

- Match the base (columns) with its corresponding organic frame (rows).
  - Adenine = purine
  - Cytosine = pyrimidine
  - Guanine = purine
  - Thymine = pyrimidine
  - Uracil = pyrimidine
- Please answer problem number 4 from Chapter 3. Uracil
- Please answer problem number 5 from Chapter 3.
  - Yes, this is valid – it involves the transfer of a  $\text{PO}_4^{3-}$
  - No, this is not a valid reaction – in this case, a pyrophosphate ( $\text{P}_2\text{O}_7^{4-}$ ) is transferred.
- Edwin Chargaff discovered the first reliable quantitative methods to study DNA. His experiments led to the universally true Chargaff's Rule. What does this rule tell us? The amount of guanine in DNA always equals the amount of cytosine. Likewise, the amounts of adenine and thymine are always equal.
- The E. coli K12 genome is 25.3% Guanine. Determine the % of the genome that is made up by Adenine. 24.7% ( $100\% = \text{A} + \text{T} + \text{G} + \text{C} \rightarrow \text{G} = 25.3 = \text{C}$  and  $\text{A} = \text{T}$ )
- Summarize the four main features of the Watson and Crick model of DNA structure.
  - Two chains create a double helix
  - Antiparallel strands form a right handed helix
  - Bases occupy the core and sugar-phosphate goes along the outside
  - Base pairs are formed between complementary bases on opposite strands.
- Single stranded RNA cannot form 2D or 3D structures. False.
- Describe the central dogma of biology....this can be done using 3 words. Replication, transcription, translation
- RNA has 3 roles in translation. What are they? mRNA - messenger from DNA, tRNA – matches the codon on the mRNA to the correct amino acid, rRNA - the ribosome is made from RNA
- Your book describes four main steps for DNA cloning. What are they?
  - Amplify by PCR
  - Insert into a vector
  - Put the vector/insert into cells for replication
  - Identify which cells have the proper DNA
- What is meant by "supercoiling" of DNA? Highly twisted conformations of DNA – this makes the polymer more stable
- The hydrogen bonds formed in a double helix do not account for very much stabilization energy. What intermolecular forces are important in the stabilization of a double helix? Select all that apply.
  - Ion-ion  $\rightarrow \text{Mg}^{2+}$  interacts with the negatively charged backbone.
  - Dipole-dipole  $\rightarrow$  part of the pi-stacking
  - London Dispersion Forces  $\rightarrow$  part of the pi-stacking