

Wk13 Lab notebook: Literature and design analysis

Your goal: Evaluate their research design against published literature and refine weak points.

One product: Literature comparison summary: one credible source cited, one strength and one weakness of the team design identified, one concrete revision documented.

Question: Which published method reveals a real weakness, and what changes in your plan because of it?

Start the work

1. Locate one credible source related to your question.
2. Compare your methods to the published approach.
3. Identify one strength and one weakness in your design.
4. Revise your variables or sample size if needed.
5. Summarize how the literature improved your plan.

If access is unavailable, save the same full record and tell the teacher. Label V0-to-V1 as practice. Ask the group to review the proposed revision and request the official prompt before following it.

Words you will use

independent variable

The factor deliberately changed or assigned in the stated experiment.

dependent variable

The response measured to address the question.

controlled variable

A condition kept consistent across the comparison.

control group

The stated comparison group, such as a baseline condition.

experimental unit

The smallest unit assigned a treatment independently in the stated design.

subsample

A smaller part observed within an experimental unit; it is not automatically another independent unit.

repeated measurement

Another reading of the same unit, which does not add a new treatment assignment.

sample size

A count of sampled units; state what kind of unit is being counted.

precision

How little an estimate would vary across repeated samples under the stated design.

systematic bias

A consistent distortion that more observations alone do not remove.

confounding variable

A factor linked to the comparison that creates another explanation for its result.

random assignment

Using chance to allocate treatments to units.

lifespan

The length of an organism's life, measured with a stated starting and ending rule.

strain

A specified genetic line within an organism used in research.

model organism

An organism studied to inform questions about a biological process.

C. elegans

Caenorhabditis elegans, a small roundworm used as a model organism.

literature

Published research and reports used as scientific sources.

life stage

A defined period of development, such as larva or adult.

adult cohort

The original group of adults enrolled at the stated starting point.

proportion

A part divided by its stated whole.

percent

A proportion multiplied by 100.

baseline

The stated condition used for comparison.

glucose

A simple sugar; the plan specifies the amount added to the medium.

medium

The material supporting culture in the proposed study.

protocol

Detailed, approved instructions for materials, measurements and procedures.

power

The probability of detecting a specified effect under stated design and analysis assumptions.

assay

A defined method for measuring a biological response.

survival

Remaining alive at the stated time under a defined scoring rule.

credible source

A source whose authors, evidence and limitations can be checked for the claim at hand.

primary paper

A report written by the researchers about their own study.

peer review

Evaluation by other specialists before publication; it does not guarantee correctness.

citation

Details that identify a source and let another reader find it.

DOI

Digital object identifier, a stable identifier for a scholarly work.

method

How a study makes or collects its evidence.

claim

A statement about what the evidence supports.

conflict of interest

An interest that may influence judgment and should be considered when evaluating evidence.

revision

A documented change made for an explicit reason.

timepoint

A specified time for an observation.

time course

A record of a response across several specified times.

progeny

Offspring produced by an organism.

founder

An original organism that starts the observed group or lineage.

significance

A statistical judgment under a specified test; it is not proof of importance or design adequacy.

generalizability

How well a result applies beyond the units and setting studied.

E1: check the source, not only its category

A credible source makes its author, evidence and limits traceable. NIH recommends checking who wrote or reviewed material, its funding, purpose, supporting evidence and date.

For today, use five checks: author and expertise; original evidence; method fit; date and later checking; purpose and possible conflicts. Explain each with details from the source.

Peer review is expert scrutiny before publication. It is useful but not a guarantee that a paper is correct or suitable for your question.

A seller may provide accurate product information, but a sales claim needs evidence beyond a commercial interest. An anonymous post may be a lead, not verified support.

Choose the supplied primary paper in E2 for the original comparison. Its authors, journal, year, methods and figure locations are available. Check the claim rather than trusting a label.

The article is from 2009. It can support a specific historical finding, not a claim that every later study agrees. Its age alone neither proves nor disproves its methods.

E2: primary literature record with a bounded claim

Lee, Seung-Jae; Murphy, Coleen T.; Kenyon, Cynthia. Cell Metabolism 10, 379-391 (2009). Title: Glucose Shortens the Life Span of *C. elegans* by Downregulating DAF-16/FOXO Activity and Aquaporin Gene Expression.

DOI 10.1016/j.cmet.2009.10.003. The authors' full paper is linked in the source bank. These original notes summarize selected methods and claims; they are not the whole article.

Figure 1A, printed page 381, identifies wild-type N2 worms. Figure 1A-B compares added glucose with baseline and distinguishes adult exposure from exposure only during development. Adult exposure shortened lifespan under the tested conditions.

The Life Span Analysis section, printed page 389, states measurements began with day 1 adults at 20 degrees Celsius. It also describes a chemical approach to preventing offspring development.

That chemical procedure is not adopted or authorized here. Full methods, safety and suitability must be reviewed before any real classroom assay.

The paper's Progeny Profiles section uses 36 individual founder worms per condition, each on a separate plate, and measures offspring production. That count belongs to another assay.

Figure 1 directs readers to supplemental Table S1 for further lifespan trials and statistics. The exact lifespan sample counts are not supplied in these notes; do not borrow 36 from reproduction.

E3: compare like measurements and units

Compare organism and strain, life stage, factor, response, time, control and assignment unit. A mismatch can limit what a published method tells you.

April 9's plan has six plate assignments per condition, with 25 adults per plate. Use your April 9 count of assignment units, not worms, when you compare it with E2.

For the sample-size prerequisite, compare those stated counts with E2's 36 individual founders per condition. Then state why the different outcome and assignment structure prevent a simple adequacy judgment.

For the lifespan comparison, exact published counts need the relevant supplemental record. The invented 100-versus-10 hook is not evidence and is not used here.

NIST links precision to independent replications, variability and measurement. More units alone do not remove systematic error or establish the power needed for an expected effect.

A different worm strain can change the biological response. Do not call strain differences automatically unimportant. A missing control or a strain change each needs a question-specific reason.

The paper's lifespan observation and V0's planned survival measure may differ in endpoint and timing. Check whether V0's measure can stand for the full adult lifespan.

S1: preserve the original April 9 baseline plan

Use your actual April 9 plan if available and retain its original version. If it is missing, use this labeled original recovery baseline, called V0. Do not call it an actual team agreement.

V0 asks whether added-glucose condition changes survival percent on day 10 after assignment in wild-type N2 *C. elegans* beginning on day 1 of adulthood.

Its conditions are baseline with no added glucose versus 20 grams added D-glucose per liter of final medium. This is a proposed setting, not a recipe or exposure instruction.

V0 has 12 separate plate assignments, six per condition, with 25 original adults per plate: 300 worms total. It holds strain, starting age, food, base medium, adults per plate and planned 20 degrees Celsius consistent.

The response is alive original adults divided by enrolled original adults, times 100, for each plate at day 10. No counts have been collected. Losses and original-cohort tracking need an approved rule.

V0 plans chance-based allocation and flags the risk of one incubator per diet. Actual chamber control, scoring, offspring management and teacher protocol remain unresolved.

Its poster outline includes question, background, methods, results and conclusion. Results stay blank. Four draft roles own question/background, methods, table/graph and conclusion/assembly.

This is the April 9 original practice design, not a new invented weak version. Preserve its single-time outcome so today's change can be compared honestly.

R1: make and document a concrete revision

First write a comparison: for each E3 feature, state what E2 did and what V0 proposes, then mark where they match and where they differ.

Name one strength as a V0 feature that matches E2 for a stated reason. Name one weakness as a mismatch that could limit what V0's outcome can show, and cite the E2 detail behind it.

Write V1 by changing only what your weakness calls for. List which V0 features stay the same and state exactly what changes in the variables, measurement plan or sample size.

Update the blank record so it has a column for every value V1 would collect. Keep each plate ID so every row stays traceable to its assignment unit.

Plan a graph that places V1's factor and response on the axes they belong on. If V1 adds repeated readings of the same plates, those readings are not new independent plates.

Record baseline values only if work is later authorized. Do not fill any value as an observation in this paper plan.

Your revision is an original response to E2, not a copy of its full assay. Name the limit that remains after the change.

Write V0 before and V1 after, then cite E2 and explain the reason. If you consider a sample-size change, justify it with E3's limitation; do not inflate it to imitate an unrelated count.

If your actual plan differs, document its real before/after and a source-supported change. If V1 is already present, revise another genuine weakness instead of inventing a change.

If no real plan is accessible, complete V0-to-V1 as a labeled solo recovery record. Ask the team to review the plan and obtain the required protocol approval before starting.

C1: source choices, warmups and stress tests

Warmup 1: where would you start, a peer-reviewed journal, a random blog or a social post? Explain the evidence you would check after choosing the journal.

Warmup 2: why can a revision improve planning? Use R1 to explain how a measurement change addresses a specific mismatch before any new data exist.

Self-check choices: a peer-reviewed worm paper, an anonymous forum post and a company selling worm food. Use E1's five checks to decide which one gives a traceable tested claim for your question.

Then name one remaining check: study design, replication, competing evidence or relevance. The label peer-reviewed is not a final quality verdict; commercial origin is not proof of falsehood.

Extension: compare a missing baseline group with a different strain. Explain how each could weaken this inference; no rule says one is harmless in every study.

A less consequential difference could be the poster's font, if all measured records and methods remain unchanged. Explain why that differs from a biological strain change.

Lost your place? Record the E2 citation, one method comparison, a strength and weakness, then the actual V0-to-V1 change and remaining limit. All inputs for this original route are supplied.

T1: Feedback, summary and team decisions

Write a comparison summary with five parts: source citation, methods comparison, one strength, one weakness and concrete before/after revision with its reason.

Include the remaining limit: name what your revised plan still cannot establish and which protocol rules still block a real experiment.

Actual group route: share the revision with your team, record its response and distinguish your proposal from an accepted change. Keep both versions for the poster's design history.

If absent, use the real source your team already selected and post a proposed revision to the actual group thread when available. The local draft alone is not that post.

Solo route uses E2 and V0/R1. Supplied critique: A new measurement plan will not fix lost-adult handling or diet-specific incubators. Explain which protocol inputs are still needed.

Answer that critique without inventing a teammate response. Use only source choices, posts, team decisions and teacher feedback that actually occur; ask for any missing input.

P1: exact official, weekly and submission boundaries

Today's class schedule says to keep building Lesson 2.3 and cite one credible source. The daily record names a Problem 2.3.1 literature-review or design-analysis prompt.

Ask the teacher to identify the exact official screen and stopping point. Complete only the teacher-assigned actual task when provided; do not assume April 9 design work is done.

The Toxic Relationships project also needs actual environmental-toxicology research, protocol, controls, data, error notes, graph and laboratory report. This literature record does not finish that project.

Actual Module II guide, culture preparation, materials, rubric and safety directions remain needed. The paper's laboratory chemicals are not classroom directions. No animals or cultures are handled here.

This week, April 12-16, names research planning and the Problem 2.3.1 design phase. Ask your teacher whether the investigation and a report with limitations are also due.

Keep the actual teacher-posted packet and tracker requirements. For the assigned PLTW screen, add a screenshot or note from your work to the tracker. If access fails, save your work and tell the teacher; do not invent evidence from the task. No invented experiment or validated simulation is substituted for the assigned evidence.

No homework is due before this class. Missed-class group posting is still an actual remediation requirement. April 15 has a separate 25 minute hypothesis/protocol preparation item.

The next dated instructional context is April 13 heavy-metal ethics. April 14 is a catch-up day. These are separate from this literature summary.

The full Lee paper is publicly linked and selected claim/method facts are supplied here. If a teacher assigns the whole paper or supplemental Table S1, that reading remains a separate task.

If the actual team's question needs another source, use that source when supplied or located and record its methods. E2 does not become relevant to every question by being published.

Submit Wk13 Lab notebook: Literature and design analysis through your enrolled section. 1292:

<https://clevelandmetro.schoology.com/assignment/8544587000> . 6792:

<https://clevelandmetro.schoology.com/assignment/8544587024> .

Confirm access and submit the summary plus versioned revision record. If access fails, save the same work and tell the teacher. Keep actual team decisions and official-task evidence, and check Schoology after uploading.

M1: a different worked design revision using NIST guidance

Original fictional coating plan V0: apply coating A to all parts from lot 1 and coating B to all parts from lot 2, then measure surface roughness. No roughness results exist.

NIST's sampling guidance explains that linking a tested material to a separate lot mixes possible effects. Its coolant/lot example is a design illustration, not our coating experiment.

Strength: V0 names a measured response. Weakness: lot and coating change together, so either could explain a later difference.

Original V1 revision: include both coatings within each lot and assign parts by chance. Record lot ID alongside coating and roughness; the analysis must account for lot.

Worked summary: NIST identified a competing lot explanation. I changed from one coating per lot to both coatings in each lot. Actual material, measurement and sample adequacy still need review.

This shows before, source reason, after and limit. It does not copy the worm survival revision or report a test result.

Try the decision

What is the defensible revision record for the original V0 after comparing its methods with E2?

- Change the V0 feature your E2 comparison shows is weakest, keep plate IDs, and state the limit the revision still leaves.
- Copy 36 worms per group because that reproduction count proves the lifespan sample is adequate.
- Keep all methods because a peer-reviewed paper guarantees our different design will work.

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	Use E1 and C1 to evaluate source credibility and answer both warmups.
10–28 minutes	Locate E2's source record and selected methods, or the actual team source; record citation, claim and method.
28–45 minutes	Compare the original plan with the published approach using E3 and S1. Distinguish counts, units and assays.
45–58 minutes	Identify a strength and weakness; select and justify one revision with R1.
58–70 minutes	Preserve V0 and write V1 with changed variables or measurement plan and record fields.
70–80 minutes	Write the comparison summary, check credibility reasoning and submit; use only actual team communication and evidence from the assigned official work.

Your response record

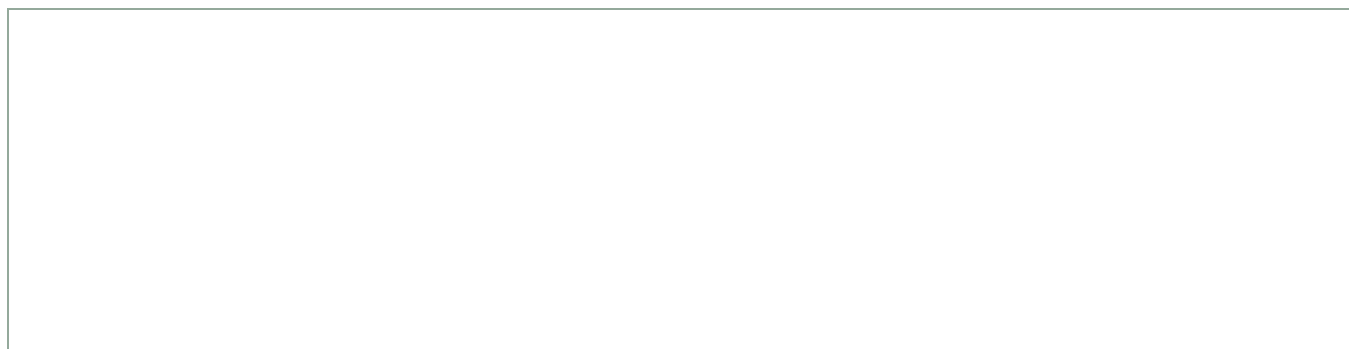
Use these labels on paper or in your document. The space below also works when this page is printed.

Evaluate credibility

Use E1's five checks and C1's two warmups. Explain why the journal is a starting point rather than automatic proof.

Check author, evidence, method fit, date and purpose; do not treat a website suffix or sales motive as the whole verdict.

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

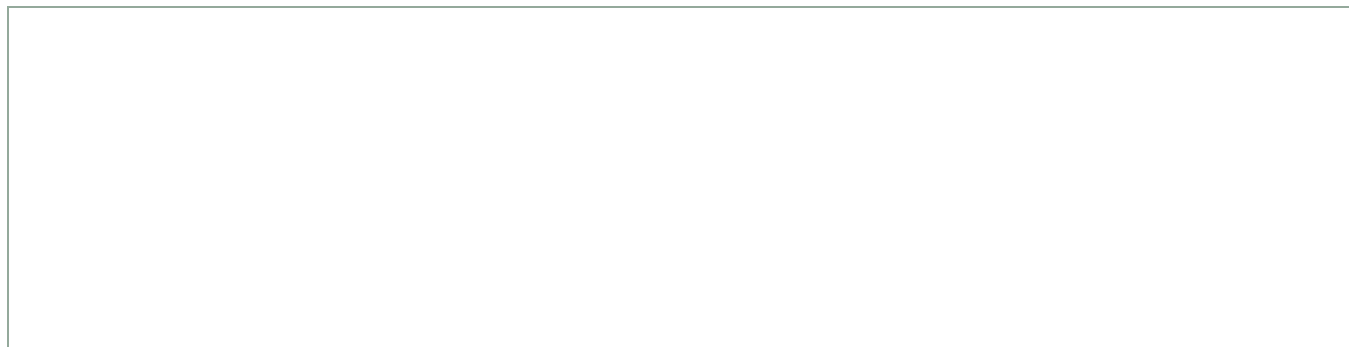


Locate and record the source

Record E2's title, authors, year, DOI and relevant method locations for the original route, or use the actual team source when available. State the claim and method separately.

The linked paper is the primary source. These supplied notes support the local task but do not claim whole-article or supplement completion.

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



Compare methods and units

Preserve the actual original plan or labeled S1 V0. Compare organism, strain, life stage, factor, response, time, control and unit with E2. Complete the count comparison with E3's assay caveat.

The 36 founders belong to reproduction, not the lifespan figure. Do not import that count as a power requirement, and count assignment units rather than worms.

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

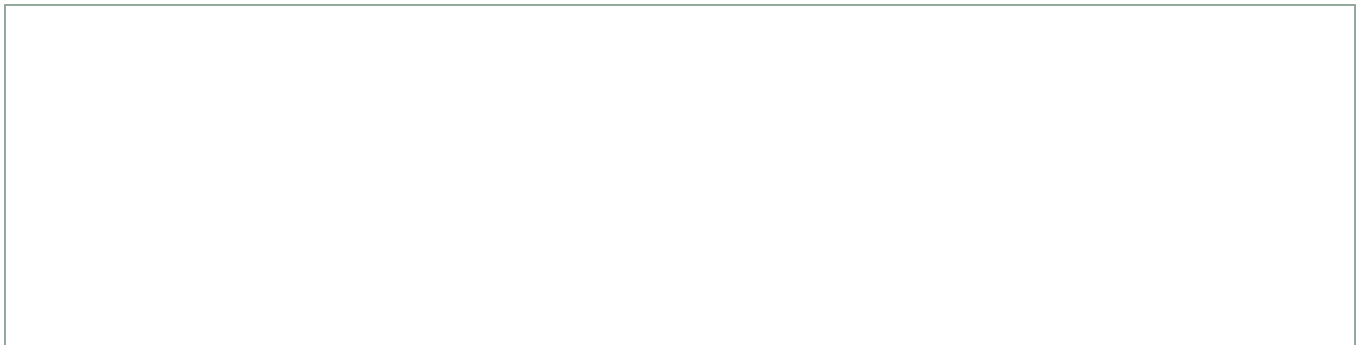


Name one strength and one weakness

Use the comparison to identify a supported strength and genuine weakness. Select a concrete revision using R1 or an equally supported change to your actual plan.

A strain mismatch can matter. A genuine weakness does not mean V0 had no useful design features.

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



Keep a before-and-after record

Write the original wording, source reason, revised wording and evidence-record changes. For recovery, write your own V0-to-V1 change and update the record fields and planned graph to match it. Keep results blank.

Repeated readings do not add independent units. Preserve actual protocol and team-adoption holds.

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

Summarize, share and submit

Write T1's summary; answer the C1 self-check and extension when ready. Share through the actual group route when available, or label the supplied critique and missing post. Submit the full comparison and revision record.

A proposed revision is not an accepted team change. Use your enrolled-section URL and P1's directions for the official task.

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

- Design is compared to at least one credible source.
- Summary names one concrete revision made.
- The original and revised plans are distinguishable.
- Counts, experimental units and measurement endpoints are not conflated.

Keep the limit: Original literature-comparison practice supports a reasoned design revision. It cannot establish class outcomes, adequate power, animal authorization, team acceptance or official course completion.

Turn in your work

Submit the comparison summary and before/after revision in your enrolled section:1292

<https://clevelandmetro.schoology.com/assignment/8544587000> ;6792

<https://clevelandmetro.schoology.com/assignment/8544587024> . Open the assignment to check access. Keep team decisions and evidence from assigned official work with the notebook.

If access is unavailable, save the same full record and tell the teacher. Label V0-to-V1 as practice. Ask the group to review the proposed revision and request the official prompt before following it.

[Section 1292: Wk13 Lab notebook: Literature and design analysis](#)

[Section 6792: Wk13 Lab notebook: Literature and design analysis](#)

Carry forward

Compare the actual methods and units, then preserve a before-and-after revision with its evidence and remaining limits.

Keep the revised plan and literature limits available for the next exposure discussion; actual experiment evidence remains separate. How could the exposure route change the interpretation of a literature finding?

Sources and resources

[Open today's page](#)

LEE-2009 · Glucose Shortens the Life Span of C. elegans by Downregulating DAF-16/FOXO Activity and Aquaporin Gene Expression

Lee, Murphy and Kenyon, Cell Metabolism 10, 379-391 (2009), DOI 10.1016/j.cmet.2009.10.003; author-hosted primary paper

https://murphylab.princeton.edu/sites/g/files/toruqf1986/files/2009_cell_metabolism_lee.pdf

NIST-SAMPLE · Choosing a Sampling Scheme

National Institute of Standards and Technology

<https://www.itl.nist.gov/div898/handbook/ppc/section3/ppc332.htm>

NIST-UNIT · How can I account for nested variation (restricted randomization)?

National Institute of Standards and Technology

<https://www.itl.nist.gov/div898/handbook/pri/section5/pri55.htm>

NIH-QUALITY · How To Evaluate Health Information on the Internet: Questions and Answers

NIH Office of Dietary Supplements; reviewed May 4, 2022

https://ods.od.nih.gov/HealthInformation/How_To_Evaluate_Health_Information_on_the_Internet_Questions_and_Answers/