



**NSTA 2011 Regional
New Orleans**


Sea Turtle CSI


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 Thymine

 Adenine

 Guanine

 Cytosine

D = Deoxyribose
(sugar)

P = Phosphate

 Hydrogen
Bond

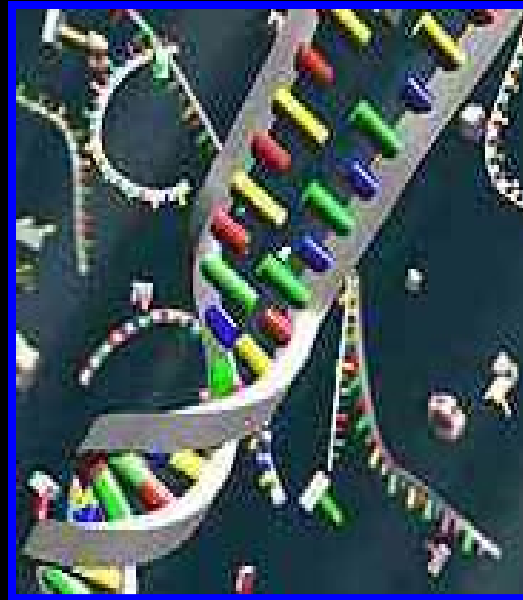
DNA Double Helix



DNA Facts

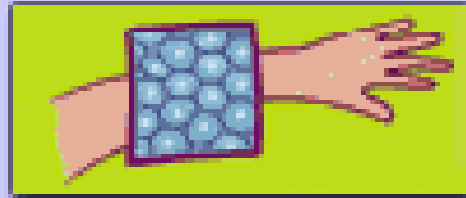
DNA stands for:

- Deoxyribose
- Nucleic
- Acid



Under a microscope DNA looks like a twisted up ladder!

Every living thing has DNA. That means you have something in common with a shark, a flower, a mushroom, and a horseshoe crab!



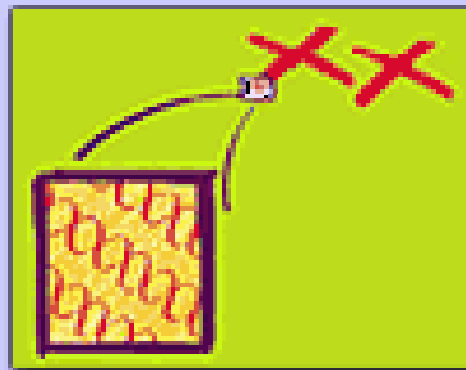
Every living thing is made of cells.*



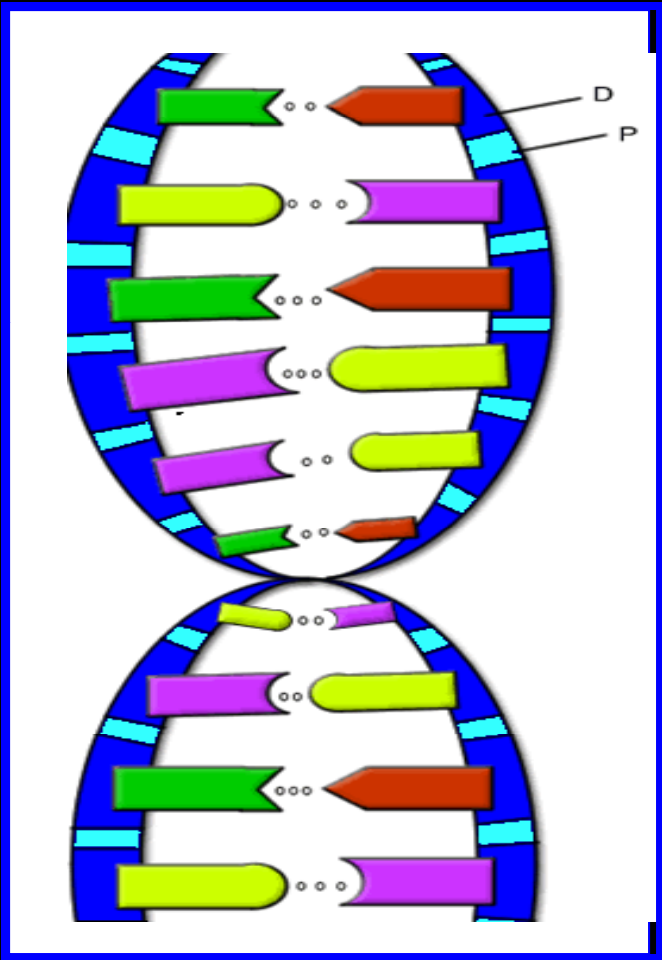
Most plant and animal cells have a nucleus.*
The nucleus tells the cell what to do.



Inside the nucleus are chromosomes.*



Chromosomes are made of long strands of tightly coiled DNA.
(If you stretched out the DNA from a human cell, it would be about six feet long!)



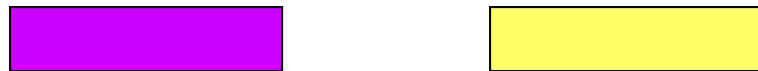
Adenine can only pair with Thymine

Guanine can only pair with Cytosine

Green can only go with Red



Purple can only go with Yellow



Activity:



You are going to make a
DNA molecule with CANDY!

Everyone knows we can tell people apart by their fingerprints...



But today we are going to look
more at footprints than fingerprints!



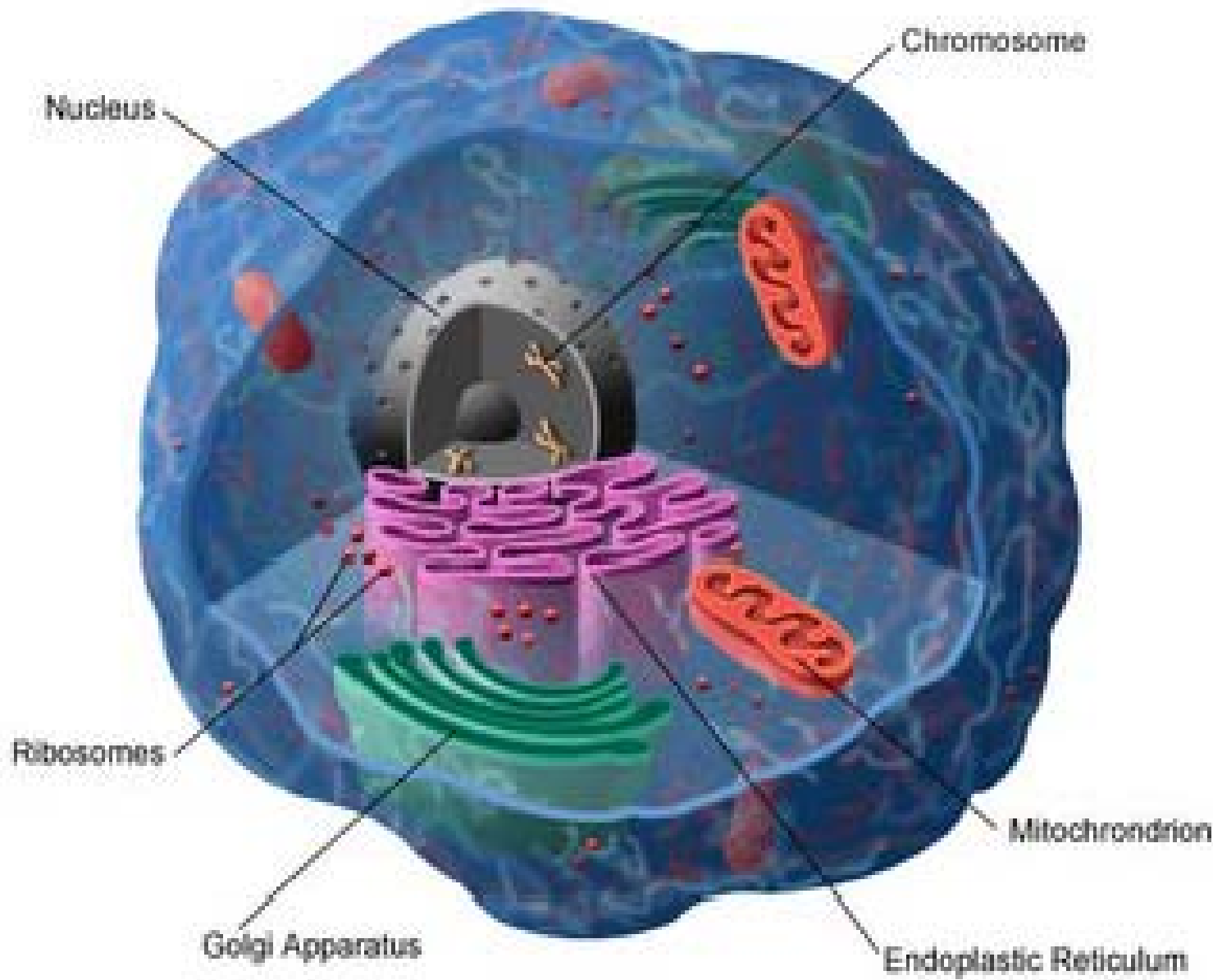
Sea Turtle crawl,
Dauphin Island



Scenario



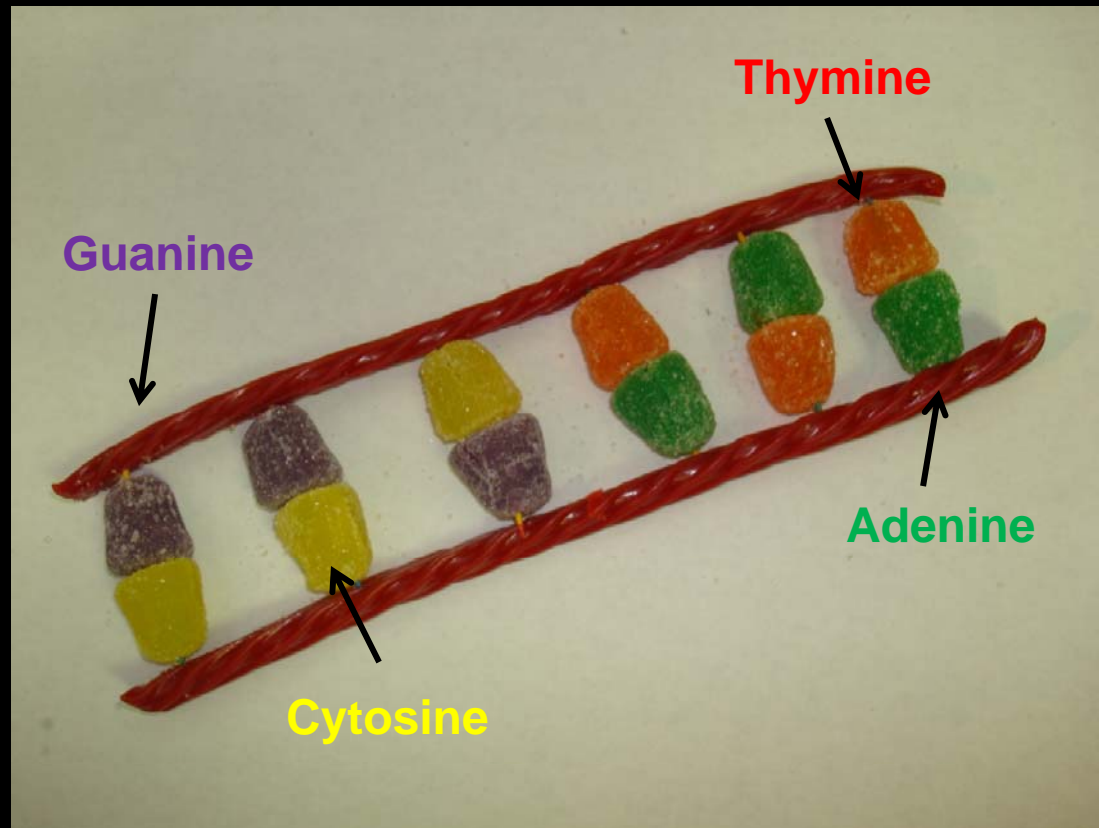
Anatomy of a Cell



Mitochondria are structures within cells that convert the energy from food into a form that cells can use.

Mitochondrial DNA: mtDNA

- Only inherited from the mother
- Natal Homing – female sea turtles return to the beach where they were born
- Beach footprint – imprint on DNA



How do we get enough DNA to test this scenario, to find out where that sea turtle meat came from?

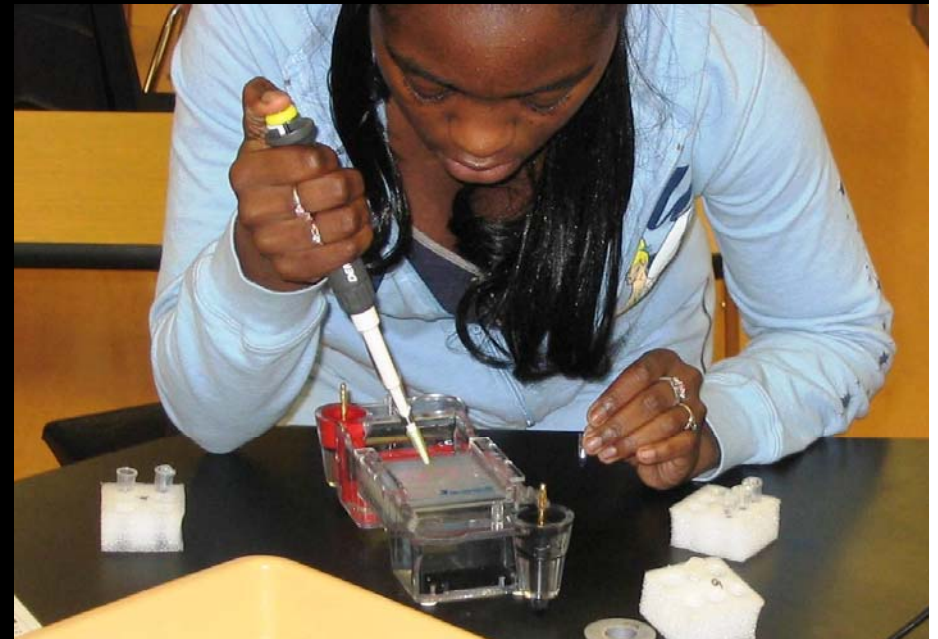
Common CSI and Cop show practice:



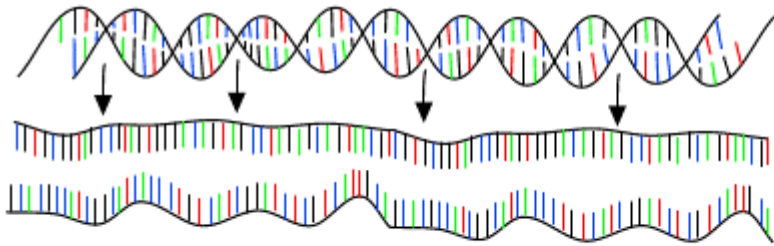
Not enough DNA is gathered to run a Gel Electrophoresis!

PCR: Polymerase Chain Reaction

Gel Electrophoresis

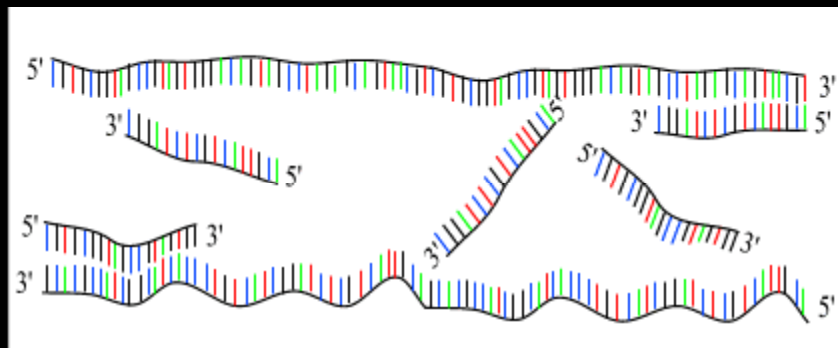


The Polymerase Chain Reaction



Step 1 : denaturation

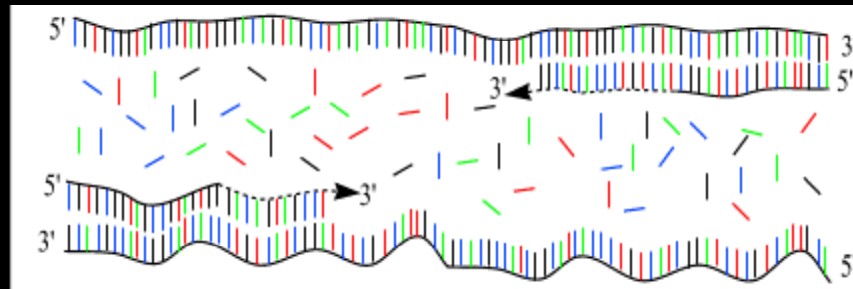
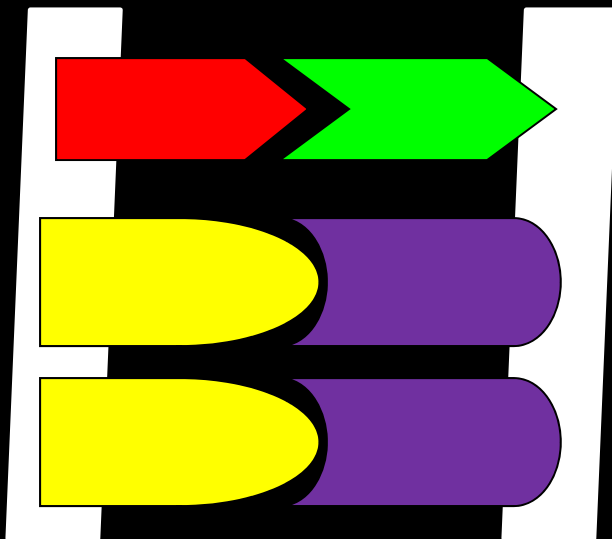
1 minut 94 °C



Step 2 : annealing

45 seconds 54 °C

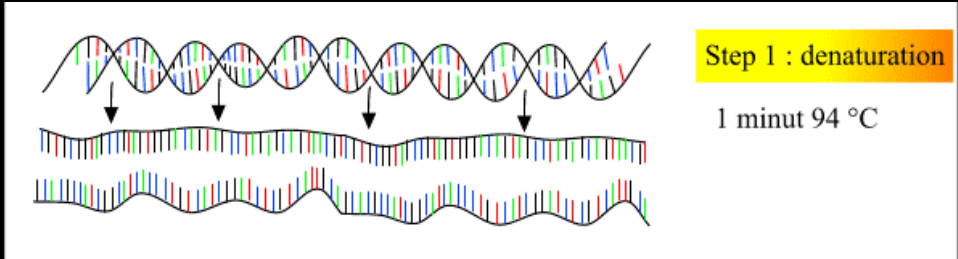
forward and reverse primers !!!



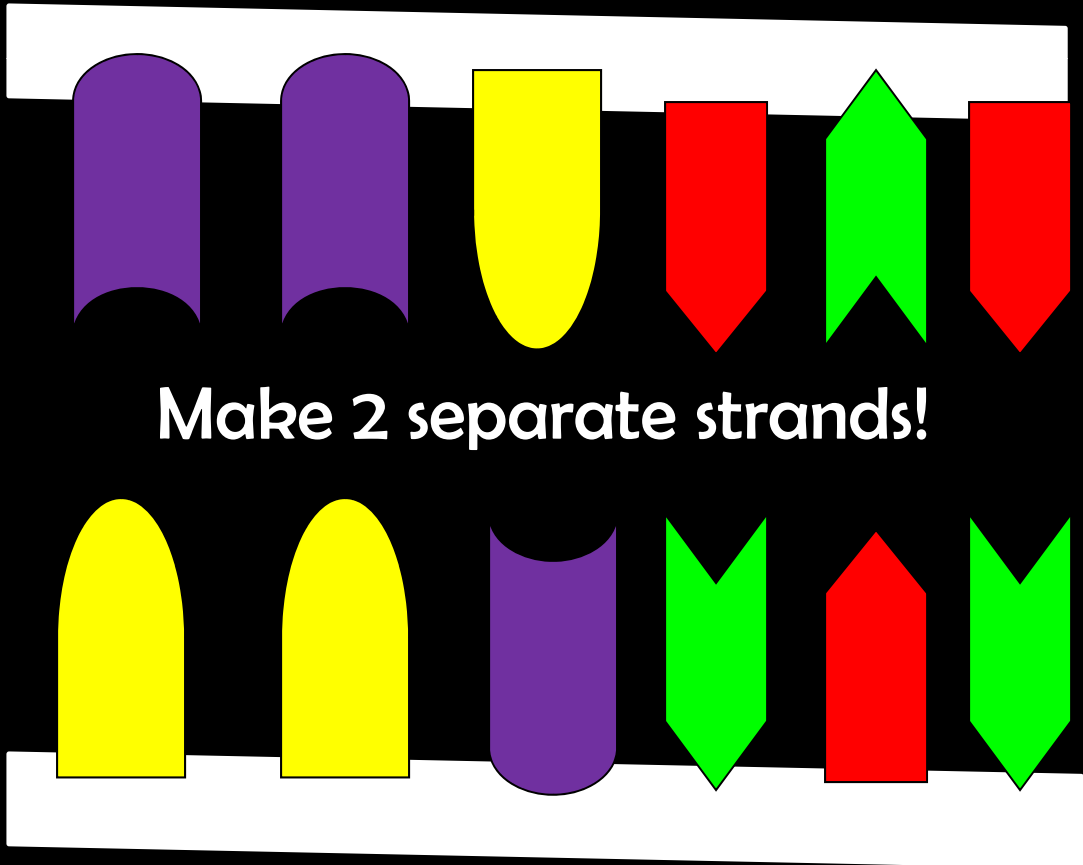
Step 3 : extension

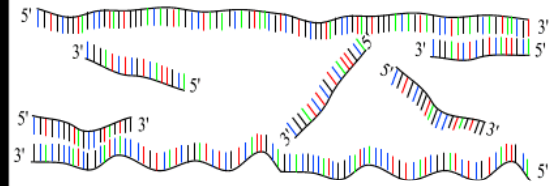
2 minutes 72 °C
only dNTP's

(Andy Vierstraete 1999)



Step #1: Denaturation – heat up to separate



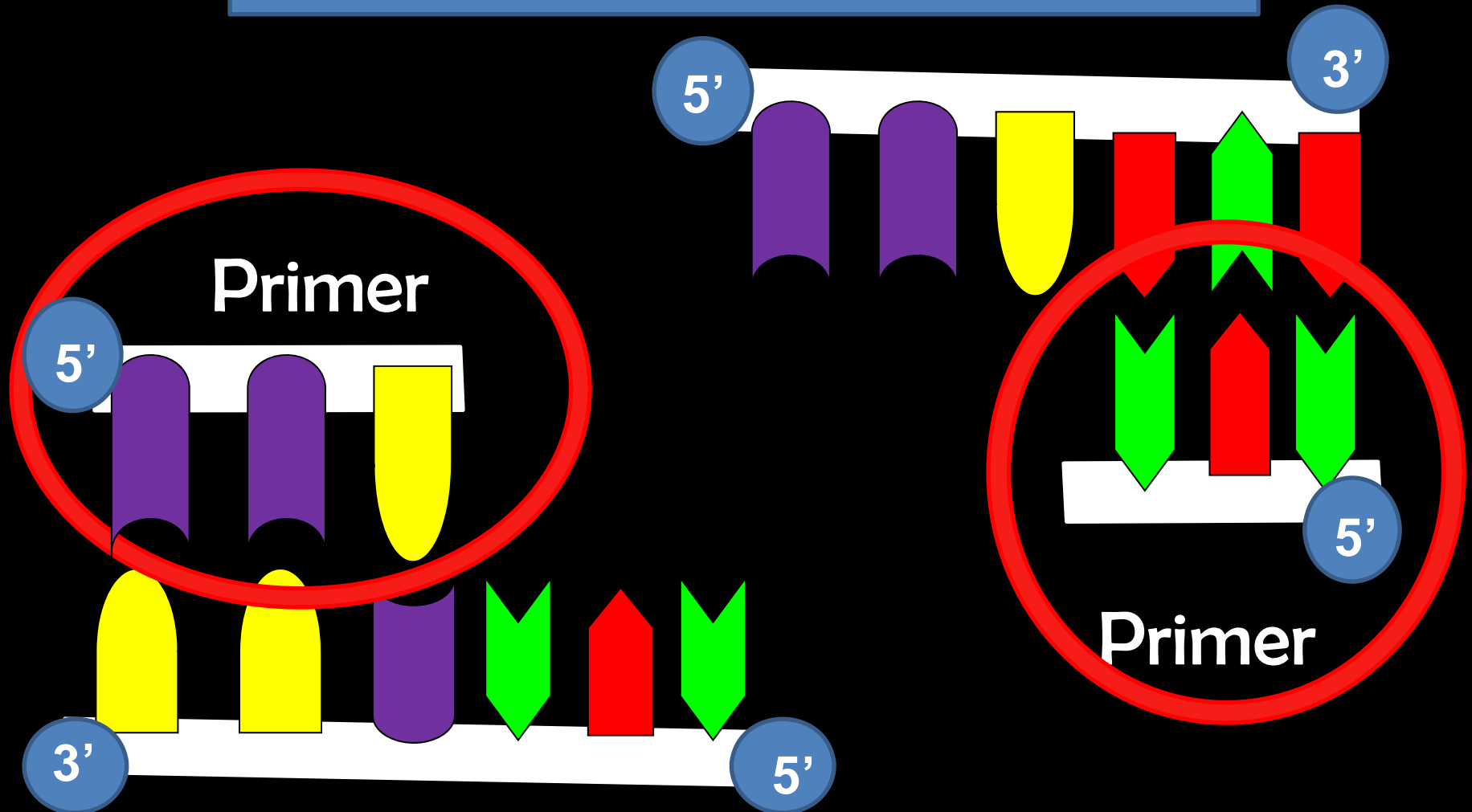


Step 2 : annealing

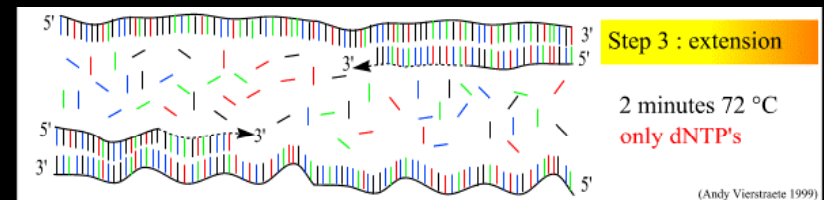
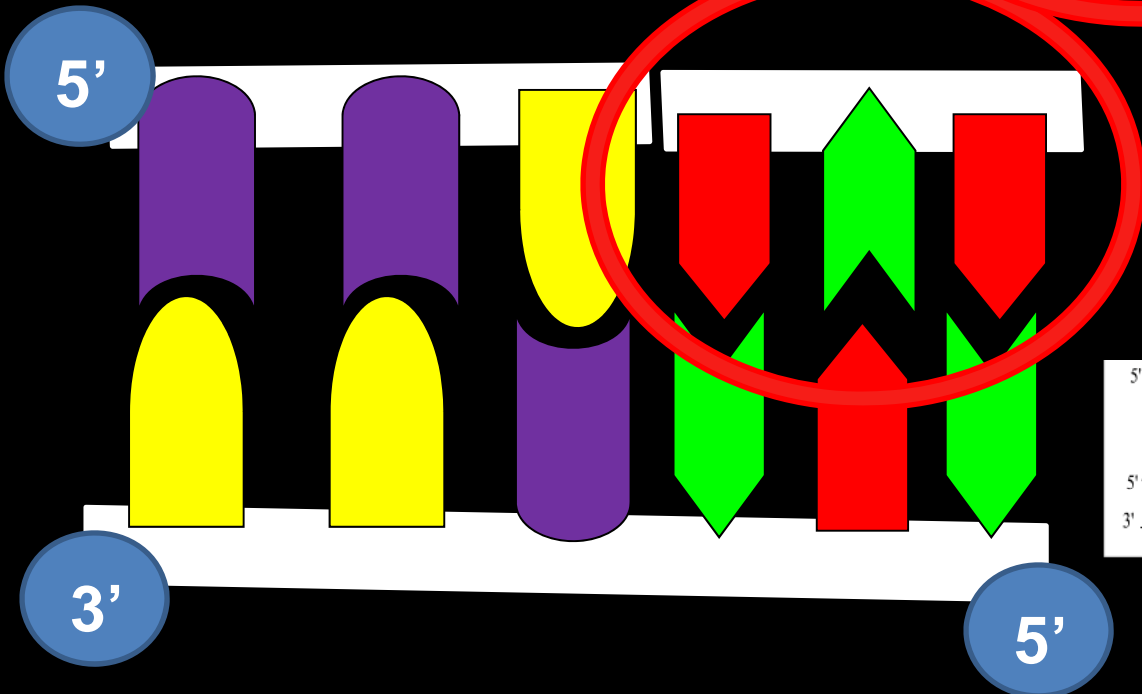
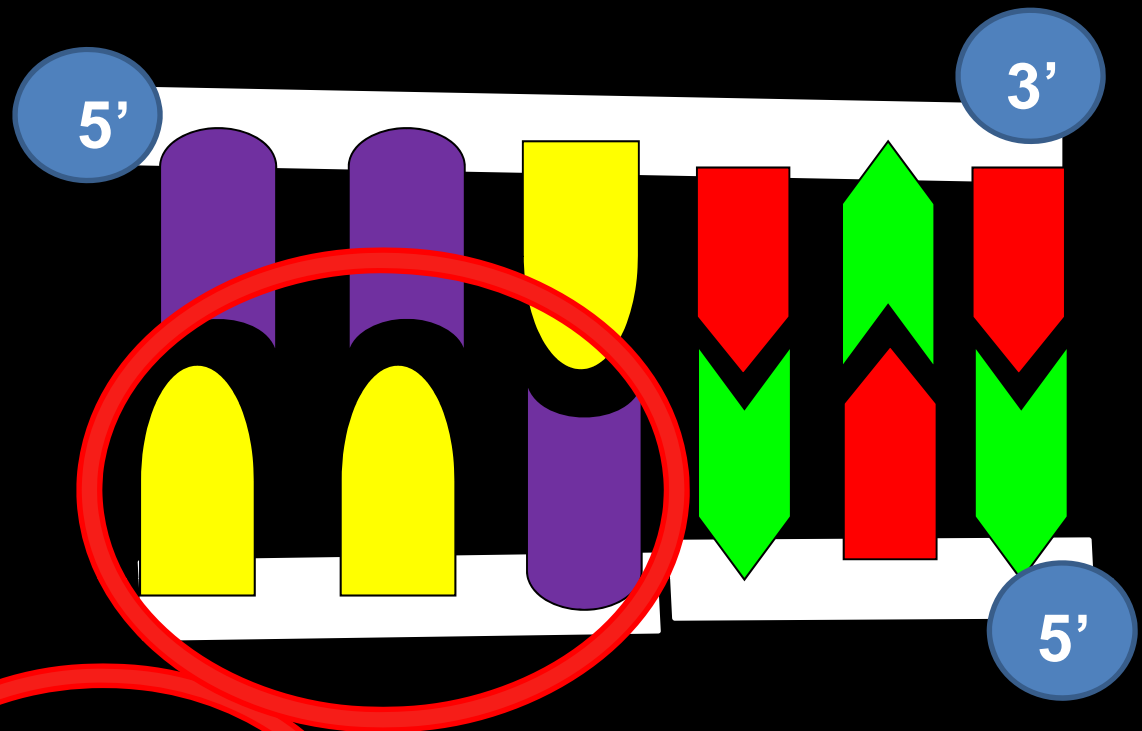
45 seconds 54 °C

forward and reverse primers !!!

Step #2: Annealing: make primers



Step #3: Extension:
Grow the DNA
molecules by
adding nucleotides!



Last Step: Match your DNA to known Haplotype

Haplotype A

North Carolina
South Carolina
Georgia
Florida

**TEACHABLE MOMENT =
GENETIC MUTATIONS**



Bio Edit program

Online virtual lessons & interactive games

Genetic Science Learning Center, The University of Utah

- <http://learn.genetics.utah.edu/content/labs/extraction/>
- <http://learn.genetics.utah.edu/content/labs/pcr/>
- <http://learn.genetics.utah.edu/content/labs/gel/>

http://www.nobelprize.org/educational/medicine/dna_double_helix/about.html

Interactive “matching” game!



www.disl.org

Developed by Stephanie Serra

Presented by Joan Turner