

Be a Science Fact-Checker

Learn how to evaluate science-based claims in the media.



IF YOU HAVE EVER SCANNED NEWS STORIES on social media, you've likely scrolled through headlines that make surprising, or false science claims. Some, such as those that say Earth is flat, can be relatively easy to spot. But articles that are misleading—as opposed to outright fake—may be harder to recognize.

For instance, social media is packed with articles about how different behaviors or products affect your health. These scientific claims should be supported by evidence collected through rigorous scientific research. Unfortunately, many health claims found in internet articles are not backed up by solid evidence.

In 2008, the *New York Daily News* published an online article titled “Sugar as Addictive as Cocaine, Heroin.” It discussed a study that investigated the effects of sugar on rats. The scientists found evidence that rats on a high-sugar diet developed a physical dependence on it. In addition, they saw that the diet caused changes in brain areas related to addiction. But the study didn't compare these changes with the effects of cocaine or heroin. It also didn't show that these brain changes happen in humans, which a reader might think based on the headline. Ultimately, the headline claim was not supported by evidence collected in the study.

Most science articles from reputable sources are accurate. But it's important to think critically about what you read and where you get your information. Asking some simple questions can often help you determine if the latest health story is based on solid science—or if it shouldn't be believed.

Five Questions to Ask as You Evaluate a Science or Health Article



1) Where is the story published?

Some websites publish articles that are not checked for accuracy. Information published by reliable organizations, such as legitimate news agencies or government sites, like the National Institutes of Health, goes through rigorous fact-checking procedures. If you aren't sure about the reliability of a site, ask a librarian or teacher for advice.

2) Does the headline make a very surprising claim?

Headlines are sometimes exaggerated to catch readers' attention. Read the story carefully to see if the author presents scientific evidence to back up the headline. If the article suggests something very

different from other studies, or doesn't provide supporting evidence on the topic, you should be more skeptical.

3) What is the original source?

When scientists conduct research, a detailed description of their study methods and results is usually first published in peer-reviewed scientific journals. Before an article can be published, researchers from the same field analyze the method the scientists used to make sure the scientific process was carried out carefully. If the research was not peer-reviewed, it may not be reliable.

4) Who conducted the research?

Sometimes the people who conduct scientific studies may have a bias. For example, a company that makes a health

product may carry out a study about how it affects humans. The fact that the company wants to sell the product may affect how data in the study are interpreted. Find out if the research was paid for by a company that would benefit from a particular outcome. If so, it may be unreliable.

5) Who, or what, did the scientists study?

Scientists often do research on animals to learn about health topics. Animal studies are critical in developing treatments for human disease. But finding something in mice doesn't always mean it is true in humans. Sample size is also important. The results of a medical study are more reliable if a large number of people are included in the study.

ID the Site

The ending of a URL provides clues on how to evaluate the content on a website.

.com = *commercial*. Often for-profit companies

.edu = *educational institution*. Often universities

.gov = *government*. Usually federal, state, and local agencies

.net = *network*. Could be any site

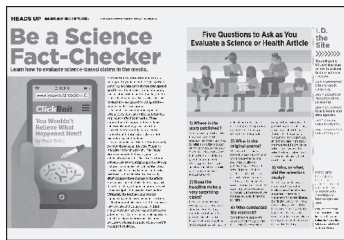
.org = *organization*. Could be any site

MORE INFO:

For additional facts about science and your health, visit scholastic.com/headsup and teens.drugabuse.gov.

From Scholastic and the scientists of the National Institute on Drug Abuse, National Institutes of Health, U.S. Department of Health and Human Services

TEACHER'S GUIDE



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Subjects

- Science Literacy
- English Language Arts
- Health/Life Skills

Common Core State Standards

- RST.6-8.1 / RST.9-10.1
- Cite specific textual evidence to support analysis of science and technical texts
- W.6-8.1 / W.9-10.1
- Write arguments to support claims, using valid reasoning and relevant and sufficient evidence

Next Generation Science Standards

- MS-LS1.D / HS-LS1.D
- Information Processing

National Science Education Standards

- Personal Health
- Science and technology in society/Science and technology in local, national, and global challenges

National Council for the Social Studies

- 8. Science, Technology, and Society

TOOLS & RESOURCES

Vocabulary Tools

Visit scholastic.com/headsup/sciencefactchecker for a vocabulary list to support this article.

Additional Teaching Resources

headsip.scholastic.com/teachers and teens.drugabuse.gov

Be a Science Fact-Checker

Science literacy is an important skill for everyone. That’s especially true for teens who are inundated with stories on social media about important topics such as their health. Many of the articles found on Facebook or Twitter make claims that are not backed up by scientific evidence. By sharing the student article “Be a Science Fact-Checker” and teaching the lesson plan below, you will help students build skills that let them separate good science from misinformation. In the paired worksheet (see reverse side), students will put these tools to use by critically analyzing a story in which scientific facts were misrepresented, with some serious health consequences.



Critical Thinking

1) Today, there are many different types of sites that publish what appear to be news stories about science and health. Explain why it is important to research these sites before reading the articles. What questions might you ask about the sites? (*Answers may include that sites may have a bias, such as to sell health products, or may publish articles that make claims that are not backed by scientific evidence. You might ask who created the site and what their affiliation is, what the original source is for the stories they publish, etc.*)

2) Misleading news articles often spread over the internet faster than factual articles from mainstream sources. Why do you think this is true? (*Answers may include that misleading articles often have exaggerated headlines or make surprising claims. These articles catch readers’ attention and may cause them to be shared more often.*)

3) “Fake news” is a term that has been used recently to describe many different types of news. According to most media experts, “fake news” is something that intentionally contains false or inaccurate information. What are some reasons a science article might be labeled “fake news”? Cite evidence from the text to support your answer. (*Answers may vary but may include an article that describes research from a known biased source without revealing the bias, or an article that makes claims that aren’t supported by the study, etc.*)

Writing Prompts

- **Grades 6–8:** Explain why it is important to read an article completely before you make a judgment about what it says.
- **Grades 9–10:** Explain why it is important for journalists to find out more about the scientists who have conducted research before they write an article about the results of a study.

- **Grades 11–12:** Experts warn social media users: “Think before you share.” Use information from the article to explain why this is important. What steps should readers take before they click “Share”?

Paired Reading

- **“Say What? ‘Scientific Method’”**
<https://teens.drugabuse.gov/blog/post/say-what-scientific-method>
- **Writing Prompt:** What is replication? How does it help prevent misleading or inaccurate science stories from being published? Use text evidence from “Say What? ‘Scientific Method’” and “Be a Science Fact-Checker” to support your answers.

Student Worksheet

The worksheet on the reverse side includes a news story about a study on drugs and addiction. Students will read and analyze the story using the critical-reading tips they learned in the student article. They then will answer questions to explain ways in which the story may be misleading, and they’ll cite evidence to support their arguments.

Answers: 1. Answers will vary but may include the following points as supporting evidence: The headline exaggerates the findings of the study; the research was published as a one-paragraph letter to the editor and was not a peer-reviewed article.

2. Answers will vary but may include the following points: a) The study did not include sufficient evidence to support the claim that opioids are not addictive. b) The study did not include patients who were given opioid prescriptions to use at home. These patients may be more likely to develop addiction than those using the drugs in the hospital. c) The study assumed that patients with no record of addiction treatment in their medical reports did not develop the disease. Patients could have developed addiction but it was never reported in their records.

CAN YOU SPOT MISLEADING NEWS?

In the article “Be a Science Fact-Checker,” you learned that news articles are sometimes misleading. If inaccurate news spreads, it can have serious consequences.

For example, in 1980, a paragraph written by two researchers appeared in the letter to the editor section of a scientific journal. The scientists presented data about how often

addiction developed in patients who had been given opioid drugs in the hospital. Opioids are powerful pain medications that are highly addictive. But according to the letter, few hospital patients developed addiction.

The letter has frequently been cited in other articles as evidence that opioids are not addictive. But it is now known that this conclusion was

misleading. Drug companies that make opioid medications used the letter to persuade doctors that the drugs had a very low risk of addiction. In the following years, the number of opioid prescriptions increased dramatically. This inaccurate interpretation has contributed to the growing misuse of the drugs and has led to a deadly overdose crisis.

ACTIVITY

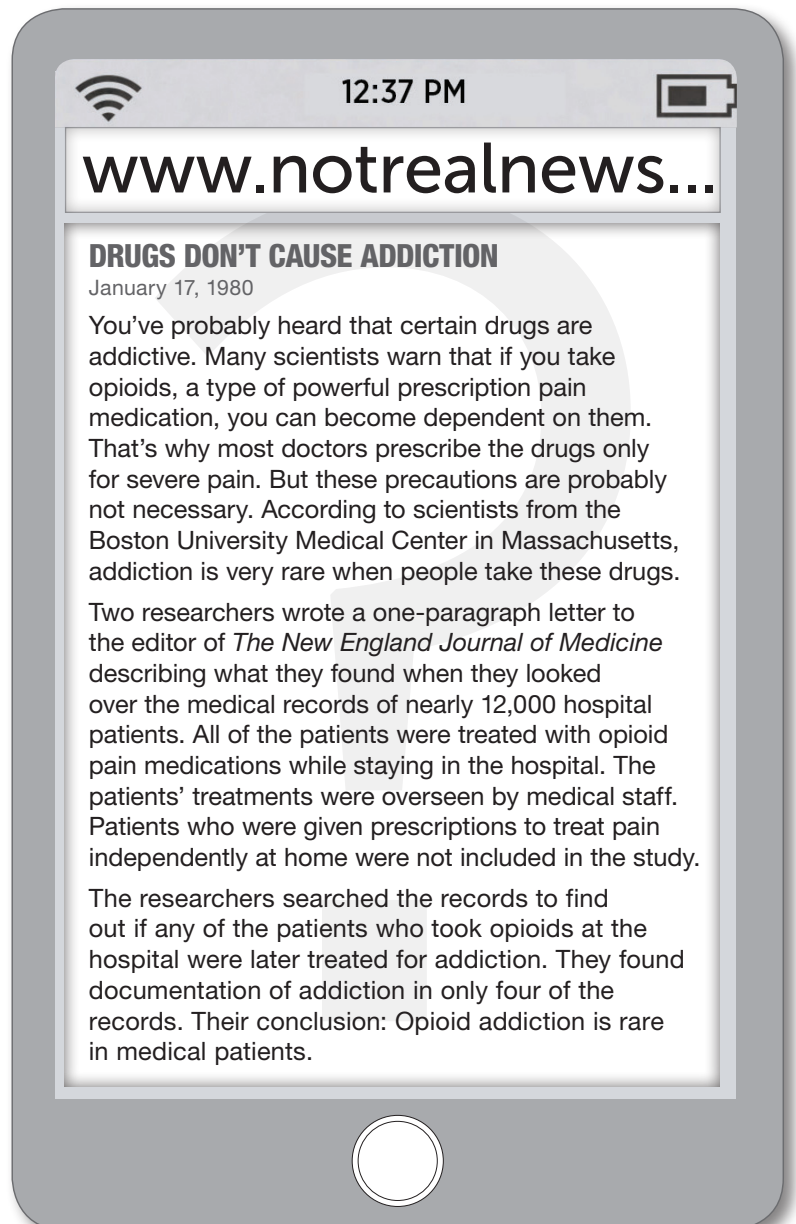
DIRECTIONS: In this activity, you’ll use the tools you learned in “Be a Science Fact-Checker” to critically analyze a misleading news article about the letter described above. Read the article “Drugs Don’t Cause Addiction” (at right) and identify ways in which it is misleading. Then answer the questions below on a separate piece of paper.

QUESTIONS

1. How is this article misleading?

Use the five critical-reading questions from the article “Be a Science Fact-Checker” to analyze the article. What is inaccurate or misleading in this article? Describe at least two factors that support your argument.

2. What evidence is missing? The article contains other clues that the claim that opioids are not addictive is not backed by sufficient evidence. Think critically about how the study was conducted. Did the scientists collect all of the relevant data to support the conclusion? Describe at least one limitation of the study. Cite evidence from the text to support your answer.



VOCABULARY LIST

GRADES 6–12

Dear Teacher,

The vocabulary list on the following pages is drawn from the “Be a Science Fact-Checker” student article and the “Can You Spot Misleading News?” worksheet.

It can be previewed with students prior to reading or reinforced with students afterward. Encourage students to incorporate these words into their discussions and writing about the student article and worksheet.

This list integrates vocabulary words that would be used across several content areas, such as *analyze*, *legitimate*, and *misleading*, as well as domain-specific words, such as *addiction*, *dependence*, and *method*.

Supplement for “Be a Science Fact-Checker”

- Student Article: [scholastic.com/headsup/sciencefactchecker](https://www.scholastic.com/headsup/sciencefactchecker)
- Teacher’s Guide (includes worksheet): [scholastic.com/headsup/teachers/sciencefactchecker](https://www.scholastic.com/headsup/teachers/sciencefactchecker)

Some suggestions for students to help their understanding include:

- organizing concept maps that include word parts, synonyms, antonyms, and examples;
- composing memory aids that explain the words or use them in a meaningful context;
- employing the words to create newspaper articles, stories, or poems.

Sources: Unless otherwise noted, definitions are sourced or adapted from: *Merriam-Webster Collegiate Dictionary* and *Scholastic Children’s Dictionary*.

accurate (*adjective*): free from mistakes or errors

addiction (*noun*): a brain disorder or illness associated with compulsive (uncontrollable) behavior, such as drug use, despite negative consequences

addictive (*adjective*): something, such as a drug, that causes changes to the brain that results in compulsive (uncontrollable) behavior despite negative consequences

analyze (*verb*): to study or examine something closely or carefully in order to understand it

benefit (*noun*): something that produces good or helpful effects

bias (*noun*): an attitude that always favors one way of thinking or feeling

cited (*adjective*): referred to

claim (*verb*): to state something as true; (*noun*): something that is stated as true

cocaine (*noun*): an addictive illegal drug that produces a temporary increase in alertness and feelings of pleasure

compare (*verb*): to examine one or more things in order to find similarities or differences

conclusion (*noun*): a final decision based on reasoning

conduct (*verb*): to direct or take part in the management of

consequence (*noun*): something caused by a set of conditions

contribute (*verb*): to play a part in an end or result

crisis (*noun*): a situation that has reached an unstable point and that has a high chance of having a negative outcome

critical (*adjective*): important or necessary

critically (*adverb*): using careful judgment

data (*noun*): information such as measurements that are used as a basis for making conclusions

dependence (*noun*): the quality of having a need for a drug because of repeated use so that physical withdrawal symptoms are experienced if the drug is removed

develop (*verb*): to grow or cause something to grow larger or more advanced

documentation (*noun*): records or materials used to prove or show something

evaluate (*verb*): to determine the importance, value, or condition of something by carefully analyzing it

evidence (*noun*): something that gives proof or a reason to believe something

exaggerated (*adjective*): overstated beyond the truth

heroin (*noun*): an illegal opioid drug that has no medical use

inaccurate (*adjective*): containing mistakes

interpret (*verb*): to explain or tell the meaning of

investigate (*verb*): to study closely

journal (*noun*): a magazine or periodical that reports on things related to a specific topic

legitimate (*adjective*): being exactly as described, not false

limitation (*noun*): something that controls how much of something is possible or allowed

method (*noun*): a process, way, or technique for doing something

misleading (*adjective*): giving the wrong idea; making you believe something that is not true

misuse (*verb*): to use something in a way that is unintended or harmful, such as misuse of a prescription drug

navigate (*verb*): to make one's way over or through; to steer through

opioid (*noun*): one of a group of drugs that produce relaxation, pleasure, and pain relief. Opioids can be addictive and potentially deadly due to overdoses.

opposed (*adjective*): completely different from

outcome (*noun*): something that comes about as an effect or end

overdose (*noun*): a lethal or toxic amount of a drug; (*verb*): to take a lethal or toxic amount of a drug

oversee (*verb*): to watch over or direct

peer (*noun*): one belonging to the same group based on age or status

persuade (*verb*): to win over to a certain belief or position

physical (*adjective*): of or relating to the body

precaution (*noun*): an action taken to avoid a dangerous situation or to lead to a positive result

present (*verb*): to bring to one's attention

procedure (*noun*): a particular way of doing something

provide (*verb*): to supply or make available

publish (*verb*): to produce or prepare for the public to see

related (*adjective*): having a close connection

relevant (*adjective*): having something to do with the matter at hand

reliable (*adjective*): able to be believed

reputable (*adjective*): respected and trusted by most people

research (*noun*): a careful study, experiment, or collection of information that has the goal of finding and reporting new knowledge

result (*noun*): something determined by an investigation or calculation

review (*verb*): to go over or examine carefully

rigorous (*adjective*): done carefully with a large amount of attention to detail

scan (*verb*): to look over quickly

scroll (*verb*): to move up or down or across a display screen

skeptical (*adjective*): relating to or marked by doubt

source (*noun*): a person, book, or document that is used as a reference

support (*verb*): to provide proof or evidence for

treat (*verb*): to care for or deal with medically

treatment (*noun*): the act or matter of caring for or dealing with medically

ultimately (*adverb*): in the end