Biotechnology Lesson 2:
Transformation of the pGLO plasmid

Subject Area	Biology/Biotechnology
Age or Grade	Juniors/Seniors AP Biology
Estimated Length	3 85 minute Class periods
Prerequisite knowledge/skills	DNA structure function, transcription, translation. Central Dogma: DNA->mRNA->Protein.
Description of New Content	Genetic engineering is the process of manipulating the genetic material of an organism — often to include the DNA from a foreign organism. In this activity, students transform bacteria by introducing a gene from the bioluminescent jellyfish *Aequorea victoria*. The same procedure is used for creating "designer proteins" that has led to the explosion of new health treatments, agricultural applications, and environmental solutions. Students will be learning about green fluorescent protein that glows green. They will be able to reinforce theories they learned about transcription and translation, as they will transform a gene into a bacteria and will be able to see the expression of that gene in the form of the green fluorescent protein. Students will also learn how bacteria use plasmids (small circular non-genomic DNA) to transfer important information. The process that they will learn about is called a transformation or the uptake of naked DNA.
Goals	To give the students another example of biotechnology, genetic engineering. Additionally this exercise can be used to reinforce central dogma of molecular biology.
Materials Needed	pGLO Bacterial Transformation Kit Bio-Rad
Procedure	Day 1 Introduction: The students will be reminded of the central dogma of molecular biology DNA->RNA->Protein, and

	will be given background necessary to understand plasmids and a transformation. Day 2 Lab activity: The students will then participate in a lab exercise where they will transform the Day 3 Lab Activity Part 2: Students will be able to visualize colonies that have taken up the pGLO plasmid. A more detailed protocol can be found in the lab manual provided by Bio-Rad. pGLO Bacterial Transformation Kit
Extensions	The techniques learned in this lab, as well as the previous lab (Biotechnology Lesson 1 Restriction enzyme analysis) can be used to talk about genetic engineering and gene cloning, as both are critical for this process.
References	pGLO Bacterial Transformation Kit Bio-Rad