

2027-04-16 · 80 minutes

Claim graph submit

Your goal: Finalize and submit your environmental claim graph with supporting CER analysis.

One product: Finalized claim graph package: labeled data table, graph with titled scaled axes, CER paragraph, data-source citations, and outlier notes.

Question: You are about to submit your claim graph. Does every number trace back to a source, and does your written claim stay inside what the graph can actually prove?

Start the work

Keep interval coverage separate from point error, and support each causal claim with the design and evidence it needs.

1. Combine your data table, graph, and CER paragraph.
2. Verify axis labels, units, and outlier notes are correct.
3. Add citations for the data source.
4. Check that the claim is fully supported by the graph.
5. Submit the claim graph and confirm it in your tracker.

Save the same dated original draft if access or authentic inputs are missing. Mark submission and tracker status separately; keep the real confirmation screenshot and official work pending.

Words you will use

claim

A specific statement supported by evidence.

observation

Something noticed or recorded.

evidence

Information used to support or challenge a claim.

reasoning

An explanation connecting evidence to a claim.

CER

Claim, evidence and reasoning in a connected scientific argument.

correlation

A pattern in which two variables vary together; it does not by itself establish cause.

association

A relationship between variables in supplied or observed records.

causation

A relationship in which changing one factor produces a change in another under the relevant conditions.

empirical

Based on actual observation or experiment rather than a constructed example.

simulation

A constructed representation using stated rules or invented records.

hypothesis

A proposed explanation or prediction that evidence could test.

alternative explanation

Another possible account of a pattern that requires its own evidence.

confounding

Distortion of a relationship by a third factor associated with the compared variables.

bias

A systematic distortion introduced by how information or participants are selected, recorded or interpreted.

observational study

A study that records existing conditions without assigning the exposure or intervention.

controlled experiment

A study that deliberately changes an input while managing other conditions to test a response.

control

A condition or comparison used to isolate or check a factor in a study.

independent variable

The input deliberately varied in an experiment; here the modeled starting concentration.

dependent variable

The recorded response; here endpoint well number.

concentration

Amount of a substance per stated volume of mixture.

nominal concentration

An assigned or calculated concentration, not necessarily an actual measured value.

mg/L

Milligrams per liter, a mass-per-volume concentration unit.

milligram

One thousandth of a gram.

liter

A unit of volume.

dilution

Lowering concentration by adding diluent under the stated conditions.

twofold series

An ideal sequence in which each well has half the concentration of the previous well.

indicator

A substance giving a visible response under specified conditions.

threshold

The boundary used for a decision; here the declared model rule, not a validated detection limit.

positive

Meeting the declared response rule.

negative

Not meeting that rule; it is not proof of universal absence.

blank

A comparison without added target substance under the stated conditions.

endpoint

The last well meeting the positive rule in a valid ordered series.

calibration

Using a model to translate a measured response to a quantity on another scale.

reference

A stated comparison value with a known source; today the 12 mg/L value is fictional.

point estimate

One numerical value used to estimate an unknown quantity.

interval

A set of values between stated bounds.

coverage

Whether a reference belongs to the stated interval; not the same as point error.

half-open interval

An interval that includes one boundary and excludes the other.

signed difference

Point value minus reference, retaining positive or negative direction.

absolute error

The magnitude of point value minus reference, without its sign.

additive width

Upper bound minus lower bound, in the original units.

multiplicative factor

Upper bound divided by lower bound when both are positive; a unitless ratio.

log2

The exponent of two giving a positive number; it counts doublings.

stepwise

Changing in discrete steps rather than continuously.

censored endpoint

A boundary response giving only a one-sided concentration limit.

outlier

A record that differs substantially from the surrounding pattern.

replicate

A repeated record under specified conditions, retaining its own identity.

precision

Agreement among repeated measurements under stated conditions.

repeatability

Agreement of repeated measurements under the same specified conditions.

accuracy

Closeness to an appropriate reference or true value.

uncertainty

Limits on what is known about a result.

confidence interval

A statistical interval constructed by a specified procedure with a stated coverage interpretation.

range

The observed minimum through maximum, or their difference when explicitly stated.

error bar

A plotted interval whose meaning and calculation must be identified.

exposure

Contact with an agent through a stated route over time.

dose

An amount entering or absorbed by a body, sometimes normalized to body mass and time.

paired values

Two values belonging to the same record, such as one fictional day.

provenance

The source and history of a value or record.

peer review

Feedback from another person; a solo check is labeled separately.

citation

A reference that identifies where information came from and where to find it.

traceability

The ability to follow a claim or value back to its identified source record.

data source

The record supplying the actual values being used.

method source

A reference explaining an approach; it need not contain the values in a local example.

population

The full group to which a claim refers.

sample

The subset or material represented by the available records.

temporal claim

A claim about change over time.

spatial claim

A claim about where a pattern occurs.

nitrate

An ion containing one nitrogen atom and three oxygen atoms.

ion

An atom or group of atoms with a net electrical charge.

as nitrate ion

A concentration reporting basis that counts the mass of the whole nitrate ion, not only its nitrogen.

baseline

An identified starting or comparison condition used to judge a later value or difference.

nongermination

Failure of a seed to begin germinating by the specified observation time.

qualitative

Describing a quality or category rather than a numerical amount.

quantitative

Expressed as a numerical count or measurement.

relative concentration

A concentration expressed compared with a stated reference, often as a percentage.

statistical significance

A result assessed using a specified statistical test and its assumptions; none is supplied for Q1.

axis

A reference line showing a graph variable and scale.

scaled axes

Graph axes whose marked positions correspond to the declared numerical scale.

submission confirmation

Genuine evidence from the assignment system that a submission was received.

tracker

A separate class record of task status and supporting evidence.

H1: assemble one complete original record

Today finishes an original practice document, not a real class experiment. Use the complete D1 records, your April 13 calibration graph and your own new CER; actual prior work is not assumed.

If your earlier original CER is available, check and revise it. If it is missing, write one now from the supplied values and A1 guide. A blank response box is not a completed paragraph.

Keep the labeled table, graph, paragraph, citations and outlier notes in one document. Clearly mark original instructional practice on the title and data-source record.

An actual submission needs the teacher-confirmed assignment and genuine confirmation. A prepared file is ready for review; it is not already submitted.

If authentic class work is required, keep the actual graph, table, prior answer, teacher reference and official project materials pending when unavailable. Do not rename this example as class data.

D1: complete original records retained from April 13

All rows below are invented instructional records. Nominal starting concentration is stated in milligrams per liter before indicator addition; final indicator volume is not supplied.

The model threshold T is 1 mg/L. A well at or above T is positive, P, meaning darker than the yellow-brown blank. A lower value is negative, N, matching the blank.

Six wells contain C, C/2, C/4, C/8, C/16 and C/32. These are five halvings, not six. Every record assumes the same original comparison rule.

Known A starts at 2 mg/L. Wells 1-6: 2, 1, 0.5, 0.25, 0.125, 0.0625. Calls P P N N N N; endpoint 2.

Known B starts at 4 mg/L. Wells 1-6: 4, 2, 1, 0.5, 0.25, 0.125. Calls P P P N N N; endpoint 3.

Known C starts at 8 mg/L. Wells 1-6: 8, 4, 2, 1, 0.5, 0.25. Calls P P P P N N; endpoint 4.

Known D starts at 16 mg/L. Wells 1-6: 16, 8, 4, 2, 1, 0.5. Calls P P P P P N; endpoint 5.

C2 repeats the nominal C concentration row, but its supplied calls are P P P N N N; endpoint 3. Keep this deliberate disagreement; its cause is not known.

C3 repeats the same nominal row with P P P P N N; endpoint 4. The three 8 mg/L records are C, C2 and C3, not one averaged replacement.

BL has zero added starch and is yellow-brown, recorded N. It defines the comparison appearance; it does not prove every transfer or reagent worked.

U has no revealed concentration. Its symbolic wells are U, U/2, U/4, U/8, U/16 and U/32. Calls P P P P N N; endpoint 4.

The complete pooled start/endpoint pairs are A (2, 2), B (4, 3), C (8, 4), D (16, 5), C2 (8, 3), C3 (8, 4). Starts have units mg/L.

E2: use the actual supplied graph with its scale rule

Use your April 13 calibration graph. Its horizontal coordinate x equals $\log_2(C/T)$: the number of doublings from threshold T. Its vertical coordinate e is endpoint well number.

Label each tick with both its x value and its concentration, as on your April 13 graph. Equal horizontal gaps mean equal ratios, not equal concentration differences.

A, B, C and D lie on the ideal reference line from your April 13 graph within the known range. The reference is not a fit claiming that all records agree.

C and C3 share one position, labeled two records. C2 remains flagged. U has endpoint 4 with an included left and excluded right interval bound.

NIST describes calibration as converting between measurement scales using a model. Its guidance calls for uncertainty assessment; a line alone is not proof of accuracy.

The actual endpoint response is stepwise. The ideal reference supplies a reading guide, not an exact continuous response or a validated real calibration.

At 8 mg/L, report the observed range of the three endpoints. This range is not a confidence interval.

Other known levels have only one record. Do not claim their precision or invent error bars. Keep the flagged record and distinguish a possible error from a demonstrated cause.

E3: interval coverage and a new point comparison

The last positive and next negative wells bound U. Apply threshold T to U's last positive well and its first negative well.

Use your April 13 interval for U. A square bracket includes its bound; a round bracket excludes its bound.

Check whether the new fictional reference 12 mg/L lies inside your interval. Coverage under the model is not zero point error or validation of an actual sample.

For the newly chosen point $p = 8$ mg/L and fictional reference $r = 12$ mg/L, signed difference is p minus r . Keep its sign and units.

Absolute error is the magnitude of that difference. Additive interval width is the upper bound minus the lower bound. Compare the illustrative error with that width.

The multiplicative interval factor is the upper bound divided by the lower bound. It has no units. It is not a plus-or-minus range in mg/L or a confidence interval.

Equal factors do not mean equal widths: [50, 250) and [90, 450) both have factor 5, yet they span 200 and 360 mg/L. Compare quantities in matching units.

A reference exactly on an excluded bound would lie outside the interval. Endpoints 0 and 6 give only one-sided bounds, as in your April 13 boundary checks.

These censored cases lie outside the known calibration range. Do not extend the ideal line to make them exact values.

C2 disagreement warns that real pooling could add uncertainty. A fictional reference inside the interval would still not prove repeatability, accuracy of an actual method or a causal mechanism.

Starch concentration is not pollutant exposure, intake or absorbed dose. No breathing volume, intake, body mass or duration is supplied to calculate any dose.

C1: trace a value to its actual source

Use this data citation for the retained endpoint records: John Hay Biomedical, Original instructional endpoint records, April 13, 2027, D1, rows A, B, C, D, C2, C3, U and BL.

Cite your graph as your own April 13, 2027 calibration graph, drawn from the D1 records and stated threshold model.

Use this arithmetic citation: John Hay Biomedical, Original calibration CER comparison, April 15, 2027, E3. Its 12 mg/L reference and newly chosen 8 mg/L point are fictional.

These records are printed here so another reader can inspect them. A citation identifies the source, date, item and record; it does not turn original teaching data into an observed result.

NIST explains calibration and uncertainty. It does not contain the A-D or C2/C3 numbers. Cite NIST for the method concept and the original D1 record for the numerical evidence.

Map each plotted record to its D1 row. A shared dataset citation can cover several points when that mapping is clear; do not hide an uncited value behind a general link.

Check a citation by locating the actual value, units and scope at its named source. If you cannot trace a number, mark it unresolved rather than assigning a plausible source.

For actual data, retain its real dataset title, author or organization, date, row or sample ID, method and accessible locator. Missing actual provenance remains missing.

A1: final assembly and the learner-written CER

Warmup 1: why is a claim unsupported when it exceeds its graph? Warmup 2: what genuine confirmation and tracker steps remain after preparing the file?

Opening check: name one missing or incorrect feature in your own record. If starting fresh, use the missing CER as your first work item.

Prerequisite: place the table, graph and paragraph side by side. Check that all three refer to D1 and the same concentration basis, units, records and interval.

Table checklist: preserve A-D, C2, C3, U and BL; start concentrations, well values, calls, endpoint numbers and record status. Do not average away the flagged repeat.

Graph checklist: title, $x = \log_2(C/T)$, concentration equivalents 2, 4, 8, 16 mg/L, endpoint axis, all six pooled records and the U interval.

Include your April 13 calibration graph, checked against D1. Keep C/C3 labeled two records, C2 flagged, the dashed interval and both boundary meanings.

Write your own complete paragraph: a specific claim, at least two D1 anchor pairs, the C2 exception, reasoning, a justified design classification and one possible alternative explanation.

Explain that the reference follows a constructed model and does not prove a real environmental cause. State why a possible mixing or call difference is not an established cause of C2.

Retain E3 coverage and point-comparison notes beside the paragraph. Do not call 12 mg/L a real teacher reveal or 8 mg/L your historical answer without that actual record.

On-grade finish: combine every required piece, check each claim against its values and cite its actual source. Keep today's five steps visible in your record.

Recovery: begin with provenance for each supplied record and a bounded claim. Then complete the missing table, graph, paragraph and outlier notes before describing the product as ready.

Restart: check whether the pieces are combined, then inspect labels and citations. Finish with real submission and tracker evidence if available, or honest pending status.

Q1: a complete original nitrate scope check

All three site entries below are invented for this exercise. They describe one fictional sampling session, not Cleveland or any real water source.

The reporting basis is milligrams of nitrate ion per liter, written mg/L as nitrate. It is not milligrams of nitrogen per liter. No conversion or health standard is supplied.

Session S, Site A: 2 mg/L as nitrate. Session S, Site B: 4 mg/L as nitrate. Session S, Site C: 3 mg/L as nitrate.

Data citation: John Hay Biomedical, Original three-site nitrate comparison, April 16, 2027, Q1, Session S, Site A/B/C. These are original inputs, not measured samples.

Inspect this claim about the three-site record: Nitrate pollution is rising across all of Cleveland's water. Is it ready to submit? Rewrite it using the supplied values.

Check your rewrite: it names which site is highest in Session S with its value and units, compares it with the other two, and stays within these three invented sites.

One session does not show a rise over time. Three invented sites cannot establish conditions across a city. No stated baseline or threshold supports calling these values elevated, unsafe or compliant.

If you report a range or difference, keep the units mg/L as nitrate. No repeat data or analytical uncertainty is supplied, so do not invent error bars or significant differences.

If you kept rising, state what repeated time records would be needed. If you kept all Cleveland, identify the missing real sampling design and population coverage.

Nitrate is a nitrogen-and-oxygen ion, as described by the USGS glossary. That definition does not make this fictional table an environmental assessment.

T1: inspect a draft and make a documented revision

With a partner, ask them to find your claim, one cited value, the outlier note and the limit without help. Record their actual feedback and your revision.

Without a partner, inspect this supplied flawed draft: Every original 8 mg/L record ended at well 4, so the actual unknown is exactly 8 mg/L. Source: NIST.

Solo check: C2 is an 8 mg/L record with endpoint 3. U supports only your conditional April 13 interval, not exactly 8. NIST supplies method guidance, not these original records.

Write your corrected sentence and exact data citation. Then inspect your own paragraph for the same errors. Label this a solo critique; do not invent a peer statement.

Extension: write the hardest skeptical question about your completed record. Answer it in two sentences using your values and source; if evidence is missing, narrow the claim.

A useful question could ask whether C2 proves a pipetting mistake. Your answer must distinguish a plausible explanation from evidence that would establish that explanation.

Review: a line graph can show change across ordered times. An outlier differs from a pattern; association alone does not prove cause. Error bars require a defined meaning and calculation.

Record a before sentence, an after sentence and a reason. The final document still needs your own CER, not only a copied correction of the supplied flawed draft.

P1: actual project and submission obligations

Today's class schedule names Project 4.1.4 Dose Response and Lab Reports. Confirm the assigned portions with your teacher.

Project 4.1.4 includes a radish seed investigation, teacher-reviewed design and dilution calculations, controls and three days of observations. This starch practice does not fulfill it.

The official design lists a control and relative concentrations of 6.25, 12.5, 25, 50 and 100 percent. These are scope details, not a complete recipe or authorization to handle chemicals.

Actual work needs chosen seed count and chemicals, controlled conditions, labeled samples, qualitative and quantitative records, presentation notes and teacher review. Those inputs are not supplied here.

Part III requires Day 3 results: concentration/dose on x and number of seeds that did not germinate on y. It adds two other groups' data and compares three identified chemical lines.

It also asks about whether a threshold can be determined or what further experiment is needed. Actual seed data and group comparisons remain pending; do not invent nongeneration counts.

Get Part I, the conclusion questions, the full presentation requirements and the experimental-design resource from your teacher, and ask which graph step to follow.

Activity 4.1.3 separately uses eleven tests on two waters, resource-sheet records, health notes, research and peer/remediation comparison. Neither official activity is completed by a copied teaching graph.

This week, April 12-16, also includes environmental map and public-data work.

If absent for the earlier graph task, use the actual posted class chart when available; otherwise complete the supplied original records and keep that actual chart branch pending.

Keep the actual public-data and unfinished-map obligations pending. No homework is due before this class. April 19 permits catch-up on unfinished Problem 4 work.

When the assignment is confirmed, submit the correct combined file through your enrolled section and inspect the genuine LMS confirmation. Then update the required tracker with matching evidence.

Today's task requests a screenshot of your actual LMS submission confirmation. Capture only a real confirmation after submission; no sample screenshot or filled mock receipt is provided.

A tracker entry is a separate class requirement. A missing tracker does not prove an LMS transaction never happened, and a filled tracker does not prove the upload succeeded.

Without access or genuine completion, save the dated original draft, name the missing item and mark submission or tracker pending. Open the linked BI assignment and check its posted requirements and deadline.

M1: a distinct source audit with three paper strips

Original model record: three fictional paper strips in one session have lengths A 41 cm, B 34 cm and C 38 cm. Citation: John Hay Biomedical, Original strip comparison, M1, records A-C.

Flawed claim: All paper strips are getting longer. The record has one session, so it cannot establish growth over time or describe every strip outside this example.

Repaired claim: Strip A is longest among the three original entries, at 41 cm compared with B at 34 cm and C at 38 cm. This states the supported comparison.

Audit: the value 41 and unit cm trace to record A. The source is the original M1 example, not a public paper about material strength.

Two-sentence skeptical answer: We cannot tell whether A grew, because no earlier length is supplied. A real growth claim would need comparable measurements of the same strip at different times.

This model shows citation and claim-scope checking. It does not supply the learner's final calibration CER or demonstrate any actual experiment.

Try the decision

The original table, graph and learner-written CER are assembled. What final check supports a truthful handoff?

- Trace every plotted record to D1, retain limits and C2, then use genuine assignment confirmation and record any pending tracker or official work.
- Treat a filled tracker as proof that a file uploaded successfully even when no confirmation can be found.
- Cite NIST as the source of the invented A-D numbers and remove C2 so the graph looks consistent.

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

Your 80-minute flow

0–5 minutes	Identify a missing or wrong graph feature and answer the short warmups.
5–20 minutes	Combine the table, graph and learner-written CER in one document.
20–40 minutes	Verify labels, units and outlier notes; trace every value to a source.
40–55 minutes	Check the claim and Q1 scope against supplied values.
55–68 minutes	Use actual partner feedback or T1 solo review; revise and extend when ready.
68–80 minutes	Submit and verify the actual confirmation/tracker if available; otherwise record the genuine pending status.

Your response record

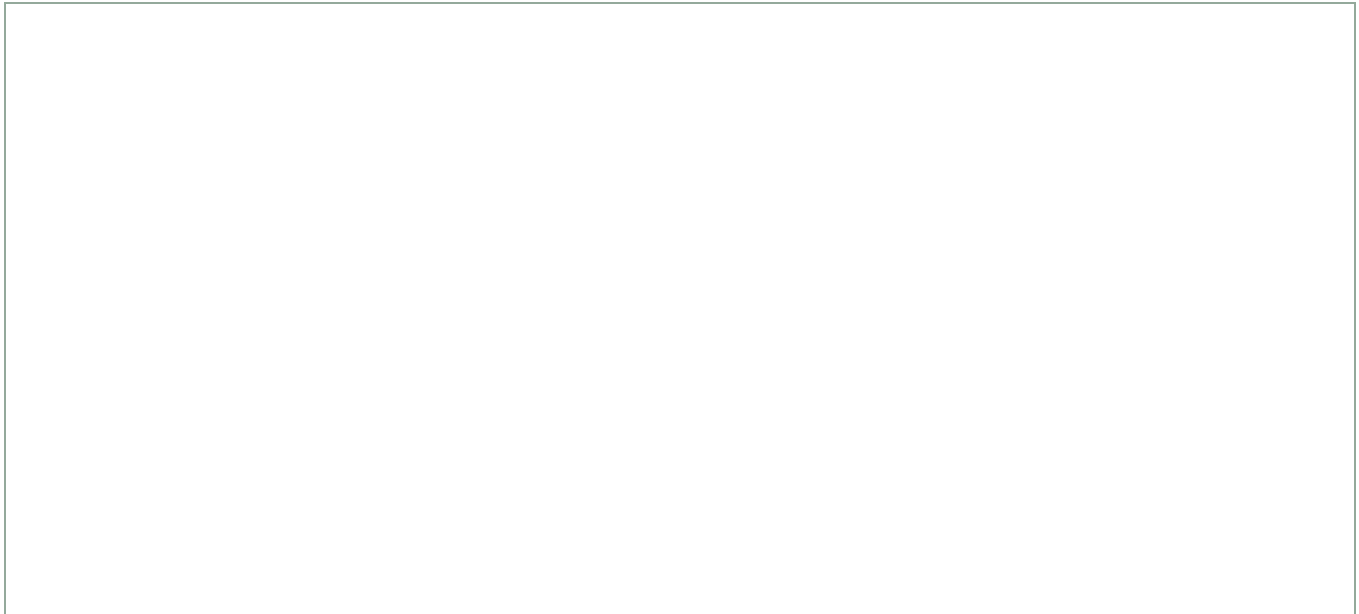
Use these labels on paper or in your document. The space below also works when this page is printed.

Check the three pieces

Complete both A1 warmups and identify one missing item. Check that table, graph and paragraph describe the same original D1 records; write your own CER if none exists.

The supplied model and blank response fields are not an actual completed learner paragraph.

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

A large, empty rectangular box with a thin black border, intended for students to write or draw their responses.

Assemble the complete final record

Combine the labeled D1 table, your April 13 calibration graph, your own full CER, citations and outlier notes in one document. Retain all six pooled records, U and BL.

Use the complete D1/E2/E3 inputs. Keep C2 flagged, C/C3 separate and the conditional U interval; actual prior work remains separate.

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

Audit labels and provenance

Check axis titles, units, scale, each plotted record and outlier note. Use C1 to trace each value to the original data record and distinguish method citations.

A clear shared data citation can cover several mapped points; a method source cannot stand in for a missing numerical source.

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

Test the claim against the evidence

Check your paragraph's claim, exact evidence, reasoning, design classification, alternative and E3 comparison. Complete Q1 by rewriting the nitrate claim with all three values and limits.

Do not claim a temporal rise, a city-wide result, an elevated level or a real reveal from inputs that do not establish one.

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

Record a real peer check or labeled solo revision

Use actual peer feedback or T1's complete solo critique. Write a before/after sentence and reason; attempt the two-sentence skeptical-answer extension when ready.

Do not copy the flawed-draft correction as your whole CER or invent a partner statement.

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

Submit and confirm only what actually happened

Use the confirmed assignment to submit the full file and inspect the real confirmation. Record the required tracker status and genuine screenshot; otherwise save the draft and list pending items.

Follow P1. Preparing, submitting, receiving confirmation and updating a tracker are distinct states. No mock confirmation is supplied.

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

- Your submission pairs an accurate graph with a valid CER.
- The claim graph is cited and submitted.
- All original records, source labels, interval limits and the flagged repeat agree across the table, graph and paragraph.
- Actual submission, tracker and official-work status are recorded without fabrication.

Keep the limit: Original assembly practice supports a traceable classroom argument. It cannot establish any actual water result, seed investigation, teacher reveal, causal health effect, successful submission or official completion.

Turn in your work

Submit the complete table, graph, learner-written CER, data citations and outlier notes through the confirmed April 16 Lab Reports route in your enrolled BI section and Problem 4 portfolio. Verify the genuine LMS confirmation and required tracker evidence.

Save the same dated original draft if access or authentic inputs are missing. Mark submission and tracker status separately; keep the real confirmation screenshot and official work pending.

[Open this assignment in Schoology.](#)

Carry forward

Trace each value to its real source, keep the claim within the evidence, and record submission and tracker status truthfully.

Carry the checked record and any pending Problem 4 obligations into the April 19 catch-up and discussion. Which claim in your submitted graph needs the strongest qualification?

Sources and resources

[Open today's page](#)

NIST-CAL · Calibration

NIST/SEMATECH e-Handbook 4.1.3.3

<https://www.itl.nist.gov/div898/handbook/pmd/section1/pmd133.htm>

NIST-SCATTER · Scatter Plot

NIST/SEMATECH e-Handbook 1.3.3.26

<https://www.itl.nist.gov/div898/handbook/eda/section3/scatterp.htm>

OPENSTAX-DILUTION · Chemistry 2e: 3.3 Molarity, dilution subsection

OpenStax, Rice University

<https://openstax.org/books/chemistry-2e/pages/3-3-molarity>

USGS-GLOSSARY · Water Basics Glossary: nitrate

U.S. Geological Survey

https://water.usgs.gov/water-basics_glossary.html