Appendix B Glossary of Terms

Agar	Provides a solid matrix to support bacterial growth. Contains nutrient mixture of carbohydrates, amino acids, nucleotides, salts, and vitamins.
Antibiotic Selection	Use of an antibiotic to select bacteria containing the DNA of interest. The pGLO plasmid DNA contains the gene for beta-lactamase that provides resistance to the antibiotic ampicillin. Once bacteria are transformed with the pGLO plasmid, they begin producing and secreting beta-lactamase protein. Secreted beta-lactamase breaks down ampicillin, rendering the antibiotic harmless to the bacterial host. Only bacteria containing the pGLO plasmid can grow and form colonies in nutrient medium containing ampicillin, while untransformed cells that have not taken up the pGLO plasmid cannot grow on the ampicillin selection plates.
Arabinose	A carbohydrate isolated from plants that is normally used as source of food by bacteria.
Beta-Lactamase	Beta-lactamase is a protein that provides resistance to the antibiotic ampicillin. The beta-lactamase protein is produced and secreted by bacteria that have been transformed with a plasmid containing the gene for beta-lactamase. The secreted beta-lactamase inactivates the ampicillin present in the LB nutrient agar, which allows for bacterial growth and expression of newly acquired genes also contained on the plasmid, *i.e.,* GFP.
Biotechnology	Applying biology in the real world by the specific manipulation of living organisms, especially at the genetic level, to produce potentially beneficial products.
Cloning	Cloning is the process of generating virtually endless copies or clones of an organism or segment of DNA. Cloning produces a population that has an identical genetic makeup.
Colony	A clump of genetically identical bacterial cells growing on an agar plate. Because all the cells in a single colony are genetically identical, they are called clones.
Culture Media	The liquid and solid media referred to as LB (named after Luria and Bertani) broth and agar are made from an extract of yeast and an enzymatic digest of meat byproducts which provide a mixture of carbohydrates, amino acids, nucleotides, salts, and vitamins, all of which are nutrients for bacterial growth. Agar, which is from seaweed, polymerizes when heated and cooled to form a solid gel (similar to Jell-O gelatin), and functions to provide a solid support on which to culture the bacteria.

Genetic Engineering	The manipulation of an organism's genetic material (DNA) by introducing or eliminating specific genes.
Gene Regulation	Gene expression in all organisms is carefully regulated to allow for differing conditions and to prevent wasteful overproduction of unneeded proteins. The genes involved in the transport and breakdown of food are good examples of highly regulated genes. For example, the simple sugar, arabinose, can be used as a source of energy and carbon by bacteria. The bacterial enzymes that are needed to break down or digest arabinose for food are not expressed in the absence of arabinose but are expressed when arabinose is present in the environment. In other words when arabinose is around, the genes for these digestive enzymes are turned on. When arabinose runs out these genes are turned back off. See Appendix D for a more detailed explanation of the role that arabinose plays in the regulation and expression of the Green Fluorescent Protein gene.
Green Fluorescent Protein	Green Fluorescent Protein (GFP) was originally isolated from the bioluminescent jellyfish, *Aequorea victoria*. The gene for GFP has recently been cloned. The unique three-dimensional conformation of GFP causes it to resonate when exposed to ultraviolet light and give off energy in the form of visible green light.
Plasmid	A circular DNA molecule, capable of self-replicating, carrying one or more genes for antibiotic resistance proteins and a cloned foreign gene such as GFP.
pGLO	Plasmid containing the GFP sequence and ampicillin resistance gene, which codes for beta-lactamase.
Recombinant DNA Technology	The process of cutting and recombining DNA fragments as a means to isolate genes or to alter their structure and function.
Screening	Process of identifying wanted bacteria from a bacterial library.
Sterile Technique	Minimizing the possibility of outside bacterial contamination during an experiment through observance of cleanliness and using careful laboratory techniques.
Streaking	Process of passing an inoculating loop with bacteria on it across an agar plate
Vector	An autonomously replicating DNA molecule, such as a plasmid, into which foreign DNA fragments are inserted and then propagated in a host cell.