

Investigation records: paper-data table

Your goal: Use supplied illustrative records for the approved paper-data investigation.

One product: Completed data table with results for all treatment concentrations and the control, consistent units, and notes on any unexpected observations.

Question: How do you keep missing values and unexpected events visible in a complete data table?

Start the work

Use evidence about possible harm to plan protection, then state the fairness rule and uncertainty behind your responsibility claim.

1. Use this paper-data record to practice analysis related to Problem 2.3.1 Toxic Relationships. Read H1 and write the two opening notes; no organisms or treatments are handled.
2. Read K1/C1. Label the condition and control references and four same-record features.
3. Audit all 33 supplied D1 rows at 0, 6 and 24 hours without recopying. Keep missing values separate from responses.
4. Add the 24 h counts and units to the five endpoint summary rows, retaining both plates.
5. Add the timestamped E1 events and their consequences. Review, save and submit the same completed data table.

Save the same file locally. Ask the teacher for the correct Schoology assignment or course upload location.

Words you will use

Illustrative record

Invented information used to practice a skill; it is not a real measurement.

C. elegans

A small roundworm used in some biological research.

External concentration

The amount of a substance in its surrounding mixture, not the amount inside an animal.

ppm

Parts per million. Here it is only the supplied mixture label; the record gives no chemical form or conversion basis.

Dose

The amount received by an organism. These records do not measure it.

Condition

One labeled comparison group in the record.

Control

A reference used to interpret other records.

Plate ID

The label for one container record, such as C0-A; no container is used today.

Replicate

A separately assigned experimental unit at the same condition; here each plate represents one modeled unit.

Original count

The 20 individuals listed at the start of each plate record.

Found count

The number listed as located and scored at a given time.

Nonresponse

The supplied scoring label N. It does not mean death or absence of all movement.

Response

The supplied scoring label R; it does not prove that an animal is healthy.

Missing

Not found in that observation. It is neither R nor N.

Scoring rule

The same stated way of assigning labels to every record.

Endpoint

The response measure at a stated time; the analysis uses 24-hour N counts.

Time point

A labeled moment in a record, measured here in hours from its start.

Denominator

The total used under a fraction; name whether it is original or found.

Recovery count

Here, another name for the found count. It does not mean recovery of health.

Independent variable

The condition varied in the modeled comparison: the external concentration label.

Dependent variable

The recorded response: N count at each time.

Controlled feature

A feature declared the same for the modeled comparison.

Unexpected event

A supplied observation that needs a note because it may affect interpretation.

Baseline

The starting reference value for a comparison.

Scoring reference

An all-N example used to check how labels are read; it is not a biological treatment control.

Model assumption

A condition declared for an example, rather than verified by actual measurement.

Evidence

A specific record used to support a claim.

Limitation

A feature that restricts what a conclusion can establish.

Interpretation

The meaning you give records, kept separate from their values.

H1: Start here

Today you will check and complete one supplied paper data table. All numbers are invented. You need no prior notebook, animal, chemical, microscope or login to begin.

Use the supplied paper records today. Complete one product. If the teacher assigns a different dataset, use that dataset and its directions instead; do not complete two versions.

Start with this short comparison: one table lists a control and every condition; another omits the control. Which permits a reference comparison? Neither table alone proves cause. Explain why an unexpected event belongs in the record. Use these two answers as notes beside your one table.

Read K1 and the word guide at 10-20 minutes. Read D1 and M1 during 20-50. Read E1 during event review. Use paper or a document; annotation replaces recopying.

K1: Record plan

K1 record assumptions: concentration labels are 0, 1, 10, 100 and 500 ppm. Each has two plate records, A and B. Each original count is 20. All records use times 0, 6 and 24 hours and the same R/N label key. These four features support a consistent table: original count, time schedule, label rule and reporting units. They do not verify a real experiment. The plate is the modeled assignment unit; its 20 individuals are subsamples. Repeated times are repeated views of a plate, not extra independent plates. No mixture recipe, absorbed dose or ppm-to-mM conversion is supplied.

C1: Reference roles

C1 reference key: C0-A and C0-B are the two no-lead-label comparison records. S-REF is a third reference record with all N labels. Keep these three roles separate. S-REF is excluded from concentration means. The no-lead records are not zero-response promises. A reference match alone cannot prove valid design, causation, death or safety.

D1: Complete illustrative records

D1 is an invented record, not an experiment you will perform. Work on paper or in a document. Do not handle organisms or chemicals. The 24-hour labels describe a fictional timeline; you do not wait 24 hours.

Use the existing table as your data table. Do not recopy it. Each row lists plate, concentration label in ppm, time in hours, original count, found count, N count, R count and missing count. N and R are supplied labels. Read them; do not carry out a response test. Missing = original minus found. R = found minus N. Check both equations without changing the source values.

D1 condition 0 ppm label. Columns: plate | time h | original | found | N | R | missing. C0-A | 0 | 20 | 20 | 0 | 20 | 0; C0-A | 6 | 20 | 20 | 1 | 19 | 0; C0-A | 24 | 20 | 20 | 1 | 19 | 0; C0-B | 0 | 20 | 20 | 1 | 19 | 0; C0-B | 6 | 20 | 20 | 2 | 18 | 0; C0-B | 24 | 20 | 20 | 3 | 17 | 0.

D1 condition 1 ppm label. Columns: plate | time h | original | found | N | R | missing. C1-A | 0 | 20 | 20 | 1 | 19 | 0; C1-A | 6 | 20 | 20 | 2 | 18 | 0; C1-A | 24 | 20 | 20 | 3 | 17 | 0; C1-B | 0 | 20 | 20 | 0 | 20 | 0; C1-B | 6 | 20 | 20 | 3 | 17 | 0; C1-B | 24 | 20 | 20 | 5 | 15 | 0.

D1 condition 10 ppm label. Columns: plate | time h | original | found | N | R | missing. C10-A | 0 | 20 | 20 | 0 | 20 | 0; C10-A | 6 | 20 | 20 | 4 | 16 | 0; C10-A | 24 | 20 | 20 | 8 | 12 | 0; C10-B | 0 | 20 | 20 | 1 | 19 | 0; C10-B | 6 | 20 | 20 | 5 | 15 | 0; C10-B | 24 | 20 | 20 | 10 | 10 | 0.

D1 condition 100 ppm label. Columns: plate | time h | original | found | N | R | missing. C100-A | 0 | 20 | 20 | 1 | 19 | 0; C100-A | 6 | 20 | 20 | 5 | 15 | 0; C100-A | 24 | 20 | 20 | 7 | 13 | 0; C100-B | 0 | 20 | 20 | 1 | 19 | 0; C100-B | 6 | 20 | 18 | 6 | 12 | 2; C100-B | 24 | 20 | 20 | 9 | 11 | 0.

D1 condition 500 ppm label. Columns: plate | time h | original | found | N | R | missing. C500-A | 0 | 20 | 20 | 0 | 20 | 0; C500-A | 6 | 20 | 20 | 8 | 12 | 0; C500-A | 24 | 20 | 20 | 13 | 7 | 0; C500-B | 0 | 20 | 20 | 1 | 19 | 0; C500-B | 6 | 20 | 20 | 9 | 11 | 0; C500-B | 24 | 20 | 20 | 15 | 5 | 0.

D1 scoring reference S-REF. Its concentration is not applicable. At each time 0, 6 and 24 hours: original 20, found 20, N 20, R 0, missing 0. This is an invented all-N label key. It is not a heat-killed preparation, instruction or evidence that an actual scoring method works.

E1: Events and scoring comparison

E1 event log: at 6 h, C100-B has 18 found and two missing. At 24 h, C100-B lists 20 found, without individual tracking. Keep both entries. Never replace the earlier missing count with a later value. At 24 h, C0-A has six still labels under a look-only rule, but one N under the supplied scoring rule. Different rules yield different counts. This is a record comparison, not a request to touch an animal. Nonresponse does not establish death; response does not establish overall health.

M1: A distinct library-record example

M1 is an optional invented library-record example. A cart starts with 12 coded books. At 0 h, 12 are found: 2 flagged and 10 clear. At 2 h, 11 are found: 3 flagged, 8 clear and 1 missing. Check: 12 minus 11 = 1 missing; 11 minus 3 = 8 clear. Report 3 flagged among 11 found, with 12 originally listed. Do not count the missing book as flagged. Event note: at 2 h, one book is absent from the scan record. The record cannot say where it went. This model teaches record handling, not worm biology. Your task uses D1, not these library numbers.

Try the decision

An illustrative record has an unexpected value. Decide how to use it.

- Retain the unexpected value in the illustrative record and explain its evidence limit.
- Change the unexpected value in the illustrative record to match the expected pattern.
- Call the illustrative record a real experiment and present its values as actual observations.

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	Read H1 and add two short opening notes.
10–20 minutes	Label references and four same-record features.
20–50 minutes	Check all 33 supplied rows without recopying.
50–62 minutes	Add the 24 h counts and units to the same table.
62–72 minutes	Add timestamped events and consequences.
72–80 minutes	Review, save and submit the table; ask for help if upload fails.

Your response record

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

Start the record

Using H1, answer the two opening questions in two short notes beside your table.

One note explains the comparison reference; the other explains why an unexpected observation must stay visible.

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

Prepare the table

Use K1 and C1 to label the three reference roles and four controlled features. Keep D1 as the supplied table.

Use one note per reference and four short feature labels. Do not create a second table.

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

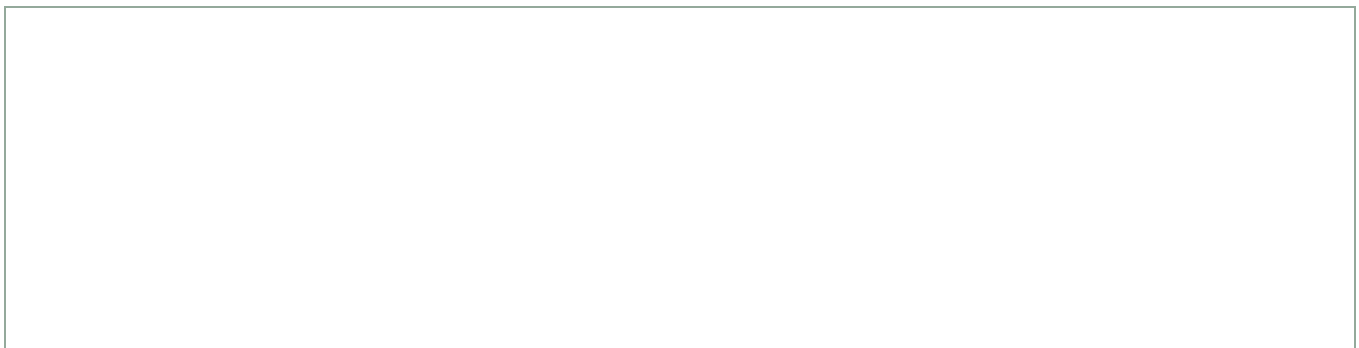


Audit every row

Read D1. Check original minus found equals missing and found minus N equals R in all 33 rows. Mark checked rows in the same table.

Use the formula guide and M1. Circle any row where found is less than original. Do not change a count to fit a pattern.

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



Complete the summary

At 50-62 minutes, add five endpoint rows: concentration label, both plate IDs, both 24 h N counts, original count and found count.

Take each found count from its own 24 h D1 row. Exclude S-REF from these five rows. This summary is part of the same data table.

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

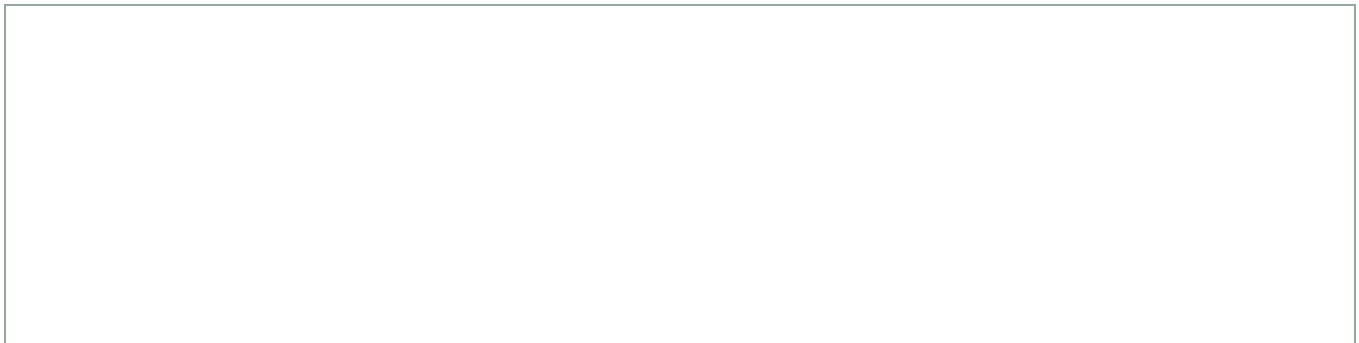


Record unexpected events

At 62-72 minutes, add the three E1 event notes with time, plate and one consequence. Compare the two C0-A scoring counts.

Record each event at its own time. Later found counts do not rewrite earlier records. Name the rule behind each C0-A count before comparing them.

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



Check and submit one table

Check every condition, both plate records, times, units, reference roles and event notes. Save and upload this one table to your Schoology course.

Use the named assignment and current due date. If access fails, save the file and ask the teacher. Keep this check with the same work; no separate report is required.

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

- One table preserves all conditions, reference records, times and count units.
- Missing counts remain separate from response labels.
- Three timestamped events and their consequences are recorded.
- Only the supplied paper-data work is represented as completed.

Keep the limit: These invented counts support record checking and a bounded comparison. They cannot establish a real chemical effect, absorbed dose, death, a human health conclusion or a safe exposure threshold.

Turn in your work

Save your work in your Schoology course under the named assignment. Check the due date and directions there. If you cannot find or open it, save your file and ask the teacher where to upload it. After uploading, reopen the file to check that it is readable. Section 1292 uses assignment 8544588695; section 6792 uses <https://app.schoology.com/assignment/8544588723>.

Save the same file locally. Ask the teacher for the correct Schoology assignment or course upload location.

[Section 1292: Wk13 Data table: Run the investigation](#)

[Section 6792: Wk13 Data table: Run the investigation](#)

Carry forward

Keep the original counts, scoring rule and unexpected events together so another reader can check the record.

Next class: use these same records to graph a pattern and write a bounded CER. Which pattern can the supplied records show without establishing its cause?

Sources and resources

[Open today's page](#)

NIST-SCALE · Measures of Scale

NIST/SEMATECH e-Handbook of Statistical Methods

<https://www.itl.nist.gov/div898/handbook/eda/section3/eda356.htm>

MOVEMENT-RESEARCH · Assessing behavioral toxicity with *Caenorhabditis elegans*

Anderson et al., Environmental Toxicology and Chemistry, 2004; primary research abstract

<https://pubmed.ncbi.nlm.nih.gov/15180374/>