

## Differentiating Science from Opinion

### Vicki Osis /Eugene Williamson

#### **Background:**

Climate change is a hotly debated topic. There is much skepticism about climate change and some scientists are proclaiming that climate change is not happening or climates change all the time. Some even maintain the planet is cooling. Others argue that global warming is occurring, but it is only due to natural events.

We explain this skepticism by looking at similar events such as what happened with cigarette smoking. There was a push back when researchers found and were issuing reports that smoking caused health problems. We now know that the tobacco industry paid scientists and doctors to question the research and present opposing information that stated tobacco is harmless, or even healthful for users.

All fields of scientific research have scientists with different theories and differing research results. Their information is debated and discussed at scientific conferences and through the publication of their papers. This is welcome and is one of the strengths of science. However there is a difference between healthy debate and debate simply to sway public opinion to protect lucrative industries. The task for the public is to distinguish between what is legitimate debate and what is not.

- Why is it important to check with different sources when taking information from the media. Is everything true that is put in print or broadcast on television?
- What about newspaper articles? Are their articles based on factual information or is it opinion.

The NY Times and other major newspapers are usually reliable sources and they do carry opinion articles but they are labeled opinion. When reading the news articles, watch the author and determine if it is reporting facts or giving opinion. If there are citations what is their source of the information. Is it from a science research article and has it been published in a scientific journal. Such as Nature, etc. Many articles will cite the journal in which it has been published.

- Why are science journal articles more trustworthy?

It is important that students understand how science information is screened before publication. The process is called “Peer Review”. This is a process used before science research results can be published in science journals. Scientists with similar research interests review and critique the manuscript They check on the procedures used in the research and the methods used in the data analysis. If they find irregularities the document is rejected. This is a form of quality control and generally has served us very well.

Science journals are the standard source of information for scientists to review and gather information that pertains to their research interest. Nature is a good example of a peer reviewed science journal. <http://www.sciencedirect.com/science/journals> This site

has lists of science journals arranged in alphabetical order. Many fields of scientific research are represented.

**Teaching Activity:** Sorting out facts from opinions, lies, or fiction.

Have students read through the following article: **Tobacco Industry Tactics** (see page 4 of this document )discuss with students how lucrative industries have used various methods to confuse the public about their product to maintain profits. After reading the article answer the following questions.

What tactics did they use?

- What advertising used?
- Were scientists hired to report research that stated tobacco was NOT harmful, Did they create controversy whether tobacco really is harmful
- Did they fund politicians who would pass favorable laws for their industry.

What about the controversy over climate change?

The opposing views climate change skeptics are promoting in regard to climate change are lengthy. The same tactics used by the tobacco industry is at work with this issue. Several websites have been set up to deal with the theories and arguments that skeptics are promoting. One of the best is “How to talk to a skeptic”.<http://tinyurl.com/6pyshd>. This website has earned praise from scientists as a good site to sort through the controversy. Scan through the long list of denial statements that are linked to science-based rebuttal.

### **Glacier melt activity 1**

Discuss the issue of Glacier Melt. Use this website: *Glaciers have always grown and receded*. <http://tinyurl.com/4xtt6vn> Also one of the many skeptic arguments is that “The planet is actually cooling NOT warming. Therefore if that statement were true, glaciers would not be melting. Read the science-based answer on the “glaciers have always grown and receded.”

### **Glacier melt activity 2. Explore Glacier National Park**

Direct students go to the home page of Glacier National Park.

(<http://www.nps.gov/glac/index.htm>)

Introductory paragraph from Glacier National Park: **given below on page 4.** ‘

Discussion:

If this is a glacier park, why is there no mention of glaciers? The park was originally created so that the public could view and enjoy the 150 glaciers in the park boundaries. The glaciers have melted since the middle of the 20th century. Examination of the maps and photographs provide clear evidence that the 150 glaciers known to have existed in the park a hundred years earlier have retreated, and in most cases, disappeared altogether. If climate scientists predicted, and we are now finding glaciers are retreating, what kind of conclusions can be drawn? Is the skeptic statement that glaciers have always grown and receded or the planet is cooling, really true?

### **Climate change is just a Hoax 3: Skepticism or Science?**

Review the statement and the response on this website <http://tinyurl.com/5gmh7u>

Discuss with students why there are skeptics and push back against climate change.

- Why would there be so much effort to discredit climate change scientists in spite of the massive amounts of data that has been gathered to show climate change?

Answer: Profitable fossil fuel industries like the tobacco industry will lose profits.

- Why is the public likely to believe skeptic climate change arguments

Answer:

1. It is scary to think that the ecosystems that support us could greatly change and be damaged. Also there is reluctance to think about changing our life styles. The things that make our lives comfortable, cars and electricity are the source of most of the CO<sub>2</sub> emissions. They fear loss those comforts in order to reduce CO<sub>2</sub> even though alternative energy sources are being developed.
2. Many who think climate change is happening think that technology will save us from the worst of it. However right now we are not investing in the technology that will save us from the worst of climate change because skeptics have created so much controversy.

- Who are the groups that will profit from convincing the public that climate change is not occurring and will not be a problem?

Answer. Fossil fuel industries (coal and oil) protect profits by saving the sales of their products.

- Who will be adversely affected by climate change?

Answer. Farmers whose farm crops will be damaged or destroyed by heat waves, droughts and floods. Severe storms, floods, droughts are already causing huge and expensive problems for residents, through loss of homes, jobs and income. Homes can be damaged by extreme floods, and storms.

Discussion: How much of the information available through TV, internet and newspapers should be examined with a questioning eye? Just because it is in print or broadcast does it really mean that all of it is accurate or true.

Answer. All of it should be scrutinized. Ask yourself is there a viewpoint or opinion being expressed in the article or news piece. If so what aspect of the issue are they promoting?

Good video on how to identify baloney in the media

Baloney Detection Kit

<http://tinyurl.com/nkt7ov>

Junk science vrs real science. 9-12

<http://tinyurl.com/6nabthc>

Climate denial explored

[http://www.youtube.com/watch?v=l0JsdSDa\\_bM](http://www.youtube.com/watch?v=l0JsdSDa_bM)

**Tobacco industry tactics for resisting public policy on health  
Bulletin of the world health organization.**

The tactics used by the tobacco industry to resist government regulation of its products include conducting public relations campaigns, buying scientific and other expertise to create controversy about established facts, funding political parties, hiring lobbyists to influence policy, using front groups and allied industries to oppose tobacco control measures, pre-empting strong legislation by pressing for the adoption of voluntary codes or weaker laws, and corrupting public officials. Formerly secret internal tobacco industry documents provide evidence of a 50-year conspiracy to “resist smoking restrictions, restore smoker confidence and preserve product liability defense”. The documents reveal industry-wide collusion on legal, political and socially important issues to the tobacco industry and clearly demonstrate that the industry is not disposed to act ethically or responsibly. Societal action is therefore required to ensure that the public health takes precedence over corporate profits. Recommendations for reducing the political influence of the tobacco industry include the following. Every tobacco company in every market should publicly disclose what it knew about the addictiveness and harm caused by tobacco, when it obtained this information, and what it did about it. The industry should be required to guarantee internationally recognized basic consumer rights to its customers. Trade associations and other industry groupings established to deceive the public should be disbanded. These recommendations should be incorporated into WHO’s Framework Convention on Tobacco Control.

**Experience Glacier National Park** <http://www.nps.gov/glac/index.htm>

Come and experience Glacier's pristine forests, alpine meadows, rugged mountains, and spectacular lakes. With over 700 miles of trails, Glacier is a hiker's paradise for adventurous visitors seeking wilderness and solitude. Relive the days of old through historic chalets, lodges, transportation, and stories of Native Americans. Explore Glacier National Park and discover what awaits you.

Vicki Osis Professor Emeritus Ore State U.  
Eugene Williamson- Retired teacher 8<sup>th</sup> grade science.