# Biotechnology: Bacterial Transformation

How can we use genetic engineering techniques to manipulate heritable information?

Name: _____ Date: _____ Class/period: _____

Dataset ID: _____

https://biologylabbench.com/lab08

## How to use this guide

Check off each numbered step as you work in the online simulation. Follow your teacher's assigned sections and repeat counts. This guide explains the workflow; enter your measurements and responses in the lab or your assigned worksheet.

Use Data for tables and editable calculations, Graph for plots, and Scene for the simulation. Some controls are under More options. Write predictions before running an experiment and scroll below the simulation for response boxes.

## Overview

- ☐ 1. Read the driving question and your teacher's assignment. Note which sections, optional extensions, and number of trials your teacher wants you to complete.
- ☐ 2. Sign in with your name and class period. Copy your Dataset ID onto this guide. Keep using the same dataset for the investigation; classmates may have different numbers.

## Background

- ☐ 1. Read the background explanations, diagrams, and vocabulary. Review the reference formulas you will need and identify the variables you will measure.

## Pre-lab

- ☐ 1. Complete the pre-lab questions and any practice activities. Use Check answer, read the feedback, and revise your reasoning before starting the investigation.

## Transform

- ☐ 1. Follow Do this step through the displayed protocol. Keep track of the +pGLO and -pGLO tubes and record the settings for every step.
- ☐ 2. Add transformation solution; chill the tubes; add cells; add plasmid only to the designated tube; incubate on ice; heat shock; return to ice; add LB and recover; then spread the cells on the plates. Use the times, volumes, and temperatures shown on the page or assigned by your teacher.
- ☐ 3. Before incubation, enter predictions for all six plates. Incubate plates, then compare room-light and UV views. Record growth and fluorescence separately.
- ☐ 4. Select the +pGLO LB/amp plate and click each colony to count it. Calculate total DNA, fraction plated, DNA spread, and transformation efficiency using the displayed amounts. Check the calculation, then Add this run.
- ☐ 5. For another transformation, use the page's new-run/reset control and confirm your completed run remains in saved history before proceeding.

## Design

- ☐ 1. Write a testable question, hypothesis, variables, and controls. Choose one variable and its levels, with at least three transformations per level.
- ☐ 2. Run experiment and compare efficiencies and variation in Graph and Data. If assigned, choose a large or satellite colony, select a fresh plate, and Streak and incubate; test both colony types and compare UV observations.

## Analyze

- ☐ 1. Answer every assigned analysis question using your own recorded data. Include numbers, units, and comparisons from the appropriate Data and Graph panels.
- ☐ 2. Complete the requested calculations or statistical comparisons. Show your method and explain what the result means biologically. Write the claim, evidence, and reasoning response if shown.

## Evaluate

- [ ] 1. Compare your original predictions with your results. Explain any disagreement, limitations of the simulation, and one way to improve the investigation.
- [ ] 2. Complete the assigned reflection/evaluation questions and AP-style response if shown. Use your own data where requested. Rate your confidence if you wish; ask your teacher about any unfinished or unclear work.

## Submit

- [ ] 1. Review the completion checklist and Preview my report. Check your name, period, Dataset ID, calculations, units, graphs, and written responses.
- [ ] 2. Download .docx or use Save as PDF as directed by your teacher. Open the downloaded file and check that it contains your work, then upload or hand it in where your teacher specifies. Downloading alone does not submit it.
- [ ] 3. Save a progress file using Move your work to another computer if you need a backup or will change devices. Keep recordings separately if assigned; a report cannot restore editable progress.

## Teacher instructions / notes