



## Using LabXChange to Enhance the ABE Labs

### What is LabXchange?

LabXchange is an online platform that allows you and your students to remix science content to create your own learning journey called a pathway.

### How does LabXchange fit in with ABE?

In collaboration with the Amgen Foundation and ABE teachers, LabXchange has created a collection of pathways designed to enhance the ABE lab experience. The pathways are modular to allow you to mix and match **concepts** and practice with **lab techniques** in the way that best supports your students.

## HERE ARE SOME OF THE TOURS WE SUGGEST:

### TEACH WITH A THEME

#### Introduction to Genetic Engineering

Provide an overview of gene cloning, emphasizing the design process and molecular tools.



THE PROCESS



RECOMBINANT PLASMIDS



THE ROLE OF CELLS



THE PRODUCT

#### Tools & Techniques in Biotechnology

Build foundational lab skills that will prepare students for a variety of wet lab programs.



MICROPIPETTING



GEL ELECTROPHORESIS



BACTERIAL TRANSFORMATION



COLUMN CHROMATOGRAPHY

#### Building a Recombinant Plasmid

Walk students through the process of designing and creating a recombinant plasmid.



RESTRICTION ENZYMES



DNA LIGASE



GEL ELECTROPHORESIS

### ALIGN WITH AN ABE LAB

#### Labs 1.1 & 1.2: Tools of the Trade

Preview and practice micropipetting and gel electrophoresis while exploring their applications.



TECHNIQUES: MICROPIPETTING



TECHNIQUES: GEL ELECTROPHORESIS

#### Lab 2/2A: Preparing to Clone the rfp Gene

Introduce plasmids and restriction enzymes as molecular tools and practice using them in the lab.



GENETIC ENGINEERING: THE PROCESS



GENETIC ENGINEERING: RECOMBINANT PLASMIDS



MOLECULAR TOOLS: RESTRICTION ENZYMES

### Lab 3: Building the pARA-R plasmid

Highlight the roles of DNA ligase in DNA replication and gene cloning.



BUILDING A RECOMBINANT PLASMID:  
DNA LIGASE

### Lab 4/4A: Verification of Restriction and Ligation using Gel Electrophoresis

Preview and practice gel electrophoresis before applying it to plasmid verification.



TECHNIQUES:  
GEL ELECTROPHORESIS



VERIFYING A RECOMBINANT PLASMID:  
GEL ELECTROPHORESIS

### Lab 5/5A/5B: Transforming Bacteria with Ligation Products

Explore bacterial cells as model organisms and practice carrying out transformation.



INTRODUCTION TO GENETIC ENGINEERING:  
THE ROLE OF CELLS



TECHNIQUES:  
BACTERIAL TRANSFORMATION

### Lab 6: Purifying the Fluorescent Protein

Emphasize the link between protein structure and function while practicing protein purification.



INTRODUCTION TO GENETIC ENGINEERING:  
THE PRODUCT



TECHNIQUES:  
COLUMN CHROMATOGRAPHY

## CREATE YOUR OWN NARRATIVE

### Labs 1, 2A, 4A, 5A and 6:

Follow the process of gene expression and protein production, omitting a discussion of ligation.



### Labs 1 & 5B:

Focus on recombinant protein production in transformed cells as a process common to many labs.



### Labs 1 & 6:

Connect protein structure with chemical properties to support biology or chemistry classes.

