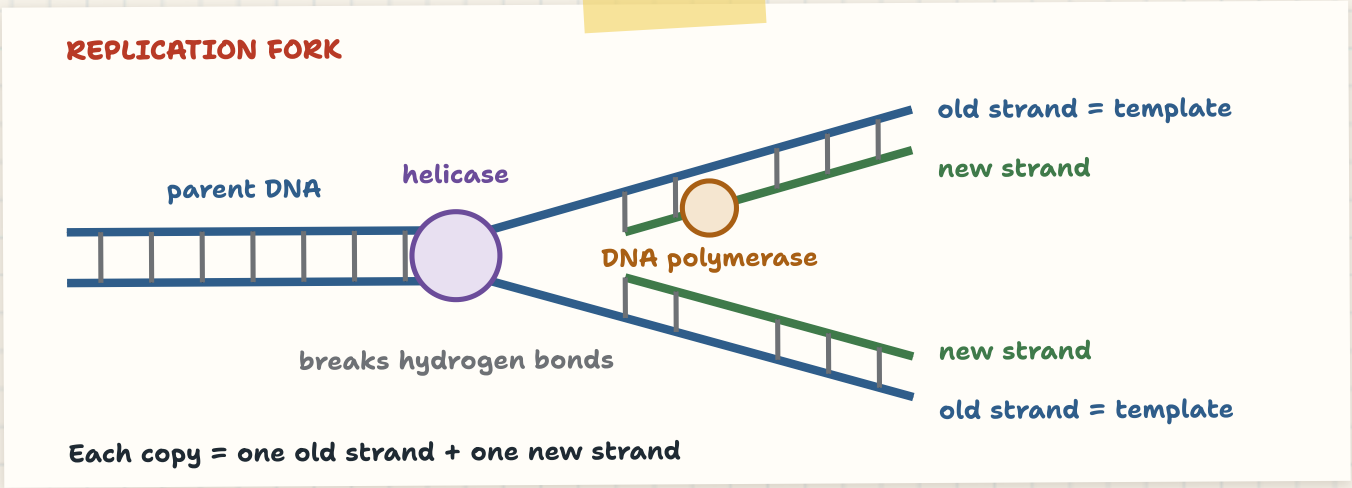
DNA Replication: Helicase and Polymerase

Helicase unwinds the double helix, then DNA polymerase joins new nucleotides on both template strands.



Key terms

semi-conservative replication	each new DNA molecule contains one original strand and one newly made strand.
DNA helicase	the enzyme that unwinds the double helix and breaks the hydrogen bonds between complementary bases.
template strand	an old strand whose order of bases decides the order of bases on the new strand.
complementary base pairing	free nucleotides line up opposite exposed bases: A with T, C with G, with hydrogen bonds between them.
DNA polymerase	catalyses a condensation reaction between adjacent nucleotides on the new strand, forming phosphodiester bonds.

I can...

- [ ] Semi-conservative replication ensures genetic continuity
- [ ] Unwinding of the double helix
- [ ] Breakage of hydrogen bonds between complementary bases
- [ ] DNA helicase unwinds and breaks hydrogen bonds
- [ ] Attraction of new nucleotides to exposed bases with base pairing
- [ ] DNA polymerase catalyses the condensation joining adjacent nucleotides

EXAM TRAP

Do not just say helicase "unzips" the DNA: say it breaks hydrogen bonds. And polymerase joins adjacent nucleotides to each other in the new strand, not the new bases to the template.

5 marks: what earns them

1. DNA helicase unwinds the double helix and breaks the hydrogen bonds between complementary bases
   Not: DNA unzips (no enzyme or bond)
2. Both (original) strands act as templates
   Not: the DNA is the template (it is both strands)
3. Free (new) nucleotides are attracted to the exposed bases on the template strand and join by complementary base pairing (A with T, C with G)
   Not: A with G or C with T; phosphodiester bonds to the template
4. DNA polymerase joins adjacent nucleotides (on the new strand) in a condensation reaction / forming phosphodiester bonds
   Not: polymerase joins bases to the template
5. Each new DNA molecule contains one original strand and one new strand (semi-conservative)
   Not: old molecule stays whole (conservative)

Remember

Helicase: hydrogen bonds break.

Polymerase: phosphodiester bonds join the new strand.

Both strands are templates; each copy keeps one old strand.

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