The main theme is central dogma

The central dogma of molecular biology outlines the flow of genetic information within living organisms. Here's a more detailed explanation:

Replication: This process occurs before cell division. The DNA double helix unwinds, and each strand serves as a template for the synthesis of a new complementary strand. The complementary base pairing rules (A with T, and C with G) ensure that the new DNA molecules are identical to the original ones. This maintains the genetic code's integrity across generations of cells.

Transcription: During this step, a specific segment of DNA is used as a template to synthesize a complementary RNA molecule. The enzyme RNA polymerase binds to the DNA at the beginning of the gene's coding region. As it moves along the DNA template, it adds complementary RNA nucleotides (A, U, G, and C) to the growing RNA strand. Here, adenine (A) in DNA pairs with uracil (U) in RNA, while cytosine (C) in DNA pairs with guanine (G) in RNA.

Translation: The RNA molecule synthesized during transcription is called messenger RNA (mRNA). This molecule carries the genetic code from the DNA to the ribosomes, the cellular structures responsible for protein synthesis. Transfer RNA (tRNA) molecules, each linked to a specific amino acid, recognize and bind to the mRNA codons (triplets of nucleotides). The tRNA's anticodon, which is complementary to the mRNA codon, ensures the correct amino acid sequence according to the genetic code.

Protein Synthesis: As tRNA molecules bring the appropriate amino acids in the correct order, ribosomes facilitate the formation of peptide bonds between the amino acids, leading to the assembly of a polypeptide chain. This chain folds into a functional protein, essential for various cellular processes.

[08-09-2023 12:06 PM] Preet Bobde: Prototype:

Level 1 cross word puzzle

Grid size:15\*15

No of hints/words:10

Across: 5 words

Down: 5 words

Across:

Genetic material that contains instructions for cellular functions (3 letters).

Process where DNA is converted into RNA (11 letters).

The type of RNA that carries the genetic code from the nucleus to the ribosomes (3 letters).

Basic unit of DNA and RNA, consisting of a sugar, a phosphate group, and a nitrogenous base (9 letters).

The site of protein synthesis within a cell (7 letters).

The molecule involved in translation, which carries amino acids to the ribosome (4 letters).

The strand of DNA that serves as a template for RNA synthesis (8 letters).

The process by which the genetic code is translated into a sequence of amino acids (10 letters).

Down:

The molecule that reads the genetic code and builds the corresponding protein (7 letters).

The sequence of three nucleotides that codes for a specific amino acid (5 letters).

The molecule that carries the genetic information from the nucleus to the ribosomes (3 letters).

The complementary strand of DNA that is synthesized during transcription (6 letters).

A building block of proteins (5 letters).

The type of RNA that is synthesized using DNA as a template (4 letters).

The strand of DNA that directly corresponds to the sequence of RNA produced during transcription (6 letters).

The process by which RNA is synthesized from DNA (11 letters).

Answers:

Across:

DNA

Transcription

mRNA

Nucleotide

Ribosome

tRNA

Template

Translation

Down:

Ribosome

Codon

mRNA

Complement

Amino

rRNA

Coding

Transcription

[08-09-2023 12:06 PM] Preet Bobde: Level 1

[08-09-2023 12:06 PM] Preet Bobde: Thermal Cycler: Used for DNA amplification through polymerase chain reaction (PCR).

Centrifuge: Used to separate cellular components based on density during processes like DNA extraction.

Gel Electrophoresis Apparatus: Used to separate DNA, RNA, or proteins based on size and charge.

Spectrophotometer: Used to measure the concentration of DNA, RNA, or proteins in a solution.

Microcentrifuge: Used for quick centrifugation of small samples, such as in DNA precipitation.

Incubator: Provides controlled temperature for culturing cells during protein expression.

Electroporator: Used to introduce DNA, RNA, or other molecules into cells through electric pulses.

PCR Tubes and Plates: Used to hold reaction mixtures during PCR amplification.

Agarose Gel: Used in gel electrophoresis to separate DNA fragments.

Pipettes and Pipette Tips: Used for accurate measurement and transfer of liquids.

Microscope: Used to visualize cells and cellular components.

UV Transilluminator: Used to visualize DNA and RNA bands after gel electrophoresis.

RNA/DNA Extraction Kit: Contains reagents for isolating RNA or DNA from samples.

Refrigerator and Freezer: Used to store reagents

[08-09-2023 12:06 PM] Preet Bobde: These are some basic machines names

[08-09-2023 12:06 PM] Preet Bobde: For level 2

[08-09-2023 12:06 PM] Preet Bobde: At the heart of every living organism's functioning lies a molecule called DNA, which is like a "genetic instruction manual." DNA carries the information that dictates how an organism grows, develops, and functions. DNA is made up of smaller units called nucleotides. Each nucleotide consists of three parts: a sugar molecule, a phosphate group, and a nitrogenous base.

There are four different types of nitrogenous bases found in DNA: adenine (A), cytosine (C), guanine (G), and thymine (T). Imagine these bases as the "letters" of the genetic alphabet. Now, let's dive into the concept of complementary base pairing.

Complementary base pairing refers to how these nitrogenous bases interact with each other in a very specific and consistent way. The key idea is that A always pairs with T (or U in RNA), and C always pairs with G. Think of it like a puzzle where A fits perfectly with T (or U), and C fits perfectly with G. This pairing is crucial because it maintains the structure and integrity of DNA.

The specific pairing rules are as follows:

Adenine (A) always forms pairs with Thymine (T) in DNA, and with Uracil (U) in RNA.

Cytosine (C) always pairs with Guanine (G).

The beauty of complementary base pairing lies in the way these pairs interact through hydrogen bonds. Hydrogen bonds are like tiny "bridges" between the bases that hold the two strands of the DNA molecule together. Adenine forms two hydrogen bonds with Thymine (or Uracil), and Cytosine forms three hydrogen bonds with Guanine. This bond is what keeps the DNA double helix structure stable.

Imagine a ladder-like structure where the sides of the ladder are made of sugar and phosphate molecules, and the rungs of the ladder are formed by the paired nitrogenous bases, A with T (or U), and C with G. This ladder-like structure is called the DNA double helix.

The concept of complementary base pairing is central to many biological processes. It's the basis of DNA replication, where a DNA molecule makes an identical copy of itself. It's also crucial for transcription, where DNA is used as a template to make RNA. Later, in translation, RNA guides the assembly of amino acids into proteins.

In summary, complementary base pairing is a fundamental concept in biology that governs how DNA and RNA molecules interact and carry out the instructions of life. It's like a language that cells use to read and interpret the genetic information that determines an organism's characteristics and functions

[08-09-2023 12:06 PM] Preet Bobde: Level 3

[08-09-2023 12:06 PM] Preet Bobde: https://youtu.be/9qyi6xgOjEk?si=fAAMXi8iuqJasAR0

[08-09-2023 12:06 PM] Preet Bobde: Level 3

[08-09-2023 12:06 PM] Preet Bobde: https://in.pinterest.com/pin/500884789784884787/

[08-09-2023 12:06 PM] Preet Bobde: Along with this the first process mentioned in the pintrest link will be present

[08-09-2023 12:06 PM] Preet Bobde: The consecutive two process mentioned will be the last two levels

[08-09-2023 12:06 PM] Preet Bobde: https://www.google.com/url?sa=i&url=http%3A%2F%2Fmsandersonbio.weebly.com%2Frna--proteins.html&psig=AOvVaw1zTD1W48aXR76m9gvNQ1Xg&ust=1693147096487000&source=images&cd=vfe&opi=89978449&ved=0CBEQjhxqFwoTCJCthczG-oADFQAAAAAdAAAAABBX

This website has all the processes and the animation is pretty good

[08-09-2023 12:06 PM] Preet Bobde: We want this kind of animations

[08-09-2023 12:06 PM] Preet Bobde: We want land scape mode