

Answer: 2. Uracil

Adenine, Cytosine and Guanine are found in both RNA and DNA.

Thymine is found only in DNA; Uracil takes its (Thymine) place in RNA molecules.

Answer: 2. hydrogen bonds

The complementary base pairs : A - T and G - C are held together by hydrogen bonds.

Answer: 1. Cytosine, Thymine and Uracil

In all, there are five nitrogenous bases : Cytosine, Thymine, Uracil, Adenine and Guanine.

The purine bases (Adenine and Guanine), have a structure which consists of two rings of atoms.

The other three bases are called pyrimidine bases.

Answer: 1. T-G-T-C-G-G-C-A-T.

Note that complementary base pairs are : A - T and G - C. So, to find the complementary strand, replace A by T, G by C and vice versa.

Answer: 1. Bacteria

Answer: 2. The DNA molecules of different species have different sequences of base-pairs.

Answer: c) 2

The Adenine - Thymine base pair is held together by 2 hydrogen bonds while the Guanine - Cytosine base pair is held together by 3 hydrogen bonds. That is also the reason why the two strands of a DNA molecule can be separated more easily at sections that are densely populated by A - T base pairs.

Answer: 2. All the above

The three options provided accurately list the differences between DNA and RNA molecules. Note that RNA molecules are single stranded with a few double-stranded regions of complementary base-pairing. These regions are called hairpin loops. Also, the 5-carbon sugar in RNA has more oxygen than the corresponding sugar in DNA.

Answer: 4. nucleotides

The DNA molecule is a polymer whose monomer units are nucleotides and the polymer is known as a "polynucleotide". Each nucleotide consists of a 5-carbon sugar (deoxyribose), a nitrogen containing base attached to the sugar, and a phosphate group. There are four different types of nucleotides found in DNA. They are : Adenine, Guanine, Cytosine and Thymine.

Answer: a) 1.8 meters

The correct answer is 1.8 meters. The coiled molecule is contained within the cell nucleus which has a diameter of about 6 micrometers !!!

Answer: 1. Semiconservative

The DNA replication process is semiconservative because one original strand of the double stranded DNA helix is found in each daughter cell after replication.

Answer : 2. X-Ray crystallography

Rosalind Franklin used X-Ray diffraction to determine the structure of DNA. She was in fact the first to state that the the sugar-phosphate backbone of DNA lies on the outside of the molecule. She also elucidated the basic helical structure of the molecule.

Answer: 1. mRNA

mRNA is a photocopy of a gene with a sequence complementary to one section of the DNA strand (gene) and identical to the other. The mRNA carries this genetic information from the cell nucleus to the ribosomes in the cytoplasm where proteins are manufactured.

Note:

mRNA - messenger RNA;
tRNA - transfer RNA ; rRNA - ribosomal RNA ; snRNA - small nuclear RNA

Answer: 2. DNA is used to make RNA which is used to make protein.

The RNA molecule is an intermediate between the DNA molecule and the protein. This lets the DNA stay pristine and protected, away from the caustic chemistry of the cytoplasm outside the nucleus. Also, many copies of an RNA molecule can be made which enables the amplification of genetic information.

Answer:

4. A pentose sugar and a nitrogenous heterocyclic base.

A nucleoside is similar to a nucleotide, except that it contains only the sugar and base, without the phosphate group. Examples include guanosine, thymidine and inosine.

Answer:

2. A phosphate group, a pentose sugar and a nitrogenous heterocyclic base.

A nucleotide consists of a nitrogenous heterocyclic base (a purine or a pyrimidine), a pentose sugar (deoxyribose in DNA or ribose in RNA), and a phosphate or polyphosphate group. A DNA molecule (a polynucleotide) is made up of a large number of these nucleotide (monomer) units.

Note : A polynucleotide is a nucleic acid.

Answer: 2. James Watson, Francis Crick and Maurice Wilkins

The Double Helix structure of DNA is one of the most significant discoveries of all time. James Watson, Francis Crick and Maurice Wilkins received a Nobel Prize for the Double Helix model of DNA in 1962 !

Another important figure, without whom this discovery would not have been possible was Rosalind Elsie Franklin. Unfortunately, Franklin died at the age of 37 from ovarian cancer just four years before the Nobel prize was awarded to Watson, Cricks and Wilkins.

Answer: 2. Walter Gilbert and Frederick Sanger

Walter Gilbert of Harvard University and Frederick Sanger developed a method for decoding DNA. This technique sparked off the biotech revolution because it enabled researchers to begin cloning genes.

Answer: b) 35,000

The Human Genome project revealed that humans have approximately 35,000 genes which is lower than expected. Even an insect as tiny as the fruit fly has as many as 20,000 genes.

Answer: 2. Erwin Chargaff

In 1949, Erwin Chargaff, a biochemist, reported that the amount of DNA and its nitrogenous bases varies from one species to another. He also found that the amount of adenine equals the amount of thymine, and the amount of guanine equals the amount of cytosine in DNA from every species !

Answer: B. 30 nm, 30 μm

Answer: D. Abnormal cells self destruct by apoptosis.

Answer: B. light microscope.

Answer: 2. in the G2 phase of the cell cycle.

Answer: C. The embryo increases dramatically in size.

Answer: D. Gastrulation

Answer: E. Ectoderm

Answer: B. Blastoderm

Answer: 2. tolerance

Answer: 1. 250,000
years ago

Answer: 3. colon cancer

Answer: 1. first trimester

Answer: 3. Gene activation and gene repression events

Answer: 4. IgE

Answer: b. True, it occurs late in prophase.

In higher eukaryotes, the breakdown of the nuclear envelope is one of the last events to occur during prophase.

Answer: b. No, crossing over is not associated with mitosis.

Answer: d) None of the above.

DNA replication occurs during interphase (remember though, this is not a stage of mitosis, it's that part of the cell cycle when mitosis isn't occurring)

Answer: b) S.

The S here stands for Synthesis (of DNA).

Answer: Cytokinesis is a part of mitosis.

Cytokinesis (the division of cytoplasm between the two daughter cells) is NOT a part of mitosis- both, however, are parts of cell division.

Answer: b. Yes.

Reduction division is required to produce haploid cells ($1/2$ the number of chromosomes) which are involved in fertilization.

Answer: d) None of the above.

DNA replication occurs during interphase (as with mitosis - remember interphase is not a stage of mitosis or meiosis).

Answer: d) Prophase I

Crossing over occurs specifically during the pachytene stage of Prophase I.

Answer: b) 3.1415926535

Answer: c) It indicates that two similar chromosomes (same genes, but with potentially different DNA sequences in each gene) come together.

This is a tough concept to understand. Whereas the genes are the same, each DNA base-pairing within the same gene may not be the same between the chromosomes (this is how a person can be heterozygous for a gene/trait).

Answer: C. bacteria and blue-green algae

Answer: D. Chloroplasts are found in plant cells but not in prokaryotic or animal cells.

Answer: D. the human eye, the light microscope, and the electron microscope.

Answer: C. Glycolysis occurs within mitochondria.