**What about Hershey Chase?**

**What is DNA?**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Genetic **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ responsible for all our inherited \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and
	+ controlling the production of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Rosalind Franklin produced an x-ray photograph, allowing James Watson and Francis Crick to work out the 3D structure of **DNA**.

<http://ed.ted.com/lessons/rosalind-franklin-dna-s-unsung-hero-claudio-l-guerra>



**DNA Structure**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Polymer of repeating units **\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ consisting of:
1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, 4 kinds:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (A), \_\_\_\_\_\_\_\_\_\_\_\_\_(G), \_\_\_\_\_\_\_\_\_\_\_ (C), and \_\_\_\_\_\_\_\_\_\_\_\_ (T)

* + **two types of bases: \_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ **purines** – A, G have a ***double ring structure***
	+ **pyrimidines** - have a ***single ring structure*** (thymine, cytosine, uracil)
	+ **four** different kinds of bases so there are **four** different kinds of nucleotides

**twisted ladder:**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** bases, (rungs) held together by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ base pairing**:
* **Sequence** of bases makes up our genetic code

**GENES** are segments of DNA that code for a particular function

* basic units of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: determine our traits and protein production
* Humans have about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* About **175,000** genes compose the DNA molecule of a single human chromosome.
* Genes always occur in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* **\_\_\_\_\_\_\_\_** are forms of the same gene with small differences in their sequence of DNA bases.

**Where is DNA?**

* DNA is found in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Nucleosome – basic unit of DNA packaging – segment of DNA wound around **\_\_\_\_\_\_\_\_\_\_\_\_** histone protein cores.
* **chromatin condenses** to form **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** during **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

More info: <http://www.nature.com/scitable/topicpage/dna-packaging-nucleosomes-and-chromatin-310>

<http://www.hhmi.org/biointeractive/dna-packaging>

<https://www.youtube.com/watch?v=0_b80fHmuWw&list=UUsooa4yRKGN_zEE8iknghZA&index=1097>

<https://youtu.be/aeAL6xThfL8?list=UUsooa4yRKGN_zEE8iknghZA>

**How many chromosomes do people have?**

* Humans have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of chromosomes (**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) for a total of 46 (**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** number).
* 22 of these pairs are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**,
* 23rd pair, the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ Females have \_\_\_\_\_\_\_\_\_\_\_\_
	+ Males have \_\_\_\_\_\_\_\_\_\_\_\_\_\_



 🡨 Karyotype.

**DNA REPLICATION:**

1. **Initiation Phase**

**helicase** unwinds the DNA helix,

initiation point is called **“origin of replication”**

replication fork

1. **Elongation Phase**
* **RNA Primase** binds to initiation site
	+ RNA primer (nucleotides)
	+ replaced by DNA nucleotides.
* strands run anti- parallel: 5’ to 3’
* Daughter Strands: **Leading Strand** and **Lagging strand**
	+ The 3'-5' daughter strand -that uses a **5'-3' template** -leading
* **DNA Polymerase**
	+ Adds complementary nucleotides
	+ moves toward replication fork in the 5’ to 3’ direction of new strand.
* Leading strand is synthesized **continuously** as one long strand
* Lagging strand synthesized **discontinuously**: Okazaki fragments.
* Each Okazaki fragment begins with an RNA primer, which DNA polymerase can attach a nucleotide to.
* As replication fork moves along additional RNA primers are needed to allow for synthesis of Okazaki fragments in the 5’ to 3’ direction.
* **DNA ligase** links Okazaki fragments to form a completed lagging strand.

**3. Termination Phase**:

* termination sequence in the DNA
* two new DNA molecules
* Nucleases repair wrong nucleotides
* Semi Conservative
* Ensures \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* in the last section of the lagging strand, when the RNA primer is removed, it is not possible for the DNA Polymerase to seal the gap (because there is no primer). So, the end of the parental strand where the last primer binds isn't replicated. These ends of linear (chromosomal) DNA consists of noncoding DNA that contains repeat sequences and are called **telomeres**. As a result, a part of the telomere is removed in every cycle of DNA Replication.



Levels of Structure of DNA pg 84

Structure <https://www.youtube.com/watch?v=dKubyIRiN84>

Crash Course: <https://www.youtube.com/watch?v=8kK2zwjRV0M>

<https://www.youtube.com/watch?v=5VefaI0LrgE>

interactive

<http://www.wiley.com/college/boyer/0470003790/animations/replication/replication.htm>

<http://www.wiley.com/college/pratt/0471393878/instructor/animations/dna_replication/index.html>