

GAC023 Collaborative Investigation and Research Reporting

GAC Science

A team investigation needs more than divided writing

Two teams describe the same pond. One records where and when observations were made; the other combines undated photographs and a website's general statements. Which report lets a reader check its conclusions? This supplement develops the collaborative investigation and Internet-research outcomes alongside the original GAC023 handout. Follow the current centre brief for the required task, methods and assessment criteria.

Agree a question, method and team record

A **collaborative investigation** 合作探究 shares a scientific task with clear responsibilities and a common method. Choose a narrow question that permitted observations can address. For example: how does the proportion of ground covered by the selected plant differ between two accessible, teacher-approved areas? This is a comparison of coverage, not automatically a test of growth rate or proof of the cause of a difference.

A **sampling method** 取样方法 specifies how observations are selected. Define the areas and observation period before collecting records. Use the same frame size and counting rule at both areas. Select positions by an agreed method, rather than choosing only attractive examples. Random selection within an accessible area can reduce deliberate selection, but cannot represent places excluded from that area. Keep **repeats** 重复测量 distinct from revisiting the exact same record: ten photographs of one patch are not ten independent patches.

Agree which member records location and time, which estimates coverage and which checks the entries. Rotate or check roles if different observers could systematically use different rules. A common recording sheet needs labels, units, the selection method and any deviations. Keep each original record and identify its observer. Resolve a disagreement by checking the agreed rule and evidence; do not replace an inconvenient result with the group average.

Obtain teacher agreement before fieldwork. Respect access restrictions, weather and local site rules. Use permitted observations without entering unsafe water or collecting unknown organisms or chemicals. A report about a proposed investigation must call it proposed. Research does not replace required fieldwork.

Analyse a supplied case without inventing causes

The following **supplied data** 给定数据 are fictional practice records, not a completed field investigation. Both areas use the same coverage rule and frame size. Each row represents a different selected position.

Position	Area A coverage / %	Area B coverage / %
1	20	40
2	30	50
3	40	60
Mean	30	50

Calculate each mean from its three records. The mean difference is $50 - 30 = 20$ **percentage points** 百分点. Each area's range is twenty percentage points. A difference of twenty percentage points is not the same statement as a twenty-percent relative increase: relative to A's mean, the increase would be $20 \div 30 \times 100\%$, approximately 66.7%.

A suitable **conclusion** 结论 is: in the supplied samples, mean coverage was greater in B, with variation within both areas. Three samples do not establish all seasons or every part of the pond. The table gives no light, soil, water or time-series measurements. It therefore cannot show that pollution caused the difference or that a plant grew faster. Coverage also does not measure species richness. Identify the additional question and measurements needed rather than inventing an explanation.

Describe the local environment through different evidence

A **physical feature** 物理特征 concerns conditions such as layout, slope, shade or water movement. A **chemical feature** 化学特征 concerns substances and quantities, such as a dated concentration measured by a stated method. A **biological feature** 生物特征 concerns organisms, their distribution and relationships. Keep the categories connected without treating one as proof of another.

For a local environment report, use a labelled location description and dated records. State which observations your team made and which came from another source. An organism photograph can support an identification within its limits; it cannot establish drinking-water safety. A chemical result without a date, unit or method may be unsuitable for the comparison. If the assignment uses secondary information only, state that limitation rather than presenting it as your own measurement.

Research online and make the report traceable

A **secondary source** 二手资料 reports information collected or interpreted by someone else. Check the producer, date, purpose, method and relevance to your question. Prefer the original measurement record or research report when available. A search-result preview does not replace reading the source. Two websites repeating one report are not two independent observations.

Keep a source log as you research: author or organisation, title, date, address, the exact claim used and its limits. Use the reference style required by your brief. A **citation** 引|用标注 links a claim to its source; the reference list gives the details needed to locate it. Explain the idea in your own words while citing it. Cite borrowed images and respect their permitted use. Do not make a missing date, method or author up.

Organise the report around question and background, method and team responsibilities, results, discussion and conclusion, and references. Distinguish observation from explanation, and your records from published background. Show checked calculations, units and labelled tables. Discuss a specific limitation and a matching improvement. A reflection should identify each person’s actual contribution and a concrete coordination issue; equal-length paragraphs do not demonstrate equal participation.

Practice and explained answers

1. Why are ten photographs of one patch not ten independent patches?
2. Calculate the mean difference for the supplied coverage data, with its unit.
3. Can these data prove pollution caused the coverage difference? Explain.
4. What must accompany a borrowed chemical measurement?
5. Two sites repeat one report. How many independent records does this establish?
6. What should a team do when its members disagree about one coverage entry?

Answers.

1. The sampled location has not changed; extra photographs do not broaden sampling.
2. $50 - 30 = 20$ percentage points, not twenty percent relative to A.
3. No. Pollution was not measured, and alternative explanations remain.
4. Its source, date, unit, method and relevant limitations.
5. One underlying report; repetition alone adds no independent observation.
6. Check the shared rule and evidence; retain the original record and correction trail.