

NAME: _____ DATE: _____

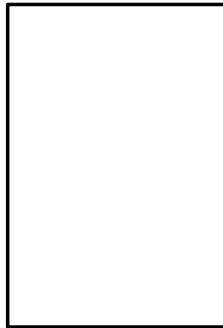
DNA Technology Virtual Labs

Visit each of the following virtual labs and complete them as directed, answering the following questions as you go.

A. Create a DNA Fingerprint

<http://www.pbs.org/wgbh/nova/education/body/create-dna-fingerprint.html>

1. DNA is unique for everyone. The only exception is if a person has what?
 2. What are DNA fingerprints used for?
- Part 1 "It Takes a Lickin"**
3. What "crime" was committed?
 4. What bodily fluid was removed from the "crime scene" to get DNA?
- Part 2 "DNA Fingerprinting at the NOVA Lab"**
5. What does a restriction enzyme do?
 6. What is agarose gel?
 7. What is electrophoresis?
 8. Smaller fragments of DNA move _____ than longer strands?
 9. Why do you need to place a nylon membrane over the gel?
 10. Probes attach themselves to _____
 11. Which chemical in your "virtual lab" is radioactive?
 12. Sketch your DNA fingerprint in the box ----->
 13. Based on your DNA fingerprint, who licked the lollipop?



B. CLONING - Let's Clone a Mouse, Mouse, Mouse . . .

<http://learn.genetics.utah.edu/content/cloning/clickandclone/>

Let's see how cloning works! Click on Mimi the mouse! Make sure to read the instructions in each step!

1. Which mouse will we clone and what is her color? _____
2. Who is the egg donor mouse and what is her color? _____
3. Who is the surrogate mother mouse and what is her color? _____
4. Step 1 – Isolate donor cells from Mimi and Megdo
 - a. Remove a somatic (Body) cell from Mimi and an egg cell from Megdo
 - b. Place each one into the correct Petri dish
 - c. What are some examples of somatic cells in your body? _____
5. Step 2 – Remove and discard the nucleus from the egg cell
 - a. Does the "enucleated" egg cell have any DNA in it after this? _____
6. Step 3 – Transfer the somatic cell nucleus in to the enucleated egg cell
 - a. After taking the nucleus out of the somatic cell, where did you put it? _____
 - b. Who's DNA is now inside the egg cell? (Which mouse) _____

7. Step 4 – Stimulate cell division
 - a. What is another name for cell division? _____
 - b. How long does it take for the cells to develop into a "Morula"? _____
8. Step 5 – Implant the embryo into Mimi, the surrogate mother
 - a. Where do you implant the embryo? _____
 - b. How long does a mouse pregnancy last? _____
9. Step 6 – Deliver the baby mouse clone of Mimi
 - a. What color will the Mouse Pup be? Why? _____
 - b. What gender will she be? Why? _____
10. If you could clone any species, animal or human that exists or once existed, which would you chose and why? _____

A. DNA Extraction - <http://learn.genetics.utah.edu/content/labs/extraction/>

1. Why might scientists need to isolate human DNA?
2. Where do we find the DNA and what do we need to separate it from?
3. What steps would you follow to purify DNA from a cheek swab?
4. Explain the purpose of each step
 - a. Lysis Solution-
 - b. Warm water bath –
 - c. Concentrated salt –
 - d. Centrifuge –
 - e. Isoproprol alcohol -

B. Gel Electrophoresis Lab <http://learn.genetics.utah.edu/content/labs/gel/>

1. a) Electrophoresis is used to sort DNA by _____
b) What is placed into the holes at the end of the gel? _____
c) By adding electric current, we can make the DNA _____
d) Shorter strands of DNA move [farther / slower] than longer strands.
2. Place the steps in the correct order.
____ Load DNA sample into the gel.
____ Stain the gel and analyze results
____ Make the gel
____ Hook up the electrical current
____ Set up gel apparatus
3. In the "Gel Electrophoresis Laboratory" follow the steps to make your own gel, answer the questions as you go.
 - a) What is agarose made from? _____
 - b) Melted agarose is poured into a _____
 - c) Buffer _____ electric current in the electrophoresis box.
 - d) In real life, loading samples into the gel wells takes _____
 - e) The black end generates a _____ charge, the red end a _____ charge.
 - f) The bubbles in the electrophoresis box are _____ that your current is running.
 - g) Staining the DNA will make it show up under a _____ light.
 - h) What are your estimates for the number of base pairs in the three bands? _____