Supporting students in the Sciences IA3: Research investigation

Effective processes and practices: Selecting sources

Purpose

Effective implementation of a research investigation involves five processes organised around a research question, as shown below. This resource supports students in locating and evaluating credible sources.

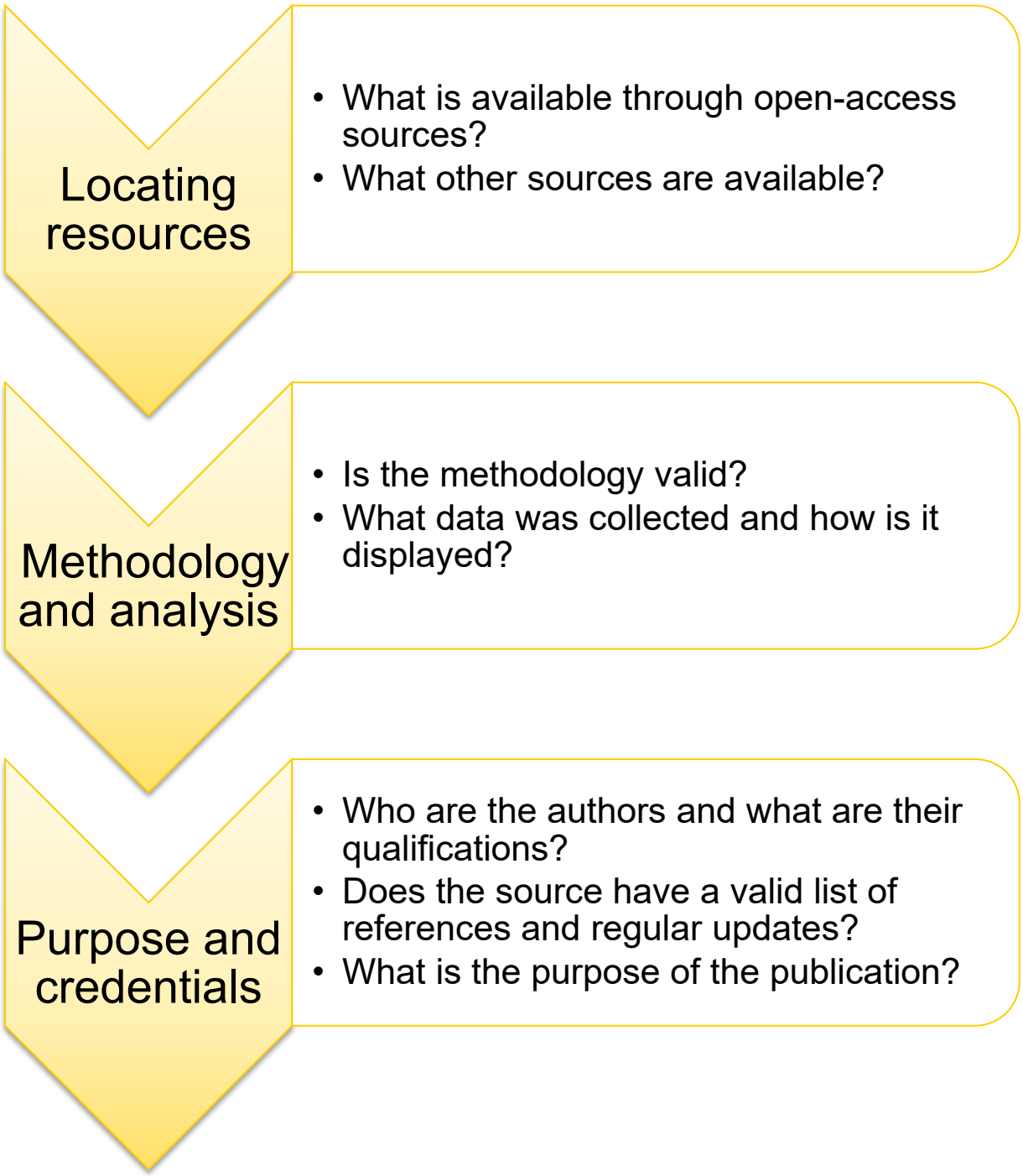
What makes a source credible?

The research investigation requires students to evaluate a claim by gathering secondary evidence from scientifically credible sources, such as scientific journals, books by well-credentialed scientists, government and university websites, independent research bodies or science and technology manufacturers.

A source is scientifically credible when the:

- purpose of the research is stated
- authors credentials are recognised
- methodology is reliable and data analysis is valid
- results are peer-reviewed, referenced and published.

Key questions when selecting sources



Considerations when selecting sources

Locating sources — Where do I look for sources?

- What is available through open-access sources?
  - Search for open-access articles and data.
    - Use Google Scholar to obtain peer-reviewed scientific journals, open-access articles and credible sources.
    - Google images often provide data for free.
    - Many educational websites provide credible scientific sources for free.
  - Search for well-referenced sources, e.g. peer-reviewed scientific journals, government websites, industry bodies.
    - Look for website suffixes such as .edu, .gov or .org.
    - Government and industry body websites often provide articles and data to the public for free, e.g. GBRMPA e-library, CERN, NASA, Cotton Australia and Meat and Livestock Australia.
  - Use textbooks linked to the syllabus subject matter.
- What other sources are available?
  - Find out whether your school library subscribes to any databases of scientific journals.
  - Join the Queensland State Library or the National Library to find articles written by credible authors.
    - Membership is free.
    - This can be a more efficient use of time than just using Google search.
  - Ask your teacher if your school has a partnership with any university libraries to access additional resources.
  - Register with academic networks, e.g. ResearchGate.
    - Most articles are free.
    - If an article is not free, you or your teacher may be able to ask the author to provide a copy.

Author and purpose

Do I know the authors' credentials and the purpose of the research?

- Who are the authors and what are their qualifications?
  - Identify and critique the authors' credentials.
    - Look for an 'About us' page.
    - Conduct a search for the authors to identify what organisations they are associated with.
- Does the source have a valid list of references and regular updates?
  - Identify if the source cites or links to other sources that appear relevant and trustworthy.
  - Prioritise articles that are peer reviewed and supported by valid references.
  - Identify the year that the source was published or last updated. Consider how that might affect the validity and reliability of its information.
- What is the purpose of the information?
  - Try to identify the intended audience for the article. Prioritise sources that have been written for the scientific community.
  - Be careful when ascertaining purpose — it can be very unclear (often by design!).
    - For example, a journal article discussing the efficacy of a particular medication may seem credible, but if the publisher is the manufacturer of the medication, you cannot be sure that it is free from bias.
    - As a rule of thumb, if a source is trying to convince you to purchase something, it may not be credible.

Methodology and analysis

Is the methodology valid and the data reliable?

- Is the methodology valid?
  - Look for investigations that clearly test the effect of one variable on another.
  - Consider whether the investigation follows the principles you have used to develop your student experiments, e.g. controlling variables, repeating trials, etc.
  - If there is no mention of the methodology, then it is unlikely to be a scientifically credible source.
- What data was collected and how is it displayed?
  - Prioritise sources that clearly document the data that was collected.
  - Look for datasets that are easy to reproduce.