Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I CAN describe the basic structure of the DNA molecule.

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_P. \_\_\_\_

**DNA Extraction Pre-Lab**

**LAB SAFETY REVIEW:**

1. Conduct yourself in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_manner at all times in the science room.

**Horseplay, practical jokes, and pranks will NOT be tolerated.**

2. Ask your teacher questions if you do not understand the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. Do not touch anything in the science room without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_from the teacher.

4. Do not conduct any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that you have thought up.

5. Never eat, drink, chew gum, or \_\_\_\_\_\_\_\_\_\_\_\_\_anything in the science room.

6. Keep hands away from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

while using science materials or when working with either chemicals or animals.

7. Consider all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_used in the science room to be dangerous. Do not touch or smell any chemicals unless specifically instructed to do so.

8. Handle all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_with care. Never pick up hot or broken material with bare hands.10.

**BACKGROUND: Fill out the background section using your notes.**

Chromosomes are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_. A sequence of DNA is called

a \_\_\_\_\_\_\_\_\_\_\_\_. All living things have deoxyribonucleic acid (DNA). DNA is a molecule that

carries our genetic information (on genes). The structure of DNA is called a \_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_. The ‘rungs’ of a DNA double strand are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

and the sides are made of alternating \_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The complementary base-pairs are (use letters)\_\_\_ to \_\_\_\_ and \_\_\_\_ to \_\_\_\_.

“Many scientists use electron, scanning tunneling and atomic force microscopes to view individual DNA molecules,” said Michael W. Davidson, curator of the National High Magnetic Field Laboratory at Florida State University. “But even with these advanced technologies, DNA appears as a string rather than being resolvable into the individual units from which it is composed.” However, if we remove DNA from **many** of our cells, we will be able to view it without a microscope.

DNA extraction is the first step that scientists take to study DNA. It allows them to find genetic disorders, study the causes of cancer and look for treatments, and even create genetically engineered organisms (GMOs) like tomatoes that stay fresh longer.

**QUESTIONS**:

* In this lab, the investigator will explore the following scientific questions:
  1. Is there DNA present in human saliva cells?
  2. Given your prior knowledge of cell parts, can a simple lab technique be developed to isolate DNA from animal cells?

**HYPOTHESIS:** If a simple lab technique is followed, then DNA \_\_\_\_\_\_\_be isolated from my saliva.

**MATERIALS**:

buckets-one with 10% bleach and the other with clean water

paper towels pipettes

test tube racks dish soap

test tubes salt

cups meat tenderizer

wooden stick isopropyl alcohol

cleaning spray

**PRE-LAB QUESTIONS:**

**Cells in Saliva:** Saliva in your mouth contains white blood cells from your immune system, cheek cells, and other epithelial cells, as well as a large number of cells of prokaryotes (eubacteria) and virus particles that are on every surface of our bodies and in most bodily fluids.

**1. What type(s) of cells are we extracting DNA from in this lab?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Cell Separation—Table Salt.** By blending the saliva sample and table salt, you will be separating the cells. This is due to both the physical process of swirling (agitating) the cells in the beaker and the chemical process of adding salt to the solution. The salt causes the precipitation (suspension of solid particles) to form of proteins and carbohydrates located in the saliva, further helping to separate the cells.

**2. Why do we add salt in procedure Step #2?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Cell and Nuclear Membrane Destruction—Detergent.** The cell membrane is composed of lipids (fats) and proteins. The detergent acts on these lipids like it does with other fats (think of how detergent works with bacon grease on a dirty frying pan) and captures the lipids and proteins. In the process of capturing these molecules, the cell membrane is lysed (or broken), destroying the membrane and releasing the parts of the cell into the solution.

**3. Name two reasons that we add soap in procedure step #3?**

**First\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Second.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**DNA Unwind—Meat Tenderizer.** Meat tenderizer acts as an enzyme when interacting with the solution. DNA, which is usually contained in the cell as long strands wrapped around proteins, needs to be unwound in order to be completely separated from the proteins and other cell contents. The meat tenderizer acts like an enzyme in that it cuts out the proteins from the DNA-protein complex.

**4. Name two reasons we add enzymes (meat tenderizer) in procedure step #6?**

**First\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Second \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Separation of DNA from Solution—Rubbing Alcohol.** At this point of the procedure, the DNA has been released from the cell and freed from the proteins it usually accompanies, but it is mixed in with all of the other cell components in the solution. To separate and isolate the DNA from all of the other cell “junk,” you can add rubbing alcohol to the solution that forms a layer on top of the solution. This addition will cause the DNA to precipitate (cause a solid-**DNA**- to separate out from the solution) and rise up into the alcohol layer.

**5. Why do we add alcohol in procedure step #6?**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**6. Where in the test tube do you look for DNA in procedure step #9?**\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7. Based on what you know about DNA, describe what you think your DNA will look like**

**in procedure step #10?**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**8. Should the DNA in your neighbor’s test tube look like the DNA in your test tube?**\_\_

**9. Explain why they would look similar or different?**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**10. Why are we able to see our DNA?** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_