



Learn. Genetics™ Genetic Science Learning Center, created by the University of Utah, offers a number of interesting and exciting **virtual labs** that places you in the role of a genomics scientist conducting some of the

most commonly used and controversial biotechnological techniques ever created to study the role of genetics in health and disease.

To begin your job as a genomics scientist, go to:

<http://learn.genetics.utah.edu/>

The 4 virtual Labs you will complete from this website are:

1. PCR or DNA Microarray
2. Making SNPs Make Sense
3. Pus-Poppin Frogs
4. Space Doctor

Instructions to complete Virtual Lab 1:

1. From the homepage, choose the tab **Virtual Labs** near the bottom of the page.
2. You have already learned that DNA is made of four simple building blocks, yet it contains all of the information necessary to build an organism. Segments of DNA called genes contain specific instructions that make each individual unique. You have also learned how cells "read" the information in a DNA sequence to build proteins (RNA and protein synthesis), which play a profound role in proper cell function.
3. **For the first virtual lab, you will choose **one**** of following labs and explore how scientists use DNA to study and diagnose disease, and even solve crimes! Choose either: **PCR** or **DNA Microarray** (do all three chapters).
4. Feel free to do both labs and explore the rest of the website.
5. When you have completed the lab, obtain a worksheet from your teacher and complete the questions for the virtual lab that you did. Hand in your answers to be marked. You will be responsible for the virtual lab material on quizzes, tests and exams.

Name: _____

PCR Virtual Lab – answer the following questions as you complete the lab.Go to: <http://learn.genetics.utah.edu/content/labs/pcr/>, and click **begin** to start the lab.

1. How many base pairs is the human genome made up of? [1 mark]
2. What does “PCR” stand for, and what is this biotechnology used for (besides making copies of DNA)? [2 marks]
3. Is a lot of DNA required for a PCR reaction? What does this mean about the size of the sample that you need to extract DNA from? [2 marks]
4. Why is a PCR test tube special compared to regular test tubes? [1 mark]
5. What are primers and how many were added to the PCR tube? [2 marks]
6. What are nucleotides and why were they added to the PCR tube? [2 marks]
7. What is DNA polymerase and what does it do? [2 marks]
8. What is the PCR machine called, and what does it do? [2 marks]
9. Describe what happens to the DNA during cycle #1 at these specific temperatures: 95°C, 50°C, and 72°C. [6 marks]
10. What are the “desired products” and when do they begin to appear? [2 marks]
11. How do you eventually end up with over a billion copies of your targeted DNA? [1 mark]
12. Based on what you learned, what things are needed to do PCR? [3 marks]
13. For your notes, draw three **fully labeled diagrams** that represent each of the specific temperature cycles in one cycle of PCR. **Include, at least, the following in your diagrams:** DNA, primers one and two, DNA nucleotides (A, T, C, G), and DNA polymerase. [9 marks]

Your Mark

35