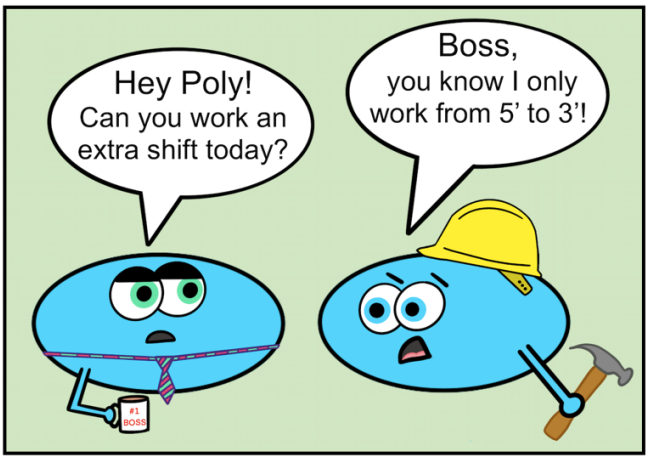
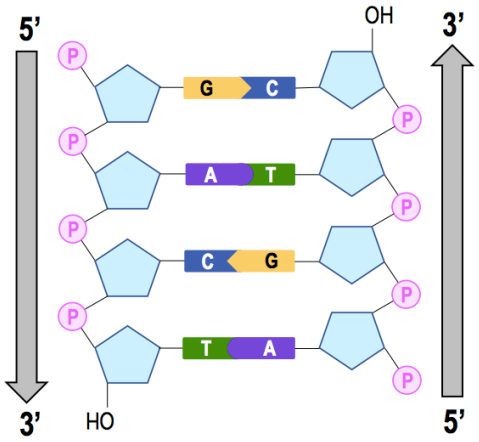
**CONCEPT:** DNA POLYMERASES

●The primary enzyme responsible for building new DNA strands are _____ *polymerases*.

□ Organisms contain _____ types of DNA polymerases with slightly different functions.

□ New DNA strands always built in the _____ → _____ direction (elongating from its free 3' _____ group).




**DNA Polymerase Requirements**

●In prokaryotes, **DNA Polymerase** _____ is the primary enzyme for elongating/building new DNA Strands.

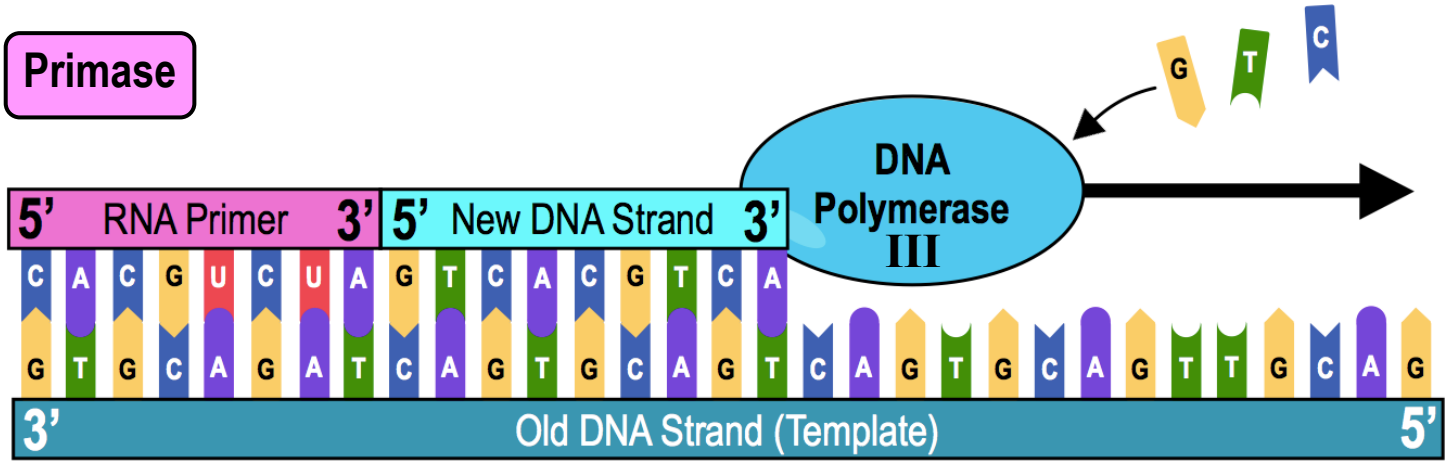
●All DNA Polymerases have _____ *central requirements*:

1) a _____: the _____/parent DNA strand that acts as a guide for building new strands.

2) a _____: small RNA molecule that acts as the _____ point for DNA polymerase.

□ _____ enzyme builds RNA primers.

□ Ultimately the RNA primer is *converted to* _____ to be part of newly built DNA strand.



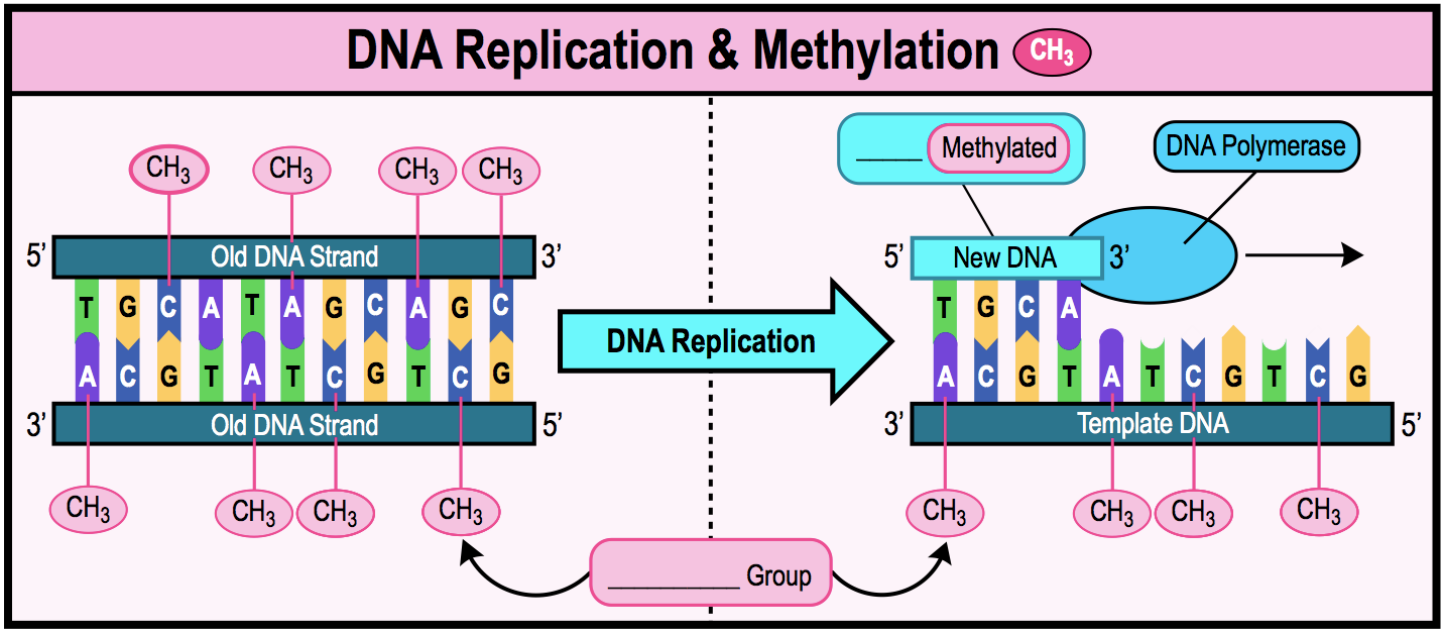

**PRACTICE:** If the sequence of the 5'-3' strand is AATGCTAC, the complementary sequence has the following sequence:

a) 3'-AATGCTAC-5'. b) 3'-CATCGTAA-5'. c) 3'-TTACGATG-5' d) 3'-GTAGCATT-5'

**CONCEPT:** DNA POLYMERASES

**DNA Polymerase Distinguishes Template from New Strand via Methylation**

- Over time, the old DNA strands (templates) are _____ via regulatory processes in the cell.
  - □ **Methylation:** addition of a *methyl* (–_____) group.
- During DNA replication, DNA polymerase can _____ the *old template* from the *new strand*.
  - □ Template strand is *methylated* & new strand is _____ yet methylated.




**PRACTICE:** What is DNA methylation?

a) The addition of ethyl groups ($-CH_2-CH_3$) to the sugar-phosphate backbone of DNA.
b) The addition of ethyl groups ($-CH_2-CH_3$) to the adenine and cytosine bases of DNA.
c) The addition of methyl groups ($-CH_3$) to the sugar-phosphate backbone of DNA.
d) The addition of methyl groups ($-CH_3$) to the adenine and cytosine bases of DNA.

**PRACTICE:** Why is DNA methylation important in DNA replication?

a) Methyl groups bind to and stop the replication of genes that the cell does not need.
b) Methyl groups bind to and increase the replication of genes that the cell needs.
c) Methyl groups bind to the old DNA strands so DNA polymerase can recognize the new DNA strands.
d) Methyl groups bind to the new DNA strands so DNA polymerase can recognize the old DNA strands.