

NOTE: Today is a computer lab day. Make sure you have signed up for the lab in advance.

TITLE OF LESSON

Biology Unit 1 Lesson 41 – Final Project #1: DNA Murder Mystery, Analysis of Results and Create DNA Fingerprint in Photoshop

How does what is on the inside help us identify something found on the outside?

TIME ESTIMATE FOR THIS LESSON

One class period

ALIGNMENT WITH STANDARDS

California – Biol CB 1; G5c-d; IE 1a-c &l

MATERIALS

Photoshop Basics – Teacher Page
Photoshop Basics II – Teacher Page
Explanation of Tools – Student Page
DNA Murder Mystery Requirements sheet – Student Page
DNA Fingerprint Analysis – Student Page
Blank DNA Fingerprint – Student Page
Adobe Photoshop
Internet access
floppy disks
copies of DNA fingerprint photographs

LESSON OBJECTIVES

- To analyze their DNA fingerprint gel
 - To create a copy of their DNA fingerprint gel in Photoshop
 - To utilize their new knowledge of tools in Photoshop
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EXPLANATION OF LESSON

Today, students will analyze the photograph of their DNA fingerprint gel. Then, students will be creating a mock DNA Fingerprint using Photoshop. Each student will be transferring their DNA Fingerprint photograph from Lesson 40 to a mock DNA Fingerprint they will create in Photoshop. Then they will meet in their groups to decide whose DNA Fingerprint will serve as the murderer’s fingerprint in their murder scenario. Only that DNA Fingerprint will be placed on their final Photoshop page so that the murderer can be identified. Only group members will know who the murderer is for their group’s final project. Make sure you have them keep it a secret today. Then they will be working in Photoshop to create an image of their DNA fingerprint gel using the new Photoshop skills they’ve learned. You will need to make sure that you have photocopies of **Explanation of Tools** just in case some students lost their copies. All students must bring a disk with them to class for today’s lesson. Just in case, you may want to bring extra floppy disks for students who forget or cannot afford one. You will also need copies of **DNA Fingerprint Analysis** and the overhead copy of the **DNA Murder Mystery Requirements** sheet. If you have forgotten the Photoshop skills you learned, you may want to use the **Photoshop Basics** and the **Photoshop Basics II** Teacher Pages to refresh your memory. Remind students to use the notes they should have taken when you gave your Photoshop lectures (using the aforementioned Teacher Pages) to troubleshoot any problems they may encounter today.

FOCUS AND MOTIVATE STUDENTS – WARM-UP ACTIVITY

- 1) Final Project Instructions – Post STEP 3 of the DNA Murder Mystery Requirements sheet on the overhead projector. Review the directions for this portion of their final project with the students. Field all questions.
- 2) STEP 2: Identify Possible Murderer – In their groups, tell the students to analyze their DNA fingerprint. Since each one of them is representing one of the suspects, their analysis of the DNA fingerprint will determine which

one of them is the murderer. This will be important since they will have to field questions as to their whereabouts and alibis during the Solving of the Mystery in lesson 45. Tell them to look at the photograph of the DNA fingerprint and determine which suspect DNA sample matches that of the DNA sample from the crime scene. They should keep this important piece of information someplace safe, and write it on a piece of paper that will be given to the teacher. This information should be kept secret so that the other groups don't know which suspect is the potential murderer which means they should be talking quietly during this part of the exercise.

ACTIVITIES – INDIVIDUAL AND GROUP

1. Computer Protocol – Remind students of computer lab etiquette before they start. Because they have so much to accomplish in so little time, tell them you will not tolerate any messing around today. Remind them that you will not be responsible for any lost or deleted work due to their failure to save their work—so save everything!
 2. Instructions – Have all students sit at a computer. Have them take out their lecture and lab notes on DNA Fingerprinting, restriction enzyme digestion, and gel electrophoresis. Have them take out the photograph of their own DNA Fingerprint from Lesson 40. Tell them today they will be creating an exact duplicate of their DNA Fingerprint using the skills they have learned in Photoshop. Hand out copies of **DNA Fingerprint Analysis** (or you can use your computer screen hooked up to a television set or you can project it from your computer onto a screen if you have a computer projector). Tell them their final DNA Fingerprint should look like the sample shown in this analysis. To create this, they will need a **Blank DNA Fingerprint** sheet saved to their computer that they can manipulate in Photoshop.
 3. DNA Fingerprint – Have all students turn on their computers. They should immediately log on to the Internet. Have them go directly to the ESubjects website by typing www.esubjects.com into their address bar. Then when the website comes up, have them click on Student Curriculum Pages. They should look under Science Year 2, Unit 1 and click on student pages. Underneath student pages they will see **Blank DNA Fingerprint**. Have them click on the icon next to it. They should be prompted to open it and save it. Tell the students to click on save. A Dialogue box will open so that they can decide where they are going to save it on their computer. (You should decide ahead of time where you would prefer for them to save it. If they are working off their own disks, have them save it to their disk. If they are working from a folder of their own on the hard drive, have them save it there. If they are working off a network server, have them save it to a folder there. The important thing is that they SAVE! DO NOT SAVE IT TO THE DESKTOP!)
 4. Photoshop Review – Next, have all students take out their **Explanation of Tools** sheets. If anyone has lost these, you may want to have extras out just in case. Briefly review with students the basics of Photoshop.
 5. Create Fingerprint and Finish STEP 3 – Tell students they will be using their DNA Fingerprint to create a visual representation of it in Photoshop on their **Blank DNA Fingerprint** sheet. They must be as accurate as possible in their representation so that it can be considered for use in their DNA Murder Mystery. Tell them they will have the rest of the period to complete their DNA Fingerprint using Photoshop. They must finish it and save it ten minutes prior to the end of class. They should also be filling in STEP 3 of their **DNA Murder Mystery Requirements** sheet as they go along.
 6. Choose DNA Fingerprint – Ten minutes prior to the end of class, call time. Ask students to get together with the members of their assigned final project group. In their groups, tell them to look at each Photoshop DNA Fingerprint and its corresponding hard copy fingerprint. Decide which Photoshop DNA Fingerprint is the most like its hard copy. That will be the Photoshop DNA Fingerprint they will use to represent their murderer's for the murder scenario. Tell them they must keep the murderer's name a secret. However, they should write the murderer's name on a small piece of paper, fold it up, and give it to the teacher. That way the teacher will be the only one with knowledge of the murderer and he/she can keep everyone honest.
 7. Homework Review – Remind students to bring their copies of the **DNA Murder Mystery Requirements** sheet to class tomorrow.
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HOMEWORK

None

GROUP ROLES

Recorder – The recorder will record the analysis of the DNA fingerprint. All group members are recorders and should be writing up everything.

Facilitator – The facilitator will ensure that the group is working efficiently during lab time

Illustrator – The illustrator will draw images of the apparatus and results

Manager – The manager will make sure that all the students in the group receive a photocopy of the DNA fingerprint gel to use during the Photoshop lesson

DOCUMENTATION FOR PORTFOLIO

Lab Report #1

Method – Photoshop Image

Lab Report #2

Evaluation Essay #1

Method 2 – Photoshop Image