Can You Believe It?

7 Questions to Ask about Any Scientific Claim

We're all constantly confronted with scientific facts and factoids. Claims about household products, technology, medicine, and even politics often come steeped in the presumed authority of scientific research. How can we non-experts decide what to believe? These 7 questions will help you separate science fact from science fiction.

1 What's the claim?

Start by figuring out exactly what the claim is, as well as what it isn't. Keep in mind that *correlation* isn't *causation*. Correlation is when two things change together—but the change could be due to chance, or to an unknown factor. Causation is a clear cause-and-effect relationship.

2 Who says?

Be sure you know where the information came from. Any decent claim requires that someone stand behind it—preferably a well-respected source from a well-respected institution. Beware of "science by press release" and research funded by sources with vested interests.

3 What's the evidence?

How much data was collected? The more information there is, the better. Numbers don't (usually) lie, so always consider the actual evidence when assessing a claim. And be sure to scrutinize charts and graphs. Visual data can mislead, but it can also tell hidden stories.

4 How did they get the evidence?

Where evidence is concerned, the devil is in the details. No matter the field, data collected different ways can support different conclusions, and errors may hide where they're least likely to be found. A *systematic error* is a flaw in a device or method that skews all the data. An *uncontrolled variable* is a factor that influences results, but hasn't been taken into account.

5 Is there anything (or anyone) to back up this claim?

If there's one thing scientists agree on it's the need for reproducibility. For one person's research to be believable, others must be able to produce the same result. Has anyone confirmed the research? The newer and stranger the result, the greater the burden of proof.

6 Could there be another explanation?

Sometimes, it's not the research methods or the data that's flawed, but the interpretation of the data. It's human nature to see what we're looking for—whether it's there or not—and to not see what we're not looking for.

7 Who cares?

Science happens in a social context, and that context determines whether research happens at all, whether and how the results are made public, and most importantly, the "spin" those results get in the media. Never take headlines or sound bites at face value. There's almost always more to the story.

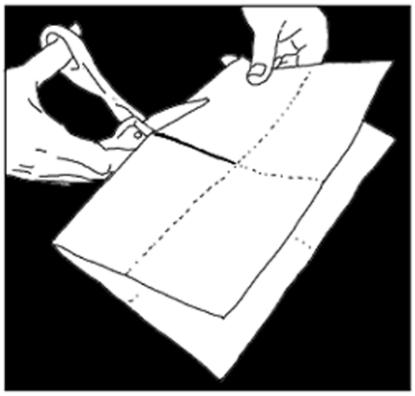
evidence

Can You Believe It?

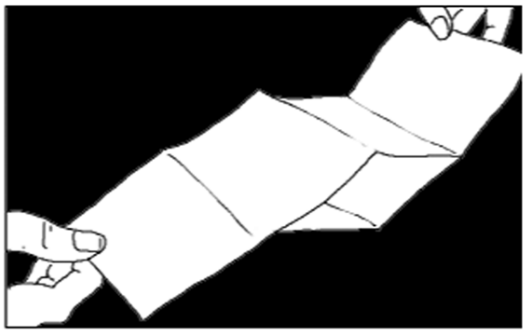
http:// www.exploratorium.edu/evidence/

Make your own mini-booklet:

1. *Cut off the unprinted outside edges of the page and then fold it along the dotted lines.*

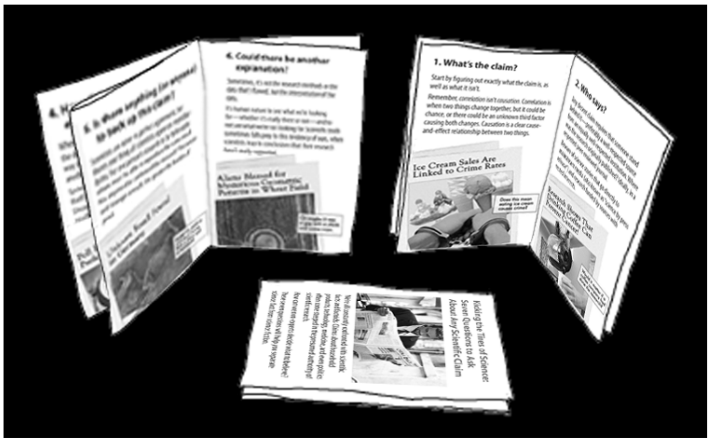


2. *Unfold the page, fold it in half widthwise (as shown), and then cut along the solid line ONLY.*



3. *Unfold the page again and fold it in half lengthwise (as shown).*

4. *Pop out the diamond-shaped center and arrange the pages so the cover is in front.*



5. *Press along the seams to flatten your booklet.*