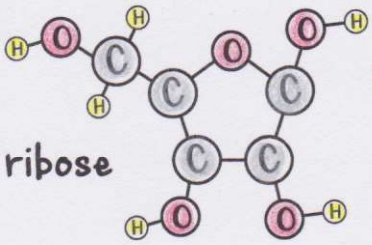
Nucleotides

Name: _____

Nucleotides are made of a phosphate group, a sugar, and a base.

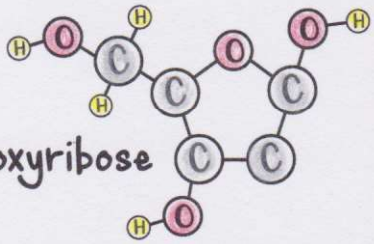
Cells "mix-and-match" different phosphate groups, sugars, and nitrogenous bases to create nucleotides for different purposes.

Pentose Monosaccharides:



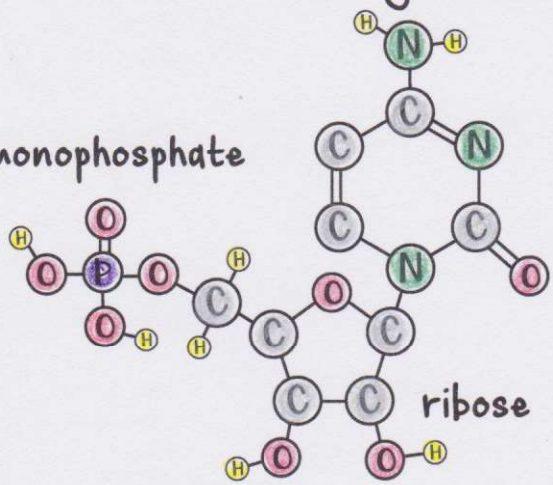
ribose

Ribose is found in RNA nucleotides



deoxyribose

Label the parts of the nucleotide.



Is it a DNA or RNA nucleotide?

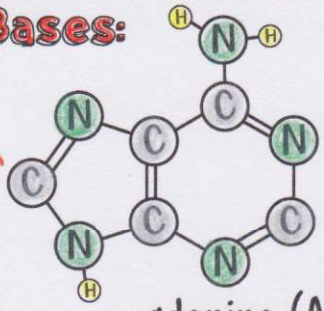
RNA Nucleotide - it has ribose

Is the base a purine or a pyrimidine?

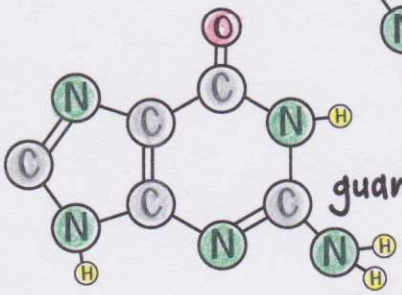
Pyrimidine, it has one ring

Nitrogenous Bases:

Two-ringed bases are called "Purines"



adenine (A)

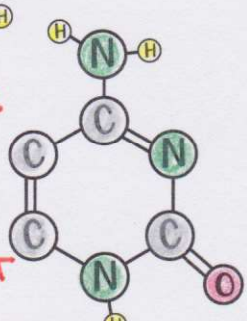


guanine (G)

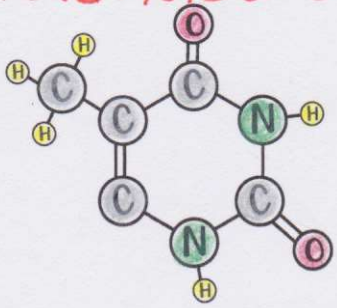
one-ringed bases are called "Pyrimidines"

DNA nucleotides can have A, G, C, or T

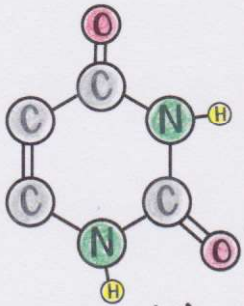
RNA nucleotides can have A, G, C or U



cytosine (C)

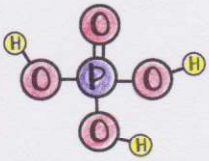


thymine (T)

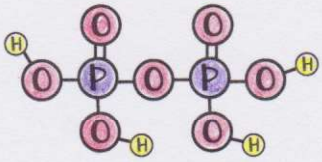


uracil (U)

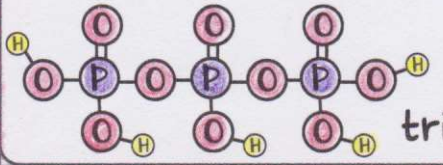
Phosphate Groups:



monophosphate



diphosphate



triphosphate

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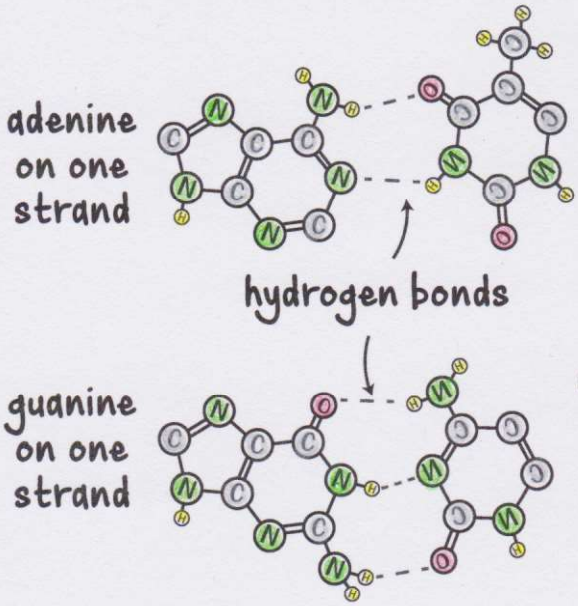
Deoxyribo-Nucleic Acid

Name: _____

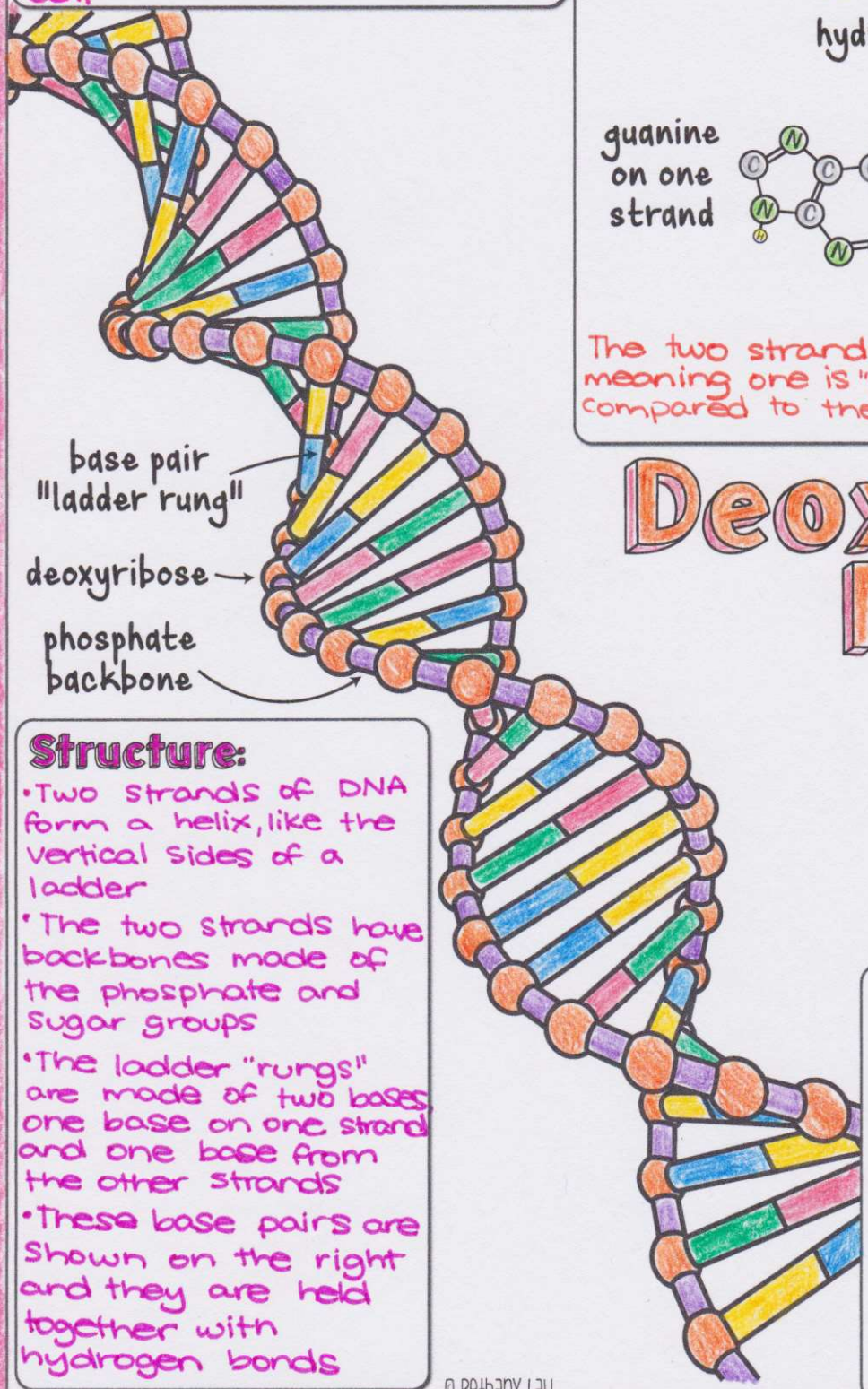
Function:

- DNA is like a giant recipe book in the cell that holds the instructions for building proteins and other things in the cell
- DNA in human cells is kept in the nucleus of the cell

Complementary Base Pairs:



The two strands are "anti-parallel," meaning one is "upside down" as compared to the other



Structure:

- Two strands of DNA form a helix, like the vertical sides of a ladder
- The two strands have backbones made of the phosphate and sugar groups
- The ladder "rungs" are made of two bases, one base on one strand and one base from the other strands
- These base pairs are shown on the right and they are held together with hydrogen bonds

Use purple for the phosphate backbone.

Use orange for the deoxyribose sugars.

For the "ladder rungs" or base pairs, color some like this:

- Half Blue (A)/ Half Yellow (T)
- Half Yellow (T)/ Half Blue (A)
- Half Red (C)/ Half Green (G)
- Half Green (G)/ Half Red (C)

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Function:

- RNA strands are usually shorter than the long DNA strands and often carry genetic information (like photocopies) from DNA to other parts of the cell.
- Some types of RNA act as "ribozymes," enzymes made of nucleic acid. Enzymes can catalyze (or speed up) chemical reactions and many enzymes in the cell are made of protein.
- There are some ribozymes that can self-replicate or build other RNA molecules.
- Some can "stick" to amino acids, helping them to speed up reactions that involve proteins.

RNA World Hypothesis:

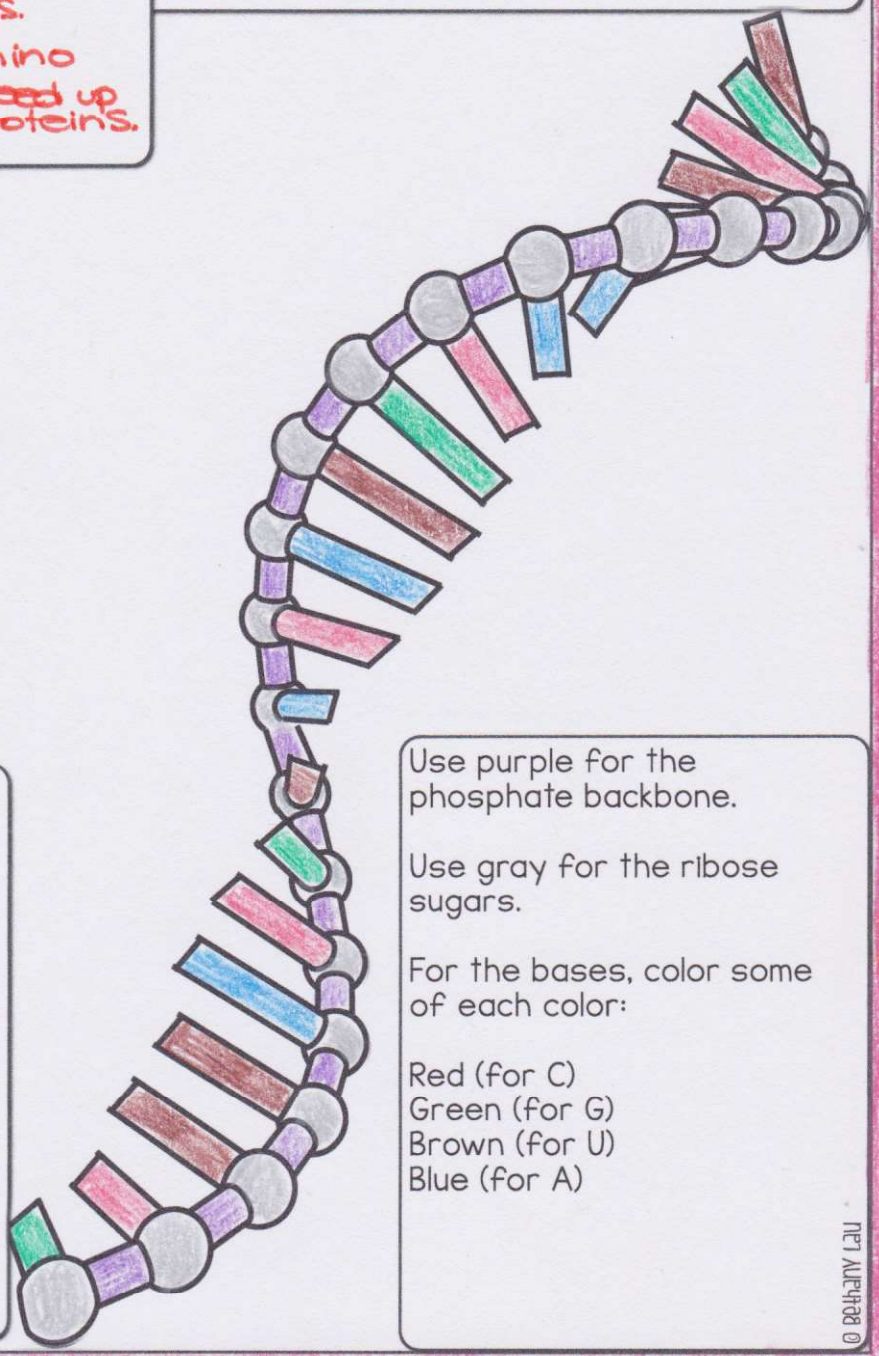
- Because some RNA can self-replicate and can catalyze reactions (including reactions with proteins), some scientists believe that primitive RNA was one of the first molecules to carry genetic information in very primitive organisms.
- Many scientists believe self-replicating RNA molecules were used in living things before DNA and proteins

Ribo-Nucleic Acid

Name: _____

Structure:

- RNA strands can be found in single stranded and double stranded form in the cell.
- Just like DNA, sugar and phosphate groups make up the "backbone." The bases stick out of the backbone.
- RNA strands can base pair with other DNA or RNA strands, if they are complementary.



Use purple for the phosphate backbone.

Use gray for the ribose sugars.

For the bases, color some of each color:

Red (for C)
Green (for G)
Brown (for U)
Blue (for A)

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