



Pre Lab (High School):

Please watch this brief animation on the Transforming Principle:

<https://dnalc.cshl.edu/view/16375-Animation-17-A-gene-is-made-of-DNA-.htm>

1. What is the name of the scientist who published a study in 1928 on 2 different strains of *Pneumococcus* bacteria?

Fred Griffith

2. In the animation we are shown images of smooth (S) bacteria and rough (R) bacteria. These different types of bacteria are named after their different physical traits. Explain why you think they have different traits.

They have different DNA that results in different traits.

3. Why are the S bacteria able to survive in the mouse but the R bacteria are not?

The S bacteria have a capsule-like coat made of sugars. This coat protects the bacteria from the immune system of the host.

4. Griffith combined heat killed S bacteria with living R bacteria. What molecule from the S cells has been released, taken up by the living R cells, and resulted in a transformation of the R cells?

DNA

5. How did Oswald Avery build upon Griffith's work?

Avery and his colleagues were able to concluded that DNA was the transforming principle.



Pre-Lab (Middle School):

1. What do you know about bacteria?

Bacteria are unicellular organisms that lack a nucleus and membrane bound organelles.

2. What do you know about *E. coli*?

***E. coli* are bacteria found in the environment, foods, and in the intestines of animals. While most strains of *E. coli* are harmless, some can make us sick.**

3. Briefly describe the difference between how humans store DNA and how bacteria store DNA. You might find it useful to draw a diagram!

Human cells store most of the DNA in a nucleus while bacteria cells have no nucleus.

4. What does it mean when someone or something undergoes a "transformation"? Predict how we will be "transforming" bacterial cells.

A transformation is a change. We will be changing the bacteria by changing their DNA.



Laboratory Worksheet (High School and Middle School):

1. As you watch or perform the experiment, keep track of what is in each tube. (Remember to add volumes.)

+ Tube	- Tube
250 μ l CaCl ₂	250 μ l CaCl ₂
mm294	mm294
10 μ l pGFP (0.008 μ g/ μ l)	No plasmid
250 μ l LB	250 μ l LB
TOTAL VOLUME = 1010 μ l	TOTAL VOLUME = 1000 μ l

2. What is the purpose of the – tube in the experiment?

The – tube is the negative control.

3. Explain what a bacterial colony is.

A group of identical cells (clones) derived from a single progenitor cell.



4. In the space below, draw your expected results.



