

2027-05-06 · 80 minutes

pGLO setup and DNA-band records

Your goal: Follow the teacher-led approved pGLO workflow and document the setup, controls and gel evidence. Newly plated cultures incubate overnight; count colonies Friday May 7. If the lab or results are unavailable, complete the labeled C1/G1 practice record without claiming physical completion.

One product: One record with actual kit condition labels, setup dates and May 7 colony-count fields marked pending; gel image and lane records when supplied. If unavailable, submit the explicitly invented C1/G1 practice record and identify the missing actual evidence.

Question: How can you preserve a supplied record without claiming an experiment or photograph you do not have?

Start the work

Prior Wednesday May 5 oversight discussion and approval are unverified. Use the complete supplied record; no laboratory clearance or prior prediction is assumed.

1. Confirm the teacher-led Bio-Rad pGLO kit route and open the linked Quick Guide. Use only that approved kit SOP; record group code, date and condition labels.
2. Follow the teacher through the kit workflow, including its 42°C heat-shock step. Preserve the +pGLO and -pGLO controls and the specified LB, LB/amp and LB/amp/ara plate identities. Do not substitute conditions.
3. The teacher tapes and retains the closed plates inverted at 37°C overnight for Friday May 7. Mark new-plate colony counts pending today. Students never reopen incubated plates.
4. Use a teacher-prepared digest or a separately approved digest started first, then a pre-run gel image if the full gel workflow will not fit. The pGLO Quick Guide does not specify this separate digest/gel experiment. Record the authentic image ID; otherwise use G1 as labeled nominal practice.
5. Follow the teacher's approved cleanup for tubes and tips: decontaminate everything that touched bacteria in 10 percent household bleach (final concentration) for at least 20 minutes before disposal. Retain the plates for Friday. No food, drink or mouth pipetting; disinfect benches before and after. The teacher switches off and unplugs gel equipment before opening it and uses the required UV-rated eye/face protection. Save the record with honest pending fields.

Approved pGLO teaching route: use Bio-Rad kit 1660003EDU with the instructor-selected *E. coli* HB101 K-12 educational strain and the official Quick Guide. This route is limited to the approved educational *E. coli* HB101 K-12 strain under BSL-1 teaching-laboratory practices; it does not authorize other strains, environmental isolates or unknown cultures. The teacher verifies the kit strain, materials, protective

equipment and approved decontamination/disposal plan before handling. Use the linked Lesson 4.1 pGLO Workflow Graphic to orient the sequence, and the Bio-Rad Quick Guide as the procedural authority. Students keep actual records distinct from the invented fallback; kit access or a successful result is never assumed. Save the same supplied-record preparation with missing input, next action and receipt pending.

Words you will use

supplied record

Written input already provided for interpretation.

fictional

Invented for teaching, not evidence of a real event.

nominal

Assigned teaching value, not a newly measured quantity.

colony count

Number of visible colonies on a plate, not individual cells. Record actual counts on May 7 after overnight incubation; supplied fallback counts remain fictional.

positive comparison

Record with a declared positive expected signal; not a designed control here.

negative comparison

Record with a declared zero expected signal; zero alone does not prove absence of all problems.

sample label

Identifier linking a record to its material and condition. Actual pGLO plate labels identify plasmid and medium conditions; P/N/S are abstract fallback record IDs.

teaching expectation

Supplied comparison rule, not the student's earlier prediction.

prediction

Expectation recorded before a real observation; not invented afterward.

match

Agreement with the specific stated key, not proof of cause.

uncertainty

What the available record cannot settle.

transformation

Uptake of external genetic material by a cell. The approved pGLO route uses the Bio-Rad Quick Guide; record actual performance and observations separately from the fictional fallback.

transformation efficiency

Defined ratio often relating transformant count to DNA amount; raw counts alone are insufficient here.

digest

Cleavage of DNA by enzymes, such as restriction enzymes. A digest needs its own approved protocol and inputs; the pGLO transformation Quick Guide does not supply that procedure.

linear DNA

DNA represented as a length with two ends, rather than a circular molecule.

double-stranded DNA

DNA containing two paired strands.

gel electrophoresis

Separation of molecules in an electric field through a gel. The supplied diagram supports paper interpretation; an actual gel requires a separate approved protocol and an authentic image with provenance.

lane

One labeled vertical column of the supplied diagram.

band

Drawn mark representing DNA at a nominal position, not an actual observation here.

ladder

Reference collection of DNA fragments with known lengths.

base pair

Two complementary DNA bases paired across strands; bp also counts fragment length.

bp

Abbreviation for base pair.

millimeter

Length unit abbreviated mm; distances here are nominal labels.

origin

Common reference line from which the nominal distance is given.

band center

Middle of the drawn mark used as its nominal position.

raw position

Supplied distance before any later size estimate.

fragment size

DNA length expressed in base pairs, different from migration distance in mm.

schematic

Simplified authored drawing, not a photograph.

photograph

Image made from a real scene; none is supplied for this fictional record.

sequence identity

Specific ordering of DNA bases; band position alone does not establish it.

provenance

Where a record came from and what it represents.

sign-off

Genuine authorized acknowledgment, not an invented mark.

receipt

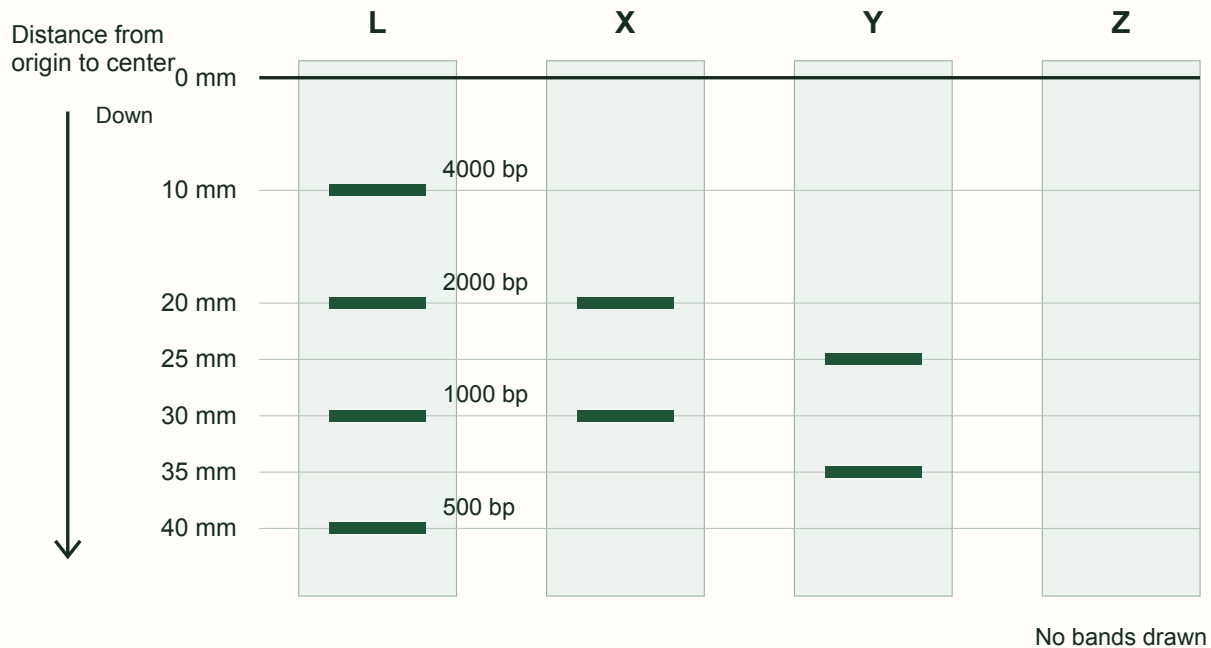
Evidence that work reached its confirmed destination.

Supplied nominal band reference

Supplied band record: BI-GEL-PAPER-01

Original idealized linear-DNA schematic. Not a photograph or actual measurement.

Distances are nominal labels. Do not measure the printed page with a ruler.



L = known-size ladder; X and Y = abstract sample labels; Z = blank comparison lane.

G1 gives every value in text. Actual records replace practice; authentic photograph remains pending.

Original idealized linear-DNA record, not gel photograph. Text is an equal alternative. Actual assigned records replace practice; authentic photo remains pending.

Text description: G1 supplies every nominal value: lane L at 10/20/30/40 mm with 4000/2000/1000/500 bp, X at 20/30, Y at 25/35 and Z no bands drawn; common origin 0 mm, downward distance.

H1: A record is not laboratory completion

Approved pGLO teaching route: use Bio-Rad kit 1660003EDU with the instructor-selected *E. coli* HB101 K-12 educational strain and the official Quick Guide. This route is limited to the approved educational *E. coli* HB101 K-12 strain under BSL-1 teaching-laboratory practices; it does not authorize other strains, environmental isolates or unknown cultures. The teacher verifies the kit strain, materials, protective equipment and approved decontamination/disposal plan before handling. Use the linked Lesson 4.1 pGLO Workflow Graphic to orient the sequence, and the Bio-Rad Quick Guide as the procedural authority. Students keep actual records distinct from the invented fallback; kit access or a successful result is never assumed. The teacher tapes and retains the closed plates inverted at 37°C overnight for Friday May 7. Mark new-plate colony counts pending today. Students never reopen incubated plates.

Use a teacher-prepared digest or a separately approved digest started first, then a pre-run gel image if the full gel workflow will not fit. The pGLO Quick Guide does not specify this separate digest/gel experiment. Record the authentic image ID; otherwise use G1 as labeled nominal practice. Follow the teacher's approved cleanup for tubes and tips: decontaminate everything that touched bacteria in 10 percent household bleach (final concentration) for at least 20 minutes before disposal. Retain the plates for Friday. No food, drink or mouth pipetting; disinfect benches before and after. The teacher switches off and unplugs gel equipment before opening it and uses the required UV-rated eye/face protection. Save the record with honest pending fields.

At 0–10 identify the source and missing authentic evidence. Opening input: a paper diagram is labeled idealized teaching record, not photograph. Name one reason saving it cannot prove a real experiment occurred. Use this rule: an authored schematic is evidence of its supplied content, not of a physical event. Answer once. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Today is Thursday May 6. Prior Wednesday May 5 discussion or safety approval is not assumed complete. The next listed class is Friday May 7, Gel map. Use every value supplied here; no prior notebook, prelab prediction or actual photo is needed for this paper route. Start S1 status marks during work and update changes only.

C1: Complete invented count cards

Record set BI-RECORD-PAPER-01 is entirely invented for document practice. It is not actual plate data, a student result or a published experiment. Here a colony count means the nominal number written on a supplied record; you do not count organisms or infer how many cells are present.

Columns: ID | role | supplied count. P | positive comparison record | 12. N | negative comparison record | 0. S | sample record | 8. Unit: nominal counted colonies per supplied record. Every row is one count, not a mean or repeated-trial set. There are no photographs to count.

The words positive and negative identify comparison roles in this authored record. They prescribe no control design or biological conditions. Do not add an organism, plasmid, antibiotic, medium, amount or procedure. The source has none. It does not link these three counts to a particular DNA lane.

At 10–30 enter all three rows in one notebook table with columns ID, role, count/unit and evidence limit. Keep zero visible. Counts alone do not establish transformation efficiency, genetic identity or absence of contamination. No DNA-mass denominator or other needed efficiency inputs are supplied. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

K1: A supplied expectation, not your earlier prediction

Teaching key K-P: P is expected to have a count greater than zero. Teaching key K-N: N is expected to have zero. No expected S count is supplied. These are declared expectations for this fictional record, not proof that any real control worked.

A comparison can say whether a supplied count matches its declared key. It cannot prove why. If no genuine prelab prediction exists, record prelab prediction unavailable. You may compare to K-P or K-N instead, explicitly naming it supplied teaching expectation. Do not backdate the key as your own prediction.

Keep the comparison for the final check. A real result may or may not feel surprising, but no feeling is required or invented. If you have no actual surprise to report, write not reported and name a remaining uncertainty instead. Actual required prediction work remains pending if absent. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

G1: Full idealized lane and band record

At 30–50 read BI-GEL-PAPER-01. It is an original schematic of idealized linear double-stranded DNA, not an actual gel photograph, restriction map or construct. Lanes run left to right in this exact order: L, X, Y, Z. L is the known-size ladder; X and Y are abstract sample labels; Z is a blank comparison lane.

The common origin is the top reference line, labeled 0 mm. Nominal distance increases downward from that line to the center of each drawn band. Values are supplied whole millimeters, not measurements students made. Printed page scaling is arbitrary; do not use a ruler to invent distances. No measurement uncertainty is supplied.

Complete ladder L: 10 mm has 4000 bp; 20 mm has 2000 bp; 30 mm has 1000 bp; 40 mm has 500 bp. A base pair, abbreviated bp, is a pair of complementary DNA bases; here bp reports fragment length. The reference ladder is a set of known lengths, not the twisted-ladder shape of DNA.

Complete sample positions: lane X has two bands, at 20 mm and 30 mm. Lane Y has two bands, at 25 mm and 35 mm. Lane Z has no bands drawn. Write no bands drawn for Z; do not turn that into zero-mm DNA or proof that no DNA or contamination exists.

Full text alternative: from left to right, L has four centers at 10/20/30/40 mm; X has two at 20/30 mm; Y has two at 25/35 mm; Z has none. Each column starts from the same 0-mm line and extends downward. The SVG shows exactly those eight band centers; text is an equal source if the image is unavailable.

NHGRI explains the general size-separation principle: shorter DNA fragments can move farther through a gel than longer ones under the same comparison. This practice record assumes linear DNA and idealized positions. It supplies no real operating conditions, sequence identity, mass or restriction

pattern interpretation. No sample-size calculation is required today. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

R1: Record the supplied positions honestly

At 50–65 add a lane table to the same notebook record. Columns: lane, role, band ID, nominal position in mm, supplied ladder size if given, and source/status. Use L1–L4 for L's bands, X1–X2 for X and Y1–Y2 for Y, ordered top to bottom. Keep one Z row saying no bands drawn and size not supplied.

Copy known sizes only for L1–L4. For X/Y size, write not yet estimated; May 7 can use these same supplied positions with a supplied comparison rule. Do not guess a size or reconstruct a DNA sequence now. Raw positions and inferred sizes are different records.

Use the supplied labeled diagram as your lane map, or make one simple text lane map from G1 if the image is unavailable. Do not do both. Keep the label authored schematic, not gel photograph. Authentic photograph: unavailable in this preparation. The actual photograph requirement remains pending; the schematic does not replace it as proof.

An expected-pattern match does not establish sample identity, success of a real digest, or a clean experiment. Count cards and gel lanes are separate supplied records with no stated biological link. Friday's analysis reuses this same supplied dataset and its limits; it does not assume you completed a lab. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Q1: Status review, then one bounded comparison

At 65–75 review source fidelity and genuine status. Check the three counts, lane order, common origin, all eight band centers and Z's no-band statement. Check that size and distance units stay distinct. Correct an actual transcription mismatch or mark a verified match. This paper check is not PPE, equipment or cleanup completion.

At 75–80 add one short comparison: choose K-P or K-N, cite its expectation and supplied count, then say match or mismatch. Label the source teaching expectation if no genuine prior prediction exists. Add one brief uncertainty or report a real surprise only if it actually occurred. Do not invent feelings or observations.

Save the same notebook record. If a real peer comments, keep the genuine deidentified comment; otherwise mark self review. The supplied worked model is optional and is not another task. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

S1: Separate preparation from authentic evidence

Track eleven short statuses: 1 teacher acceptance and genuine data/images; 2 actual rubric; 3 approved protocol and safety review; 4 real materials, training and supervision. Also track 5 actual transformation/digest/gel execution; 6 real photograph and measurements; 7 genuine prelab prediction/comparison; 8 actual peer participation; 9 cleanup and sign-off. Finally track 10 official scope/access, saved record and confirmed destination/deadline; 11 genuine receipt. Use completed, pending or not checked with a pointer or missing input.

Paper preparation cannot complete the physical objective or certify an actual photo, measurement, protocol, instrument check, safety training or cleanup. No virtual lab execution is supplied either. Those authentic requirements remain teacher-controlled. Do not use procedures from any other page or assume the prior debate grants clearance.

Ask your teacher whether myPLTW Project 6.1.2 applies today and where to stop. Open the linked BI assignment in Turn in your work. Opening the assignment is not a submission receipt.

If blocked, save the labeled record with missing input, next action and receipt pending. Friday May 7 Gel map is the next class. Its paper interpretation can reuse these supplied inputs; no actual May 6 work is assumed. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

M1: Distinct complete printing-record model

Optional distinct nonbiological record model, not a second task. An invented printing inspection log has P2, comparison card, count 5 spots; N2, blank-comparison card, count 1 spot. Unit: spots per supplied card. The supplied key expects $N2=0$; no authentic prelab prediction is present.

A separate printed-stripe diagram has two columns, R2 then T2. The common top line is 0 mm, with nominal distance downward. R2 has stripe centers at 10 mm and 30 mm; T2 has one at 20 mm. No DNA or fragment-size meaning applies to this model.

Worked record: P2/comparison/5 spots; N2/blank comparison/1 spot. Lane R2: stripe1=10 mm, stripe2=30 mm; T2: stripe1=20 mm. Source/status: invented supplied values, not actual measurement or photograph. Genuine prior prediction unavailable.

Worked comparison: supplied key N2 expects zero, but its supplied count is one, so it does not match that key. The record does not tell why. No surprise is claimed. Self-check preserves all counts and distances without correcting the unexpected value. This illustrates honest recording, not proof of an actual print run. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Try the decision

Original route: compare N with the supplied key. What may the record say? Actual route: use the genuine source and rubric.

- State whether N matches this key, while cause and actual lab completion remain unknown.
- Transformation succeeded and contamination is absent if N agrees with the supplied key.
- A matching schematic establishes that the required photograph was actually taken.

Explain your choice using the reading. Discuss it or say it to yourself. This practice does not add another submission.

Your 80-minute flow

0–10 minutes	Kit route: Check the kit SOP, safety and labels. Paper fallback: Use H1/C1 to identify source and physical-work holds. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.
10–30 minutes	Kit route: Follow the teacher-led kit workflow and record setup conditions. Paper fallback: Use C1/K1 for the three counts and supplied expectation key. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.
30–50 minutes	Kit route: Retain the closed labeled plates for overnight incubation; counts are pending. Paper fallback: Use G1 to interpret lane order and nominal values; no setup or loading. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.
50–65 minutes	Kit route: Read the teacher-provided pre-run gel image and label its lanes, or use G1 as invented practice. Paper fallback: Use R1 to record the supplied band positions; no run, photograph or real measurement. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.
65–75 minutes	Kit route: Complete approved cleanup without discarding retained plates. Paper fallback: Use Q1/S1 to review source fidelity and status; no cleanup completion. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.
75–80 minutes	Kit route: Save one record, noting what awaits Friday and what remains missing. Paper fallback: Use Q1/K1 for one bounded comparison and save the same record. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Your response record

Use these labels on paper or in your document. The space below also works when this page is printed.

One evidence-source limit

Original route: Use H1 to distinguish a schematic from an actual photo.

Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Three supplied count rows

Kit route: create four actual condition rows, +pGLO LB/amp; +pGLO LB/amp/ara; -pGLO LB/amp; -pGLO LB. Record plate ID and setup date; leave colony count and fluorescence fields pending until the May 7 read. Paper fallback only: use C1's three supplied rows, P=12, N=0 and S=8. Preserve their invented role labels and units; do not relabel them as pGLO conditions. Complete only the chosen route in the same record.

The actual kit has four condition rows; C1 has three unrelated invented count rows. No new-plate count is available during May 6 setup.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Lane map and nominal inputs

Original route: Use G1 to identify all lane positions and supplied reference sizes.

Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

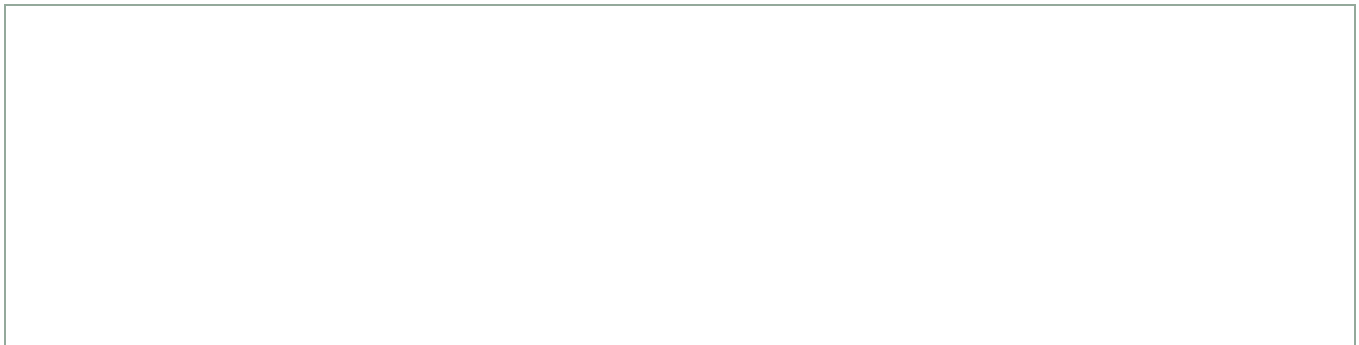


Same notebook band record

Original route: Use R1 to preserve every nominal band center and missing actual-photo status.

Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Fidelity and genuine-status check

Original route: Use Q1/S1 to check the same record; no physical cleanup is claimed.

Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

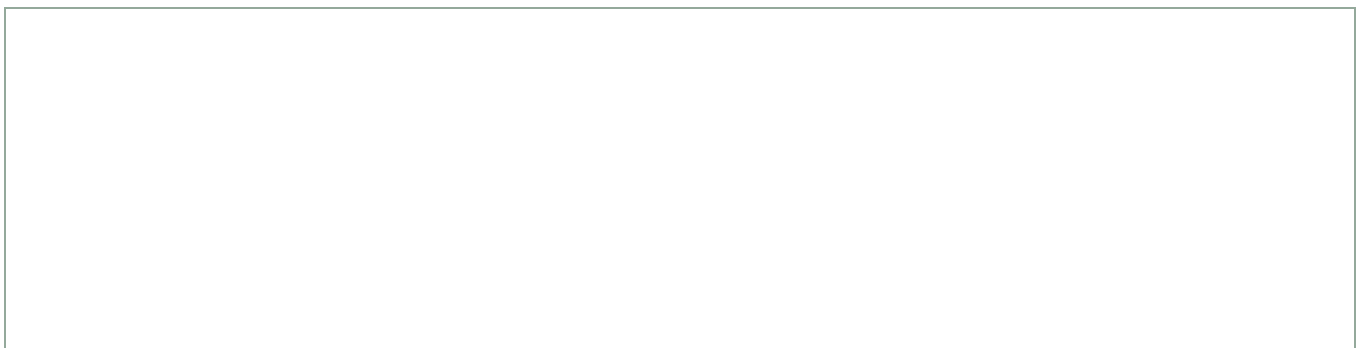


One expectation comparison

Original route: Use K1/Q1 for one honest comparison and a remaining uncertainty.

Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Check your product

- Original route: three count rows preserve P=12, N=0, S=8 and their supplied roles and units.
- Original route: lane order L/X/Y/Z, common 0-mm origin and all eight nominal band centers are preserved.
- Original route: known sizes belong to the four ladder bands only; X/Y remain not yet estimated and Z no bands drawn.
- Original route: one comparison names a supplied key or genuine prediction honestly, with no invented result, prior prediction or surprise.
- Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.
- Both routes: actual photo, measurements, biological work, safety/cleanup, approval, official completion and receipt require genuine evidence.

Keep the limit: Supplied fictional counts and nominal bands cannot establish any actual transformation, construct identity, absence of contamination, safety clearance or completed laboratory work.

Turn in your work

Open the linked BI assignment in Turn in your work. Confirm actual prompt, rubric, destination and deadline. Actual route: use genuine teacher-approved records, images and rubric in place of this practice. Complete one chosen-route record. Missing real inputs and approvals remain pending.

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[Open this assignment in Schoology.](#)

Carry forward

Preserve what the source records, label what it cannot establish, and keep actual work separate.

Friday May 7 combines observations after overnight incubation with Gel map analysis. If plates are absent or failed, label that status and use the fictional fallback without claiming completed laboratory work. Keep the nominal BI-GEL-PAPER-01 size analysis separate from actual plate evidence. What do the actual pGLO colony counts and fluorescence observations support when compared across the four plate conditions, and what remains uncertain?

Sources and resources

[Open today's page](#)

NHGRI-SEPARATION · Separating the Sequencing Products: Transcript

NHGRI educational transcript; general fragment-size comparison only

<https://www.genome.gov/25019982/online-education-kit-separating-the-sequencing-products-transcript>

NHGRI-BP · Base Pair

NHGRI glossary; base-pair concept and length unit

<https://www.genome.gov/genetics-glossary/Base-Pair>

BIO-RAD-PGLO · pGLO Transformation Kit Quick Guide

Bio-Rad, manufacturer SOP for approved educational kit

https://www.bio-rad.com/webroot/web/pdf/lse/literature/Bulletin_3052.pdf

PLTW-PGLO-WORKFLOW · Lesson 4.1 pGLO Workflow Graphic

Course-posted workflow orientation; use Bio-Rad Quick Guide for the approved kit procedure

https://drive.google.com/file/d/1b-UF2R6rSilscqmh_QsBLcuxOe-9TXxA/view