\_ have been used to produce human insulin.
49. Transgenic \_\_\_\_\_ have been produced to be more resistant to disease and to provide more nutrition.
50. The PCR, or \_\_\_\_\_ is used to make many copies of DNA.
51. \_\_\_\_\_ is used in DNA fingerprinting to separate DNA that has been cut by \_\_\_\_\_.
52. A \_\_\_\_\_ is a genetic copy of an organism.