AGENDA for 10/11/13

- AGENDA:
  1. Finish 1.2.3 – DNA Analysis
     - Analyzing DNA Samples Using Current Forensic Methods
- OBJECTIVES:
  1. Demonstrate the steps of gel electrophoresis
  2. Analyze restriction fragment length polymorphisms (RFLPs)

- HOMEWORK:
  - Due **end of the period**
    1. 1.2.3 Activity Packet (see checklist)
    2. 1.2.3. Career Journal – Forensic DNA Analyst

Activity 1.2.3. – DNA Analysis

Activity Objectives – 1.2.3.

1. Investigate the methods used to analyze DNA and to compare the DNA found at the crime scene

Essential Questions

4. How can tools of molecular biology be used to compare the DNA of two individuals?
5. What are restriction enzymes?
6. What are restriction fragment length polymorphisms?
7. What is gel electrophoresis and how can the results of this technique be interpreted?

1.2 Key Terms

Adenine	A component of nucleic acids, energy-carrying molecules such as ATP, and certain coenzymes. Chemically, it is a purine base.
Chromosome	Any of the usually linear bodies in the cell nucleus that contain the genetic material.
Cytosine	A component of nucleic acids that carries hereditary information in DNA and RNA in cells. Chemically, it is a pyrimidine base.
Deoxyribonucleic Acid (DNA)	A double-stranded, helical nucleic acid molecule capable of replicating and determining the inherited structure of a cell's proteins.
Gel Electrophoresis	The separation of nucleic acids or proteins, on the basis of their size and electrical charge, by measuring their rate of movement through an electrical field in a gel.
Gene	A discrete unit of hereditary information consisting of a specific nucleotide sequence in DNA (or RNA, in some viruses).
Guanine	A component of nucleic acids that carries hereditary information in DNA and RNA in cells. Chemically, it is a purine base.
Helix	Something spiral in form.
Model	A simplified version of something complex used, for example, to analyze and solve problems or make predictions.
Nucleotide	A building block of DNA, consisting of a five-carbon sugar covalently bonded to a nitrogenous base and a phosphate group.
Restriction Enzyme	A degradative enzyme that recognizes specific nucleotide sequences and cuts up DNA.
Restriction Fragment Length Polymorphisms (RFLPs)	Differences in DNA sequence on homologous chromosomes that can result in different patterns of restriction fragment lengths (DNA segments resulting from treatment with restriction enzymes).
Thymine	A component of nucleic acid that carries hereditary information in DNA in cells. Chemically, it is a pyrimidine base.

1.2.3. Conclusion Question

1. Whose DNA was found at the crime scene? Explain how you came to your conclusion.
2. Explain the role that restriction enzymes and gel electrophoresis play in DNA profiling.
3. What would happen if the gel was placed with the DNA starting closest to the positive electrode?
4. Besides DNA profiling, for what other reasons might scientists and researchers use DNA analysis? Explain your reasoning.
5. Describe how the biomedical science professional introduced in this activity would assist with Anna's case.

Due at the end of the period

1.2.3 Activity Checklist

1. 1.2.3. Part 1 Completed and Stamped — 0.5
2. 1.2.3. Gel Electrophoresis Notes (NB) — 3
   - Go to the *Gel Electrophoresis Virtual Lab* link
   - Include at least 5 drawings/illustrations/figures
   - Print out (by cutting and pasting onto Word doc) the last slide – Estimating bp lengths
3. 1.2.3. Gel Electrophoresis Poster (poster) — 3
4. 1.2.3. Gel Electrophoresis Handout (handout) — 1
5. Update Information on Investigative Notes (handout or NB) — 0.5
6. 1.2.3. Conclusion Questions (NB) — 2

Total = 10

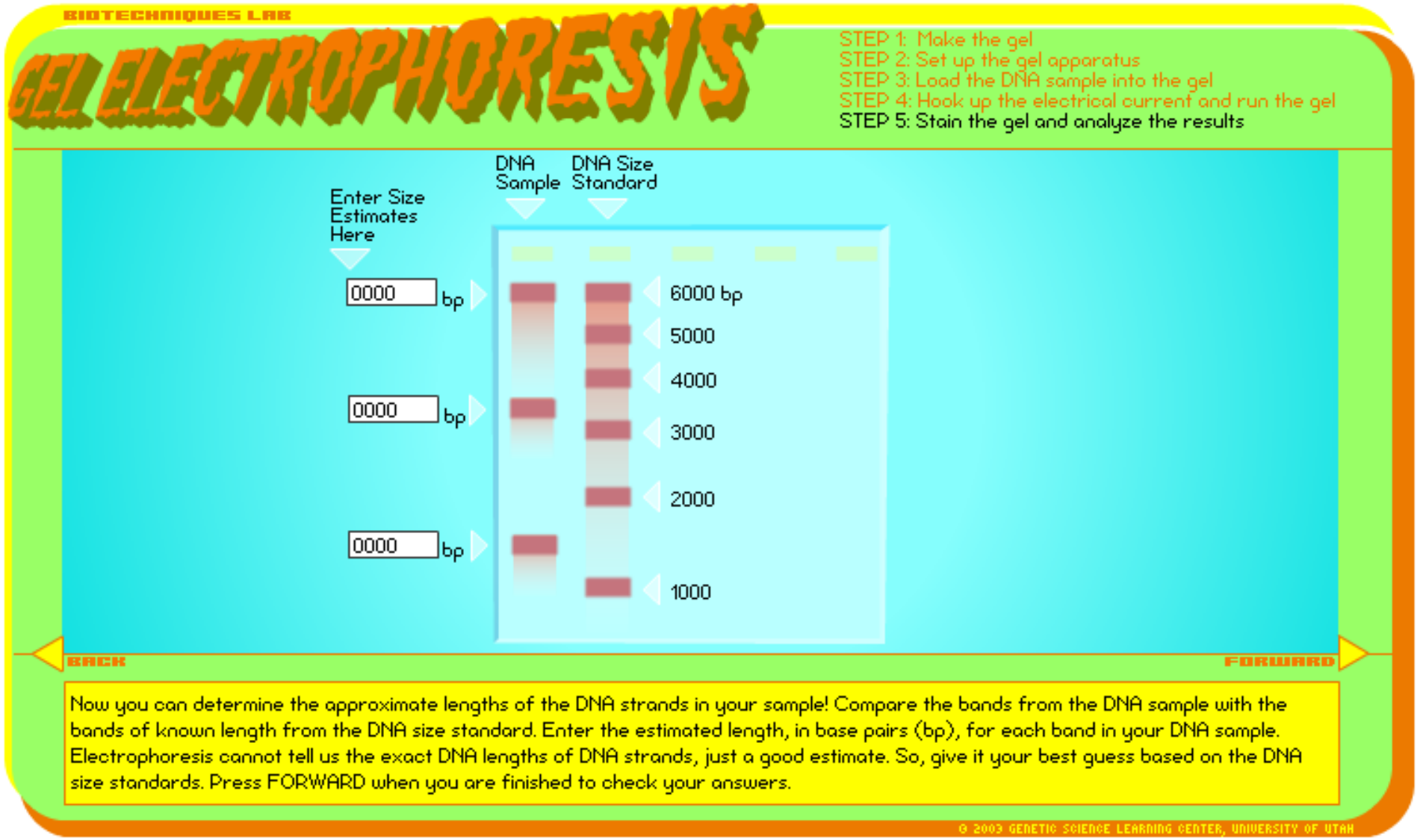
1.2.3. Part 1 - Directions

1. Draw restriction cuts on the handout
2. Get it checked by Mr. Hwang
3. After approval, cut out fragments
4. See curriculum file for more detailed directions

1.2.3. Part 2 – Gel Electrophoresis Virtual Lab

1. Go to the link: http://learn.genetics.utah.edu/content/labs/gel/
2. Follow procedures on curriculum file
3. Further instructions on the next few slides
4. See activity checklist for more information

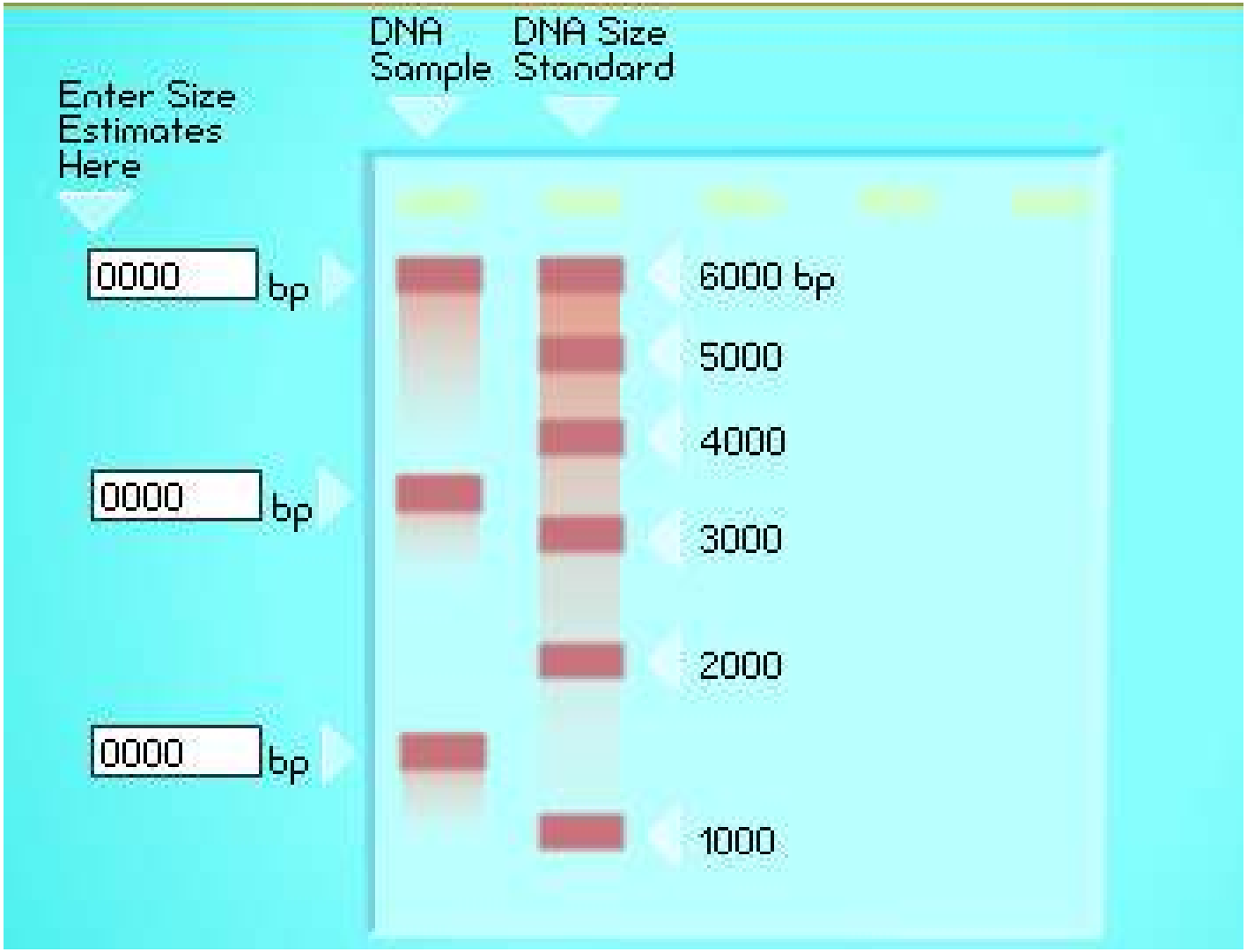
Last Screen of Virtual Lab



CUT AND PASTE ON WORD DOC AFTER CHECKING YOUR ESTIMATE

- ***DO NOT PRESS FORWARD AFTER YOU CHECK YOUR ESTIMATE*** OR YOU WILL HAVE TO START ALL OVER TO GET TO THE LAST PAGE AGAIN.

Cut Out of Your Gel Virtual Lab bp Estimate



1.2.3. Part 2 – Gel Electrophoresis Poster

1. Make a poster-sized copy of the Gel Electrophoresis handout
2. Paste your cut DNA fragments on the poster
3. Be sure to label each fragment

1.2.3. Part 2 – Gel Electrophoresis Handout

1. Using your poster with the fragments pasted in the correct place, mark the fragments on your handout
2. Label each fragment

1.2.3 Career Journals

- Careers to explore:
  - Forensic DNA Analyst
- Each person does their own career journals
- See *Career Journal Guidelines* on website for detailed information about career journals and how I grade them
- Save each career as its own file in the DROP BOX or print out a copy
  - Last name, First Initial – name of career
  - Example, "*Hwang, J – Forensic DNA Analyst*"