

DNA Fingerprinting

What you will learn...

- Essential Question:
 - How can DNA (collected from a crime scene) be helpful in solving a crime?
 - How is DNA extracted from evidence/suspect samples?
 - How is DNA linked back to a particular suspect?
- Standard:
 - SFS3 f & g

DNA in Forensics



Video Link:

https://www.youtube.com/watch?v=_POdWsii7AI

DNA in Forensics

- Except for identical twins, no two people have the same DNA
- Advances in DNA technology have allowed criminal cases to be solved (re-examined)
- DNA is considered individual evidence because it can be linked to a specific person.

DNA in Forensics

•DNA can be collected from the following:

- ✓ Skin
- ✓ Blood
- ✓ Saliva
- ✓ Urine
- ✓ Semen
- ✓ Hair



DNA in Forensics

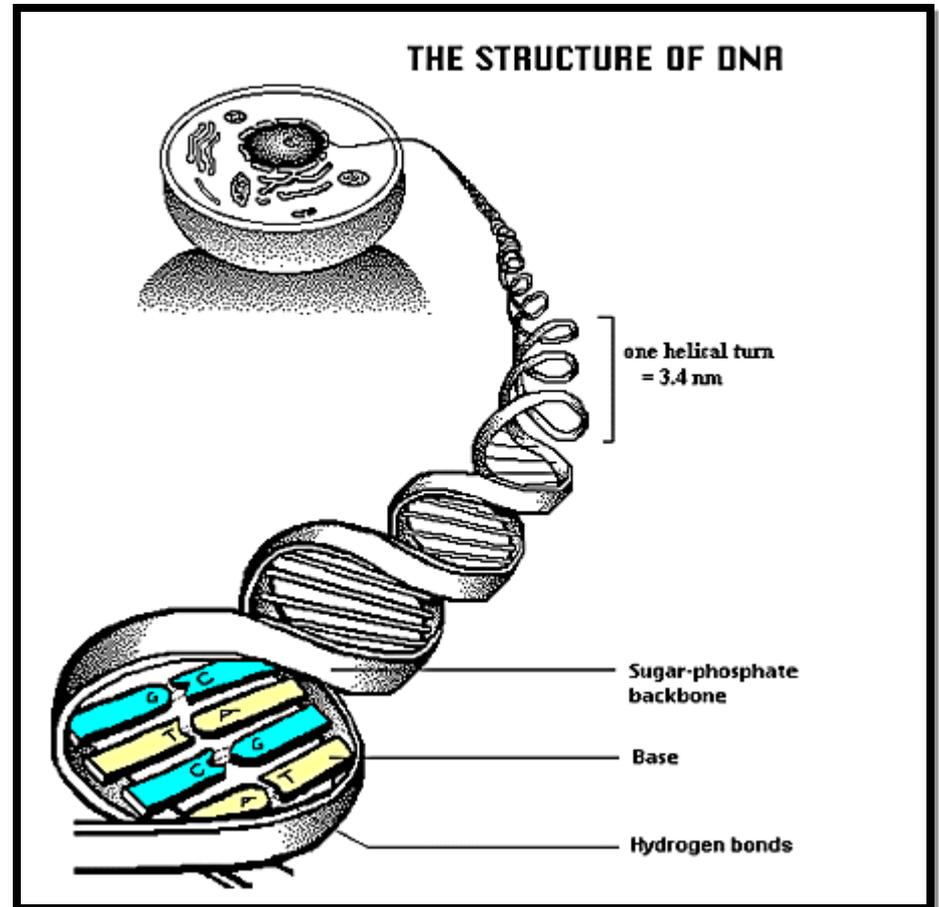
- DNA fingerprinting, aka DNA profiling is used in criminal and legal cases to determine identity or parentage.



WHO'S MY
DADDY?

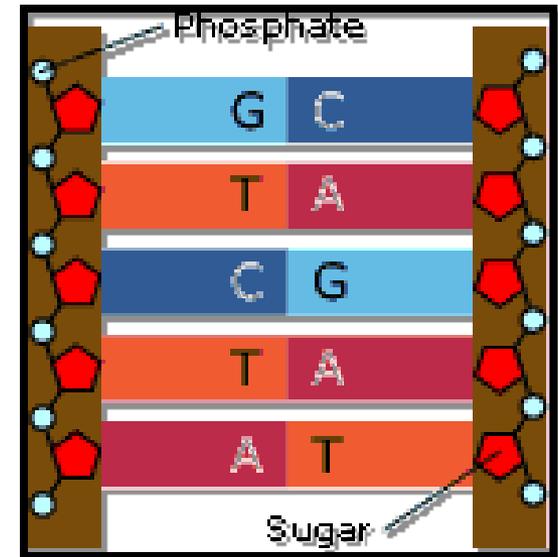
DNA in Forensics

- Deoxyribonucleic acid
- Located in the nucleus of the cell
- Carries an organism's genetic information



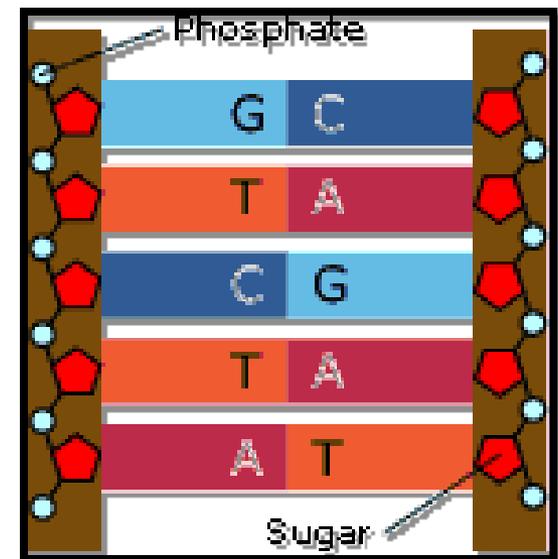
DNA in Forensics

- DNA is a polymer that consists of many monomers called **nucleotides**.
- Each nucleotide has 3 parts:
 - A phosphate group
 - A sugar called deoxyribose
 - A nitrogen-containing base



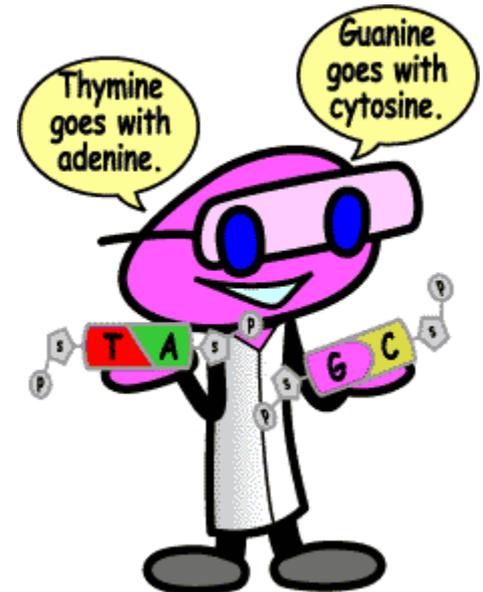
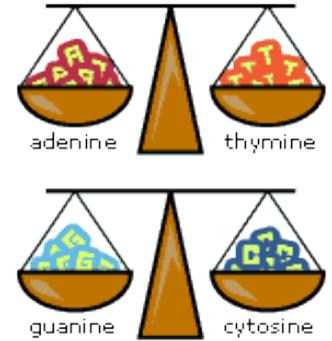
DNA in Forensics

- One molecule of human DNA contains billions of nucleotides, but there are only 4 types in DNA
 - Thymine (T)
 - Cytosine (C)
 - Adenine (A)
 - Guanine (G)



DNA in Forensics

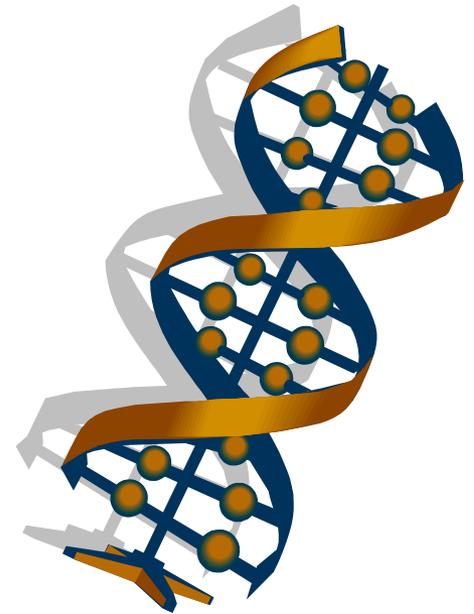
- The same four bases are found in the DNA of all organisms, but the proportions are different
- In the DNA of each organism, the amount of **adenine** equals the amount of **thymine** and the amount of **cytosine** equals the amount of **guanine**.
- $A=T$ and $C=G$



DNA in Forensics

How will the following nucleotides pair?

- ATCGGCTACGT
- TAAGCCGATAT
- GCATGCATTAC



DNA in Forensics

- If DNA is found at a crime scene, it belongs to someone and a match can be found by removing the DNA from the crime scene and matching it to a suspect or victim
- DNA is a fairly new technology
- DNA is considered the most useful form of evidence in obtaining convictions

DNA in Forensics

- When DNA is found, it is compared to DNA entered in the national database- this database is known as CODIS
- If the DNA is not registered in the CODIS database, a suspect sample is needed for comparison
- Suspect DNA is collected
 - Hair
 - Blood
 - Saliva (buccal swab)



[How to Collect a Buccal Swab Video:](https://youtu.be/azpmJ4cXiIM)
<https://youtu.be/azpmJ4cXiIM>

DNA in Forensics

- QR Quest Activity: In groups of 2-3, answer the questions provided to you by scanning the QR code.
- If you do not have a QR reader, you can google the answer.
- Turn in your answers when finished.