Study Evaluation Guide

Category	Low Score (1-2)	Medium Score (3-5)	High Score (6-7)
1. Access	**Impossible:** Behind a paywall (£30+), no link provided, or 'Contact author' with no reply.	**Difficult:** Requires University login, searching through specific databases, or requesting via forums.	**Open:** One-click access to the full PDF. Free for everyone (Open Access).
2. Headline	**Clickbait:** Uses words like 'Miracle,' 'Proven,' 'Cure.' Scarier or better than the actual data.	**Modest:** Describes the finding but might leave out limitations to sound more interesting.	**Accurate:** Boring but true. Describes exactly what happened (e.g., 'Correlation observed in mice').
3. Does it Make Sense? (Theory)	**Nonsense:** Ignores all previous science. Invents new laws of physics/biology without proof.	**Standard:** Repeats what we already know without adding much new value.	**Robust:** Fills a clear gap in knowledge. Uses past research responsibly to build a new argument.
4. Quality of the Test (Methods & Data)	**Flawed & Closed:** Tiny sample size. No control group. Data is secret/hidden.	**Acceptable:** Decent sample size. Standard methods. Data available upon request.	**Rigorous & Open:** Preregistration, large sample size, gold-standard controls, fully available materials and data.
5. Verdict (Conclusion)	**Overblown:** Claims a fact based on a guess. Confuses correlation with causation.	**Logical:** Conclusion mostly fits the results but ignores some alternative explanations.	**Nuanced:** Very careful. Admits what they don't know. Claims only what the data proves.
6. Source Reputation	**Suspicious:** Marketing blogs, 'Predatory' journals (pay-to-publish), or corporate white papers.	**Unverified / Variable:** Preprints (not yet reviewed), or mid-tier journals that sometimes favour hype.	**Trusted:** Top-tier peer-reviewed journals, reputable independent research institutes, or government bodies.

The Science Detective's Glossary

Abstract: The short summary paragraph at the very start of a scientific paper. It tells you what they did and what they found. *Warning: Sometimes the abstract promises more than the paper actually proves*.

Conflict of Interest: When researchers (or their funders) stand to gain—financially or professionally—if the results turn out a certain way. Examples:

- The pressure researchers feel to find 'positive' or 'exciting' results, because publishing in top journals leads to career advancement and future grants.
- A study on the benefits of a specific product that is funded by the business selling that product.

Control Group: The group in an experiment that does *not* get the treatment. They are used for comparison. If the 'medicine group' gets better, but the 'control group' gets better too, the medicine probably didn't work.

Correlation vs. Causation: Just because two things happen at the same time, it doesn't mean one caused the other. Example:

- Ice cream sales and shark attacks both go up in summer. Ice cream does not cause shark attacks (correlation). Summer heat causes both (causation).

DOI (Digital Object Identifier): A unique string of numbers and letters that acts as a permanent ID card for a scientific paper. If you have the DOI, you can always find the paper, even if the website moves.

Open Access: A publishing model where the scientific paper is free for anyone to read immediately. No credit card required.

Open Data: When scientists upload their raw spreadsheets, code and notes to a public website so others can check their maths. This is a sign of high trustworthiness.

OSF (Open Science Framework): A popular online platform where scientists upload their Open Data and pre-register their experiments. If a paper links to an OSF page, that's a good sign!

Paywall: A system that prevents you from reading a paper unless you pay a fee or have a subscription (usually via a university).

Peer Review: The ‘marking’ system of science. Before a paper is published in a journal, it is sent to 2 or 3 other experts (peers) who check it for mistakes.

Predatory Journal: A fake or low-quality scientific magazine that exists only to make money. They will publish anything (even nonsense) if the author pays a fee, without doing any Peer Review.

Preprint: A version of a scientific paper that has been shared publicly (often on a server like arXiv or bioRxiv) *before* it has been peer-reviewed. It allows science to move fast, but it hasn't been checked for errors yet.

Preregistration: When a scientist publicly posts their exact plan (hypothesis and methods) *before* starting the experiment. This acts like a time-stamped proof that they didn't change the rules or their prediction halfway through just to make the results look ‘successful.’

Replication: When a different group of scientists tries to do the exact same experiment to see if they get the same result. If they do, the finding is ‘replicable’ (and likely true).

Sample Size (*N*): The number of people, animals, or things tested in a study. Generally, a higher number ($N = 1000$) is better than a low number ($N = 10$).

Sci-Hub: A controversial ‘pirate’ website that bypasses paywalls to provide free access to millions of research papers. While legally challenged by publishers, it is widely used by researchers worldwide to access knowledge.