

# PAPER TRAIL

## Student Instructions

### FOR STUDENTS

Grade level: 9–12

5 exhibits per claim

One exhibit is real

Every claim in this packet started somewhere. Your job is to find out where, and to see what changed along the way. You'll get five exhibits: pieces of evidence that form a chain from a viral claim back to its origin. Four of the five exhibits were written for this exercise. One is real: an actual source that exists and that you can look up for yourself.

## HOW IT WORKS

1. Read the Claim — the short statement at the top of your worksheet. This comes from Exhibit A.
2. Work backward one hop at a time. At each hop, find the next exhibit in the chain and write down what it is and where it came from.
3. Mark the source type for each hop using the checkboxes. Is it a social post? A press release? Something else?
4. When you reach Exhibit E, look it up for real. Search the title, or search the DOI or PMID directly — if it exists, you should be able to find it in a couple of minutes.
5. Read enough of the real source (the abstract or summary is usually enough) to see what it actually says.
6. Fill in Field Notes: compare what the real source says to how earlier exhibits described it. What got left out, exaggerated, or twisted?

## TIPS FOR SPOTTING A FAKE

- Some tells are visible right on the page: a web address that doesn't match the organization it claims to represent, a vague phrase like “researchers affiliated with,” numbers that shift between exhibits.
- Other tells only show up once you check: does the DOI actually resolve? Does the journal exist? Does the source say what it's credited with saying?

## CHECKING A CITATION

- A DOI is a permanent ID for a published work. Look one up at doi.org, or just search it directly.
- A PMID is an ID number used by PubMed, a database of medical and life-science research. Search it directly at pubmed.gov.
- If a citation is real, both of these will lead you to an actual publication with a real title, real authors, and a real abstract. See the Glossary on the following pages for these and other terms.

# PAPER TRAIL

## Glossary

### GLOSSARY 1 OF 2

27 terms

You won't need every term for every claim — use this as a reference when a word in an exhibit isn't familiar.

#### **Adaptogen**

A substance, often plant-based, claimed to help the body handle stress. The term is used far more in marketing than in mainstream clinical medicine.

#### **Affiliated**

Connected to an organization in some way. That connection can range from being a paid employee to something as loose as once giving a guest lecture — the word alone doesn't tell you how strong the connection is.

#### **Biomarker**

A measurable signal in the body, like a blood level, used as a stand-in for something harder to measure directly, such as aging or disease risk.

#### **Biosignature**

A substance or pattern that could indicate the presence of life, such as certain gases in a planet's atmosphere. Finding a possible biosignature is not the same as finding life.

#### **Citation**

A reference that points to where a piece of information came from, usually including the author, title, and publication details.

#### **Cohort study**

A study that follows a specific group of people over time to see what happens to them, often used to spot patterns without directly controlling what people do.

#### **Control group**

In an experiment, the group that does NOT receive the treatment being tested, used as a baseline for comparison. Without one, it's hard to know if a result was actually caused by the treatment.

#### **DOI (Digital Object Identifier)**

A permanent ID number assigned to a published work, used to look it up reliably even if its web address changes.

#### **Double-blind**

A study design where neither the participants nor the researchers know who is getting the real treatment versus a placebo, to prevent expectations from biasing the results.

#### **Executive function**

A set of mental skills — like planning, focus, and self-control — that let people manage their thoughts and actions. It's related to, but not the same thing as, IQ.

#### **Independent replication**

When researchers who were not involved in the original study repeat it and get similar results. It's one of the main ways science checks its own work.

#### **Journal**

A regularly published collection of research articles, usually reviewed by other experts before publication.

#### **Legislative scorecard**

A rating some advocacy groups give lawmakers based on a small number of selected votes, used to label them as “for” or “against” an issue. A single scorecard grade can hide a much more complicated voting record.

# PAPER TRAIL

Glossary

GLOSSARY 2 OF 2

27 terms

**Margin of error**

A number describing how much a poll's result might differ from the true value due to random sampling alone. Real-world polling error is often larger than the stated margin of error accounts for.

**Meta-analysis**

A study that combines the results of many earlier studies to look for an overall pattern. Its conclusions are only as strong as the studies it includes.

**Narrative review**

An article that summarizes and discusses existing research on a topic, written by someone who wasn't necessarily involved in the original studies.

**Peer-reviewed**

Research that has been checked by other experts in the field before being published, as a quality check.

**Pilot study**

A small, early-stage study, often used to test whether a bigger study is worth doing. Pilot studies are usually too small to support a big claim on their own.

**PMID (PubMed ID)**

An ID number assigned to articles indexed in PubMed, a database of medical and life-science research.

**Press release**

A statement written and released by an organization, often to promote something, rather than an independent report about it.

**Randomized controlled trial (RCT)**

A study where participants are randomly assigned to a treatment group or a comparison group — considered one of the most reliable ways to test whether something actually works.

**Remission**

A period when a disease's signs and symptoms are reduced or absent. It is not the same as being permanently cured — the condition can return.

**Sample size (n)**

The number of people, or things, included in a study. A very small sample size makes it harder to trust that a result wasn't just chance.

**Statistical significance**

A way of describing whether a result is unlikely to have happened by chance. A statistically significant result isn't automatically a big or important one.

**Superconductor**

A material that can carry electricity with zero resistance, but normally only at extremely cold temperatures. A material that worked at room temperature would be a major scientific breakthrough — which is why claims about one get so much attention.

**Systematic review**

A study that follows a strict, documented process to find and evaluate all the relevant research on a question, often a step used before a meta-analysis.

**Telomere / Telomerase**

A telomere is a protective cap at the end of a chromosome; telomerase is the enzyme that helps maintain it. Both come up often in aging research.