

Run-down of the weekly assignments for Exercise 4: Molecular Genetics (To be performed Weeks 9 – 12 of the Fall semester)

Week 9

We will be reviewing how to write a lab report.

Week 10

Before class:

Review the following topics:

- PCR (pp. 332-335 in *Essential Cell Biology* and Unit 10.1 in ecb interactive CD-ROM)
- how markers are used in forensics biology (see page 336 in *Essential Cell Biology*)
- Gel electrophoresis (pp. 317-318 in *Essential Cell Biology*)

Read Lab Exercise 4.1, "Detection of a VNTR polymorphism by polymerase chain reaction".

In class:

Begin Lab Exercise 4.1, "Detection of a VNTR polymorphism by polymerase chain reaction":

- I. Isolate cheek cell DNA
- II. Set up PCR reaction and amplify

After class:

This experiment will be completed next week. **No problems are due this week.**

Week 11

Before class:

Review Lab Exercise 4.1, "Detection of a VNTR polymorphism by polymerase chain reaction".

Read Lab Exercise 4.2, "Gene Mapping in Humans using DNA Markers."

Review the following topics:

- Gene mapmaking (pp. 69-78 in *The Cartoon Guide to Genetics, Updated edition*)

In class:

Continue Lab Exercise 4.1, "Detection of a VNTR polymorphism by polymerase chain reaction":

- III. Cast agarose or polyacrylamide gel
- IV. Load gel and electrophorese
- V. Stain gel, view, and photograph

Begin Lab Exercise 4.2, "Gene Mapping in Humans using DNA Markers."

After class:

For Lab Exercise 4.1, complete the questions in Results and Discussion as described in the document **Exercise 4.1 Question revisions (next page)**. **Submit answers by Friday.** Lab Exercise 4.2 will be completed next week.

Week 12

Before class:

Review the following topics:

- DNA cloning (pp. 327-329 in *Essential Cell Biology*)

In class:

Complete Lab Exercise 4.2, "Gene Mapping in Humans using DNA Markers."

After class:

In Lab Exercise 4.2, answer both sets of "Unpacking the Problem" questions. **Submit by Friday.**

Exercise 4.1 Question revisions

We have revised the questions slightly so that the questions better reflect what was done in the lab. Please answer the questions in Exercise 4.1 as they have been modified below.

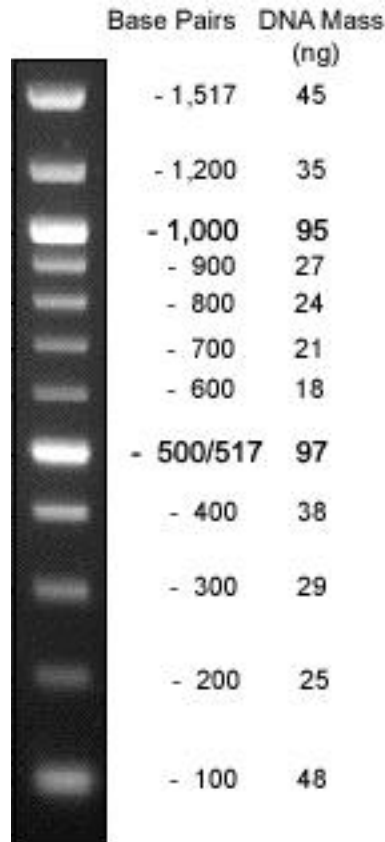
Question 1. Answer as stated in the Lab exercise.

Question 2. Skip this question (do not answer).

Question 3. Answer as stated in the Lab exercise.

Question 4. Answer as modified below

a. The molecular marker that you used was a 100 bp ladder. Below is an image of what that marker looks like when run on a gel. The sizes (in base pairs) of various bands are indicated on the right.



b. You may use Excel or any other graphing program to do this exercise instead of semi-log paper. To achieve a linear relationship between distance migrated and base pair length as it would appear if graphed on semi log paper, you will need to convert your base pair lengths into log values as described.

c.- e. As stated in the Lab exercise.