

1. Fill in the different components of each transposon within the given rectangles.

a. Insertion sequence



Insertion sequence (light and dark green) is the simplest type of transposable element.

Light green= transposase gene

Dark green= 23 bp terminal inverted repeat

Pink= 9 bp flanking repeat.

b. PROKARYOTE TRANSPOSONS (Bacterial Transposons)

Composite transposon



Flanked by two copies of Insertion sequence and carries gene in the middle during transposition.

Noncomposite transposon



Some transposable elements in bacteria lack insertion sequences. It has inverted repeats on the ends.

c. EUKARYOTE TRANSPOSONS

Ty elements



Ty (Transposon yeast) elements are a family of common retrotransposons and are evolutionarily related to retroviruses. Use RNA intermediates as method of transposition.

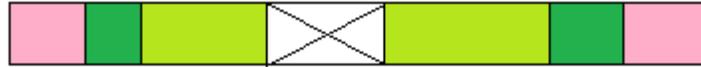
Purple= Delta sequence 334 bp aka direct repeats, function similarly to terminal repeats.

Ac



Are Autonomous- able to transpose.

Dx



Dx are just Ac elements but nonautonomous- unable to transpose. But can transpose in the presence of Ac.

Kernels would be multi-pigmented because Dx would jump in and out mid replication causing various gene expressions.

2. List the three MECHANISMS of transposition and briefly explain each one.
 - I. Replicative transposition- 'Copy and Paste'
 - II. Nonreplicative transposition- 'Cut and Paste'
 - III. RNA Intermediate- retrotransposons transpose through RNA intermediates. The retrotransposon sequence is transcribed into RNA and undergoes reverse transcription to produce dsDNA. Staggered cuts are made into target DNA. The retrotransposon integrates into the host DNA at new site.
3. NASA has found a single-celled organism from another planet that uses DNA as its genetic material. Based on the experiment below, determine whether this organism undergoes Conservative replication, Dispersive replication, or Semiconservative replication, or something new when it replicates its DNA.

1st Replication

2nd Replication

3rd Replication



Conservative replication!!!!

4. Complete the following chart about the different types of DNA Replication.

	Theta Prokaryotic	Linear Eukaryotic
DNA Template (Circular or Linear)	Circular	Linear
Number of Replicons	1	Multiple
Unidirectional or Bidirectional	Uni or Bi	Bidirectional
Products	2 circular molecules	Two linear molecules

5. Fill out the missing parts of the table below (Try without using your notes)!

Enzyme Involved with DNA Replication	Function
DNA Polymerase	Elongates the new polynucleotide by adding nucleotides
DNA Ligase	Joins the Okazaki fragments after the RNA primer has been replaced with DNA
Gyrase	Releases the tension formed from the unwinding of the double helix
Helicase	Creates the replication fork by unwinding the DNA
Primase	Creates an RNA primer- a short sequence 10-12 nucleotides long that provide DNA polymerase something to attach nucleotides too.