

21st February 2017

To the Honorable Senator Steven P. Thayn, District 8

Vice Chair, Idaho State Legislature Education Committee
P.O. Box 83720
Boise, ID 83720-0081

Dear Senator Thayn,

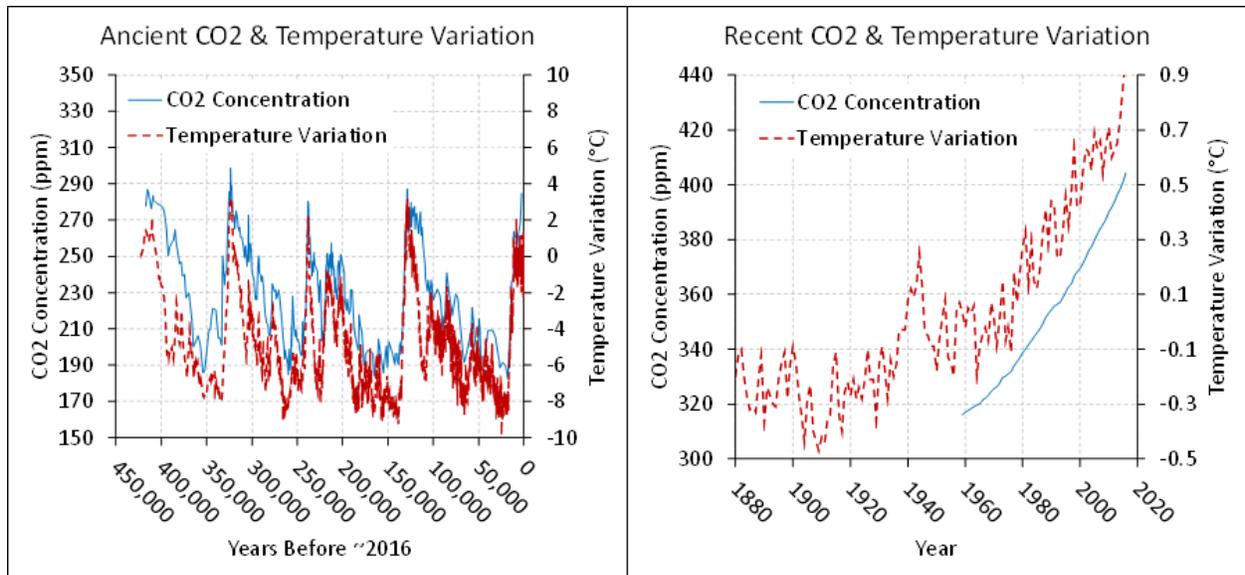
On Thursday, February 9, 2017, the Idaho Legislature House Education Committee voted to remove requirements for teaching the scientific basis of human influences on global climate change from the proposed state education standards. In response to inquiries from the citizens of Idaho, you released a five page statement outlining your opposition to these standards, and questioning the scientific basis on which these standards were developed. We are scientists, engineers, educators, activists, and concerned citizens of the state of Idaho. We are writing to rebut the many fallacious claims in your statement, as well as to offer our expertise and assistance in current and future science education deliberations.

Upon reviewing your statement in detail, it quickly became apparent that a point-by-point rebuttal would likely be too long for a succinct discussion. Therefore, this letter will instead discuss the underlying singular issue with your position - namely your lack of trust in the scientific expertise of those who have studied this issue in exhaustive detail.

As a senator in the Idaho legislature, you have a sworn duty to deliberate and enact legislation which addresses the current and future needs of your state's citizenry. This responsibility presents a significant challenge in that no one person could be expected to be an expert on all of the varied topics which you may encounter as a senator. To resolve this issue, you have the capacity as a senator to consult with various experts on any of the issues you may face.

Scientific experts are capable of providing the context, data, and scientific consensus necessary in making informed decisions on any of the topics you may encounter. In choosing to deny the overwhelming scientific consensus for the human causes of climate change, you and your committee failed in their duties to consult with experts and make informed decisions on complex issues. In short, sir, you substituted your own biased, partisan, political opinions for the scientific reality provided by experts.

From NASA's climate change site (climate.nasa.gov), more than 97% of climate scientists agree that the climate has been warming over the past century, and that the warming can be mostly attributed to human factors (Refs. 1-5). Below, two plots illustrating the correlation between global CO2 concentrations and global temperatures using both ancient historical data from ice core samples (left) and modern measurements (right). In both cases, it is apparent that a significant correlation exists between global CO2 production and temperature variations (Refs. 6-13).



What should concern everyone, and you in particular as a legislator, is the steep and growing slope of the recent data. This data has been peer reviewed and is accepted as the scientific consensus. There is no disputing it. Our task now turns toward what to do about it. If we are to confront this challenge, we will need more scientists and engineers working on unique solutions. This is only possible if those future scientists are first provided a full accounting of the problems we face. By delegitimizing science which is inconvenient, a whole generation is robbed of the potential to understand and solve these complex issues.

We could go on in significantly more detail on any of a number of related topics. However, for the sake of brevity we will conclude with this - those of us in the scientific and engineering communities are working to solve these significant challenges. But we will not solve them alone. Future generations will have to pick up where our work ends. Please, for the sake of our children's future, reconsider the evidence and ask questions of those of us who are experts on this subject. Use your position as it was intended - to support a better, brighter future for the citizens your state and country.

Feel free to contact us with any questions on how we can cope with the changing climate.

Sincerely,

Name/Credentials	Address	Phone/E-mail
John C. Kennedy, M.S., Ph.D., Mechanical & Aerospace Engineer	1556 Windsor Dr. Ammon, ID 83406	jck1686@gmail.com
Rhiannon A. Fox, M.S., Environmental Science	1863 Rainier St., Idaho Falls, ID 83402	rhi.fox@gmail.com , 540.808.3592
S. Carter Fox, Ph.D., Research Scientist, Idaho National Lab	1863 Rainer St., Idaho Falls, ID 83402	xofretrac@gmail.com

Alice Stevenson, retired teacher	1101 E 5250 S, Victor, ID 83455	alicejeanstevenson@gmail.com
Rick Nansen, Wastewater Technician	902 E. 5000 S., Victor, ID	rick@tetonwaterinc.com
Laura Jackson	2942 Eastgate Drive, Boise ID	sljargo@msn.com
Frederick Johnson, retired businessman	1952 Gleneagle Dr., Teton, ID	shearlings@gmail.com
Susan Deemer, retired manager of Idaho State Government office	3213 N 39th St Boise, ID	sedeemer@msn.com
Pauline McIntosh	5631 Cottonwood Shadows, Victor, ID	pauline@silverstar.com
Jan Stuessi, former business owner	5099 Snowberry Lane Victor, ID 83455	janstuessi@silverstar.com
Marilyn McAllister BS Engineering, MS Exercise Science	1116 S Vista Ave #364 Boise, ID 83705	marilynmc@gmail.com
Carolyn Swenson BS Environmental Science Oregon State University	700 San Jose Way Boise Idaho 83712	iamcswen@gmail.com
Kathleen Deidrick, Ph.D. Neuropsychologist	1264 E Shenandoah Dr. Boise, ID 83712	deidrickk@hotmail.com
Ed Wardwell Retired Idaho geography educator	13268 Dechambeau Way, Boise, ID 83714	edntucker@gmail.com
Avery Shawler, BA Conservation Biology Middlebury College, Conservation Planner in Ketchum	150 Wood River Dr Ketchum, ID 83340	avery.shawler@gmail.com
Anna Daley, MA Teaching English Language Arts	1412 N. 20th St. Boise, ID 83702	daleyanna@hotmail.com
Crystal Rain B.A. Environmental Studies	1326 W State St Boise, ID 83702	crystal.m.rain@gmail.com
John Kaeding, Ph.D., Materials Science	1810 W Lemp St Boise, ID 83702	kaeding@gmail.com
Sarah D. Haynes, Ph.D. Medical Nuclear Physicist	2947 S. Fox Troop Pl. Eagle, ID 83616	medicalphysics@mac.com
Russell Train, BA English Williams College	450 Wood River Drive Ketchum, ID 83340	trainrussell@gmail.com

Leigh Ford, Idaho native, mother, pre-med student	1517 N 8th, Boise, ID 83702	leigh4d1@gmail.com or lford@snakeriveralliance.org
Sara Ihrle, BS Human Dimensions in Natural Resources, MS Environmental Studies	960 W Magic Rd #37, West Magic, ID 83352	saren.call@gmail.com
Emily Cleveland, BA Geology MS Natural Science Education and Environment & Natural Resources		emilycleveland6@gmail.com
Randi Walters, Ph.D., Geophysics	4200 N. Pennfield Pl. Boise, ID 83713	randijwalters@gmail.com
Melissa Young, Educator	Victor, ID	
Molly Brown	Teton County, ID	
Price Gilroy	Victor, ID	
Ann Schenk, Concerned Citizen	Ashton, ID	
Dave Green, MMBA Activist - Creative	1311 W. Heron St. Boise, Idaho 83702	dave@northend.org
Suellen Carman Retired librarian and paralegal	299 Mountainside Blvd. Victor, ID 83455	suellencarman@gmail.com
Maureen Riegel	Victor, ID	
Katrin Lepler	3770 Creekside Drive, Idaho Falls, ID 83404	nirtak@gmail.com
Lisa Hecht, Electrical Engineer	4920 E. Sagewood Drive, Boise, Idaho 83716	heartfeltsong@msn.com

References:

1. J. Cook, et al, "Consensus on consensus: a synthesis of consensus estimates on human-caused global warming," *Environmental Research Letters* Vol. 11 No. 4, (13 April 2016); DOI:10.1088/1748-9326/11/4/048002
2. J. Cook, et al, "Quantifying the consensus on anthropogenic global warming in the scientific literature," *Environmental Research Letters* Vol. 8 No. 2, (15 May 2013); DOI:10.1088/1748-9326/8/2/024024
3. W. R. L. Anderegg, "Expert Credibility in Climate Change," *Proceedings of the National Academy of Sciences* Vol. 107 No. 27, 12107-12109 (21 June 2010); DOI: 10.1073/pnas.1003187107.
4. P. T. Doran & M. K. Zimmerman, "Examining the Scientific Consensus on Climate Change," *Eos Transactions American Geophysical Union* Vol. 90 Issue 3 (2009), 22; DOI: 10.1029/2009EO030002.
5. N. Oreskes, "Beyond the Ivory Tower: The Scientific Consensus on Climate Change," *Science* Vol. 306 no. 5702, p. 1686 (3 December 2004); DOI: 10.1126/science.1103618.
6. J.M. Barnola, et al, Laboratoire de Glaciologie et de Geophysique de l'Environnement, 38402 Saint Martin d'Herès Cedex, France
7. N. I. Barkov, Arctic and Antarctic Research Institute, Beringa Street 38, St. Petersburg 199226, Russia
8. Jouzel, J., et al, 1987. Vostok ice core: a continuous isotope temperature record over the last climatic cycle (160,000 years). *Nature* 329:403-8.
9. Jouzel, J., et al, 1993. Extending the Vostok ice-core record of palaeoclimate to the penultimate glacial period. *Nature* 364:407-12.
10. Jouzel, J., et al, 1996. Climatic interpretation of the recently extended Vostok ice records. *Climate Dynamics* 12:513-521.
11. Petit, J.R., et al, 1999. Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica. *Nature* 399: 429-436.
12. NOAA Mauna Loa Annual Average CO2 Record
13. NASA/GISS Global Land-Ocean Temperature Index

Attachment 1: Senator Thayn Response with Scientific Rebuttal

Problem with 5 of 375 Science Standards

By Senator Steven Thayn

There has been interest in the science standards being adopted by the Idaho legislature. I would like to thank the Idaho teachers for their work on this important task. However, of the 375 science standards being proposed, the House rejected 5. I would like to explain what this means and why I support the House action in rejecting these 5 standards. The 5 standards were rejected because they were political statements; not science standards that invite open inquiry.

Response: As will be shown in the responses to follow, there is no evidence presented here that the rejected standards are political statements. In many cases you have gone out of your way to unreasonably discredit and disregard science in order to make a more convenient claim of political bias.

In rejecting these standards, it does not mean that the topic of changing climate, global warming, human activity, or CO₂ levels cannot be taught in school or the legislature does not think they should be taught in school. Rejecting these standards simply means that the legislature would like to see them rewritten and brought back to the 2018 session. The topic was not rejected, only the language as currently written.

Response: Idaho's students deserve to know the science regarding climate change. By rejecting the standards, you ensure that unequal education of the state's students occurs. Given the severe consequences resulting from the human causes of climate change, the state has a responsibility to ensure future generations are educated on the subject. That is the only way they will be prepared to help find solutions.

The modern global warming or climate change argument goes something like this: the earth has been warming over the last 100 years caused mostly by the increase in greenhouse gasses. The most prominent of these green house gasses is carbon dioxide or CO₂. CO₂ levels have increased from 286 ppm, at the beginning of the industrial revolution, to about 400 ppm today. The theory goes that if CO₂ levels do not stabilize or are not reduced the earth will warm; ice caps will melt with devastating impact on the global environment.

Response: Generally, this statement is mostly correct. We would make a few observations though. First, while warming has been noticed most prominently over the past 100 years, it is important to go back about 250 years to the start of the industrial revolution. This helps to give a fuller idea of how the problem began. Second, we would note in the last sentence that the Earth is already warming and the ice caps are already melting. This isn't some far away, distant future problem. It's happening now. We must act now.

Most of those that believe in global warming also believe that government must get involved to stop the increase in CO2 levels. According to this reasoning, it is more important to save the planet by reducing CO2 levels than anything else. CO2 production is a product of combustion of fossil fuels, wood, and other plant matter. CO2 is produced in a modern society through the production of energy using coal, natural gas, and other fossil fuels.

Response: The phrase, “believe in global warming,” is a misleading characterization. This isn’t religion. The theories of climate change have been developed based on rigorous scientific investigation. A more appropriate characterization would be, “accept the scientific consensus regarding global climate change.”

Yes, you are correct that we believe the government should get involved. Government has a responsibility to protect this country for future generations. The Preamble to the United States Constitution reads:

“We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.”

The key phrase here is, “... and our Posterity.” We have an obligation to ensure the survival of this nation for future generations. Climate change is a threat to that survival. Therefore, the government, “of, for, and by the people,” has an obligation to act.

Yes, we do believe it is more important to save the planet than anything else. If the planet dies, there really isn’t much else left to save. Yes, CO2 is produced by modern society. But the great thing about modern society is that it keeps modernizing. Every day we develop new technologies that allow us to enjoy the benefits of modern society without the disastrous consequences of massive CO2 production. We know how to solve this problem.

Reduction of CO2 levels, freedom and limited government are on a collision course. If government is needed to control CO2 levels, and CO2 production is a function of energy production, then to reduce CO2 levels it stands to reason government must regulate how and to what extent energy can be produced and by whom.

Response: Your argument here is a non sequitur. It is a fallacy of logic to assume that we lose freedom by reducing CO2 levels, or that government should be so limited as to allow uncontrolled destruction of the environment.

The government is needed to control CO2 levels, however mass CO2 production is not a requirement for energy production in the modern era. Gen. 4+ nuclear power, wind, solar, fuel cell, and advanced battery technology are all strong areas of research and development, and are all capable of displacing the CO2 production which results from the burning of coal and natural gas for electricity. Over the coming half century, as battery

and fuel cell technologies continue to advance, we will see wider adoption of carbon free transportation. All of these technologies are possible because a government chose not to be overly, "limited," and invested in the necessary research and development. Additionally, one could easily argue that consumer, corporations, and the free market have greater freedom of choice now due to the wider array of choices for energy production. Freedom is enhanced, not curtailed, when we support scientific discovery.

There are a few problems with the current global warming theories which the science standards do not include. First of all, 250 million years ago, during the age of the dinosaurs, CO2 levels were almost 5 times higher than they are today (approximately 1,800 ppm rather than the 400 ppm today). From all accounts and theories, the earth supported life at 1,800 ppm. The earth did not self-destruct. In fact, it could be argued that one of the reasons that species disappeared during this time is because as plants and animals died they sequestered CO2 and reduced the overall level of CO2 to levels that did not support life as efficiently as previously. In fact, the burning of fossil fuels may be returning the earth to a previous state where it was more productive.

Response: We're not sure where you got this information. 250 million years ago, the Permian mass extinction occurred. Roughly 96% of marine species and 70% of land vertebrates were wiped out. The causes aren't entirely clear, but one of the leading hypotheses is a runaway greenhouse effect, precipitated by massive volcanic activity. The volcanic activity would have led to huge increases in atmospheric carbon and methane. It took the Earth more than 10 million years to recover.

Also, life today isn't adapted to the climate you describe. Much has changed over the past 250 million years. Humans only appeared approximately 5-7 million years ago.

CO2 is, after all, a plant food. Plants need CO2 to live. About 30 percent of the increase in agricultural production in the 20th century is due to the increase of CO2 which makes plants more efficient and requires less water. As CO2 levels rise, more areas of the planet will most likely increase in productivity supporting more life than before.

Response: Plants rely on more than CO2 to survive. It has been shown that the negative consequences of higher CO2 levels far outweigh any positive factors (See this article from Nature: <http://www.nature.com/articles/ncomms8148>). Effects on individual species are highly variable. Some invasive species perform very well under elevated CO2, while some important crop species perform much less well. Also, higher plant metabolism from increased CO2 would result in higher water consumption, not lower. This is further compounded by higher average temperatures which result in a faster rate of evaporation. As CO2 levels have continued to rise, more and more species are struggling to survive. To say that the planet would support more life as a result of higher CO2 is to deny the reality that is playing out before us right now.

One of the problems with the 5 rejected science standards is that they assumed that an increase in CO2 levels (changing climate) is always bad. This is a value judgment and not science. Science simply measures the data.

Response: Science does not simply measure data. Science tests hypotheses and collects data to support or refute those hypotheses. This results in a conclusion based on the preponderance of evidence. Science is not just an information gathering endeavor; rather, it is an effort to understand the world around us. Anyone can collect data. Scientists seek to put that data into context and make educated conclusions as to what that data indicates.

The gross mischaracterization of the nature of science is troubling and, frankly, insulting to the scientific community. We encourage you to re-evaluate your fundamental understanding of science.

Let me list parts of 2 of the standards, and point out some of the phrases I find objectionable.

1. ESS3-MS-5: "Ask questions to clarify evidence of factors that have caused the rise in global temperatures over the past century."

Concern: Why just over the past century? Climate change has happened continuously over the entire history of the planet. Limiting it to the last 100 years limits inquiry and will lead to one conclusion. This is not science.

Response: The majority of the temperature rise has occurred over the past century, and that is what the statement refers to. The factors contributing to that rise go back further (roughly 250 years to the start of the industrial revolution). The way the statement is phrased would encourage investigation of those more distant factors as they relate to the 100 year temperature rise.

2. Same standard: "Emphasis is on the major role that human activities play in causing the rise in global temperatures."

Concern: This gives the impression to the youth that man's activities are the main cause of changing climate when, in fact, that may or may not be the case. This, too, is a leading question and does not lead to true scientific inquiry. The conclusion is stated in the standard. A better standard would be: "Has global temperatures risen or fallen over the history of the world, what are some of the factors that has caused climate to change, and what if any impact has man had on climate change?"

Response: The overwhelming preponderance of scientific evidence says that man is primarily responsible for the rise in global temperatures. Given that students are human, it is appropriate for them to understand how human activities can impact the climate. Your restatement is far too broad and dismisses the fact that much of your line of questioning has already been answered. We shouldn't be afraid to share these answers with our children.

3. ESS3.C: "Typically as human populations and per-capital consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise."

Concern: This standard at least has a little balance at the end of it. However, the first part of the standard assumes that human activity is negative. It does not give the impression or idea that human activity such as dam building, agriculture, or logging can improve the

planet. Man's activities can have a positive impact on the environment.

Response: You misunderstand the standard. It does not state that all human activity is negative. It states that in the context of per-capita consumption of resources by humans, there is a correlation to negative impacts on the Earth. This is, again, the accepted scientific consensus. The Earth can only support so much capacity as it pertains to natural resource consumption. The standard encourages understanding of the technological and engineering solutions to this issue. How do we minimize the negative consequences of human activity and reduce the utilization of natural resources while still maintaining the standard of living expected in modern society? This is an excellent question and one that should be presented in all science classrooms in the state.

4. Same standard: "Human activities (such as the release of greenhouse gases from the burning of fossil fuel combustion) are major factors in the current rise in Earth's mean surfaced temperatures."

Concern: This standard does not point out the value of increased CO₂ or the benefit that it has to plant life or that CO₂ levels were much higher in the past. Thus, it becomes a political statement much more akin to indoctrination in a particular creed or ideology than real scientific explanation.

Response: This is a fallacious argument. There is little to no benefit to increased CO₂ production. In fact, the science shows that the negative consequences far outweigh the positive. We addressed this in detail earlier. You appear to be using your own unfounded, unscientific, partisan opinion in place of established science. That isn't your job as a senator.

The other standards have similar content. They all assume that man's impact is negative. All leave out important data points. All are political in nature. The legislature is not opposed to the study of changing climate; however all data needs to be understood; not selected data points. Climate change will have impacts on all of us. These five standards need to be rewritten so that they encourage scientific exploration and inquiry rather than guiding the students to a pre-conceived set of conclusions.

Response: Human activity has largely been negative with respect to the global climate. That is indisputable. In your arguments presented thus far, you have failed to provide any evidence for why the standards are inappropriate. Given that you don't even attempt to address the remaining standards, we can only assume that you have no credible defense of your opposition to them either.

Further thoughts on the topic:

Here are 12 statements taken from some of the emails I have received.

1. Scientific method is not tainted by beliefs or ideology. (Totally Agree)

Response: You say you agree with this, and yet all of your arguments here have relied upon dismissing scientific data as "political," while substituting your own partisan ideology. In essence, your entire statement is a repudiation of the scientific method you claim to support.

2. Climate change research has been conducted since the early 19th century. Contemporary climate change research can be dated to the 1960's. The modern discipline has developed over the last 50+ years to the point where 97% of the global climatology community are convinced human activity is contributing significantly to climate warming. Many of their predictions are now being experienced globally, with tragic effect. (97% are convinced – this is not science – it is not a popularity contest.)

Response: It is science. 97% of scientists have concluded that climate change is real and humans are largely responsible for it. If 97% of doctors told you that you have cancer, would your response be, “maybe I should listen to the other 3% instead”? We doubt it.

3. Climate change is the most significant challenge the human race has ever had to resolve. (Who says and what scientific proof for this faith-based assertion?)

Response: This is a statement selectively chosen by you. While it is impossible to quantify the severity of the challenges we face, there's no denying that the climate change is definitely one of the most severe we've ever faced.

4. Young students' scientific knowledge is not advanced by catering to the whims, notions, beliefs, or ideologies of their parents. I would hope most parents would want their children to know more about the world around them than they do. If the knowledge imparted to our children does not surpass the knowledge of their parents, civilization does not advance. (Are you saying that parents that question global warming are stupid? Really!! This is a reason?)

Response: Well, we wouldn't use the word stupid - and neither did the person who emailed you. It's irresponsible of you to put words in their mouth. However, they are correct - most parents do want their children to know more about the world around them than they do. This isn't a controversial statement. The counter argument is that parents want their children to be dumber than they are, and we don't really think you believe that.

5. In my opinion, politicians by definition, are not qualified to evaluate the merits of scientific knowledge. The elimination of the five critical, and scientifically valid, sections of the proposed science standards is proof of my conjecture. (Scientific method is not tainted by beliefs or ideology. The belief that global warming is caused by CO2 and is harmful is a belief system. Harmful is not a scientific word.)

Response: You again dismiss a scientific argument as not being scientific. Harmful is most certainly a scientific word (“harmful dose of radiation,” or “harmful amount of lead in Flint's pipes,” or “harmful level of ultraviolet radiation from the sun.”) You substituted your own political ideology in place of scientific conclusions. You have proven yourself incapable of making scientific judgments on behalf of your constituents, thus proving the commenter's point.

6. No reasonable person would place the unreasonable burden of evaluating science standards upon individuals whose vocation is not science. (At one time, reading of the Bible was prohibited to the common person. It took a person trained in religion to interpret God's word. Science is not different. It is about logic. Every person using logic

can use the scientific method to interpret scientific data and arguments; that includes legislators.)

Response: It's ok to admit you don't know something. We, and certainly the voters who elected you, know that you are not an expert on everything. It's ok to ask experts for their input when determining these standards. The commenter wasn't attacking you, but giving you cover to ask for help. That's a good thing. You should take advantage of it.

7. Include the paragraphs taken out by the Representatives. It is vital that Idaho children learn the impact of humans on the earth that they will soon have to assume responsibility. (The same could be said about government, economy, respect, love, and a whole host of traits necessary for human survival that the youth will need to understand. Why has the writer chosen global warming as the most important? This seems to be a value judgment found in faith-based belief systems; not science.)

Response: They chose to write about it because that's what you are debating at the moment. You are actually correct, children should have a good understanding of government, economy, respect, love, AND science. Your argument here seems to support the teaching of climate change. It's a welcome change from the rest of your response and gives me hope you may eventually come around to reality.

8. Climate change is not political. It is happening. The fossil fuel industries, even though they know better, have convinced some politicians that it is political. Please think of our state's future. (This statement believes that CO2 production is destroying the planet. I don't see the proof of this. This fear is based upon computer models with manmade assumptions.)

Response: CO2 production is harmful to the planet. If you don't see that, it's because you've chosen not to. This kind of willful ignorance is unbecoming of an elected official.

9. I am deeply disheartened to learn that Idaho's updated curriculum standards have been edited to remove wording that connects climate change to human activity. The resulting standards fail to acknowledge what has been uniformly accepted among scientists on the basis of exhaustive and ongoing research. I am frankly embarrassed to live in a state with such backward disregard for the facts that a majority of all Americans now accept as true. (Science is not about what the majority wants or thinks.)

Response: Science is about consensus. The vast majority of scientists (97%) agree that the planet is warming and humans are responsible. Your contention is that we should ignore the 97% who agree on the human causes of climate change and instead give voice to the less than 3% who disagree. That's absurd.

10. Time is short: what we most need is an educated citizenry with the integrity to own up to its role in these problems. With knowledge of our power to transform the planet, we can modify our behavior to minimize the damage that is already well underway. Without it, we risk irreversible alteration to the natural systems on which we depend. (Who says that the current climate of the planet is the best? Who is to say that the future with more CO2 will not be better? Who says it is irreversible? Where is the proof?)

Response: The species on this planet have adapted over the course of millions of years

to survive in the current climate. Evolution is incapable of acting on the short time scale that climate change is happening in. Again, if you don't see these facts, it's because you've chosen to ignore them.

11. Do your job on behalf of all our students and the rest of our citizens, not just a few narrow-minded, ill-informed, religious zealots. It's ridiculous to think that 500 years after Columbus proved zealots of his time wrong about the earth being flat, we're still falling prey to those who refuse to believe what their eyes, ears and brains tell them. (Once again, the use of ridicule rather than logic and reason. I find those that mock and ridicule typically have weak logical arguments.)

Response: Once again, this is a statement cherry picked by you. But the commenter has a point. Denial of climate change, in the face of overwhelming evidence, is akin to asserting that the Earth is flat. The argument over the existence of human caused climate change is over. Our attention should instead be on what to do about it.

12. I just read that an Idaho House panel has approved new K-12 science standards, after striking key references to climate change caused by human behavior. I'm appalled that Republicans on the House Education Committee are still sticking their heads in the sand, when 97% of scientists worldwide agree that climate change can be attributed to human actions such as burning of fossil fuels. Climate change deniers cling to the mistaken theory that natural fluctuations in climate are solely to blame. This does not explain the increasing acidification of the world's oceans, which already has killed 80% of coral reefs - crucial nurseries for a wide range of marine organisms. Fisheries all over the world are collapsing, taking away the livelihood of millions of people. If nothing is done now to curb climate change, widespread starvation and unprecedented waves of climate refugees will result. (Being shocked does not constitute an argument.)

Response: They provided an argument. They are shocked that you would ignore it and the evidence behind it - as are we.

Is the teacher going to point out that 250 million years ago CO₂ levels were up to 5 times higher than they are today? What was the impact on the earth when CO₂ levels were higher? If in fact CO₂ levels were higher 250 million years ago, it stands to reason that when dinosaurs and decaying plant matter died they locked up CO₂ and put the world into a CO₂ depleted state. The burning of fossil fuels is, very likely, returning the planet to an earlier condition which may be better than our current environmental state.

<http://www.livescience.com/44330-jurassic-dinosaur-carbon-dioxide.html>

Response: Again, we already covered this. 250 million years ago there was a mass extinction. The life that existed before, during, and after it evolved to survive that climate. The current species on the planet are not evolved to tolerate that climate.

ESS2.D: talks about models that predict future climate changes. It says: "The outcomes predicted by global climate models strongly depends upon the amounts of human-generated gases added to the atmosphere each year and by the ways in which these gases are absorbed

by the ocean and biosphere.” It does not say that models can be wrong. This is most obvious conclusion of the standards and its most glaring defect.

Response: Yes, models can be wrong. Anyone who has watched a weather forecast knows that. But they are quite often right. And, in keeping with the scientific method, the models are based on the best available data. You seem to imply it's a 50/50 proposition, as if scientists are taking a blind guess. We can tell you they aren't just guessing. They are making informed conclusions based on available data. That's the nature of science.

Models are not science. They are predictions. They are based upon assumptions that may or may not be correct. Many of these predications are political in nature. A more scientific position would be to understand the assumptions upon which these computer models are based so that students can make their own predictions.

Response: Models most certainly are science. As someone who generates models for a living, I can assure you that a deep understanding of physics and natural laws are necessary to generate accurate models. As we learn more, the models improve. The only thing that is political in nature here is your disregarding of science.

LS4.D: Biodiversity and Humans – this standard says: “But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species and climate change.”

Response: Yes, this is true.

There is a total lack of perspective in this standard. It gives the implication that all human activity is negative, that the industrial revolution (energized through fossil fuels) was harmful to mankind, and that the future must include limitation of human activity, especially the generation and use of energy. The political question becomes how will government limit human activity? This becomes a moral question between those who value individual freedom and those that say we must act to save mankind.

Response: Where does it say ALL human activity is negative? It doesn't. Again, you've substituted your own bias for the actual text. Of course there are positive benefits from the industrial revolution. However, we didn't stop there. We now have a capacity we didn't have even 20 years ago - to build a cleaner, lower carbon energy infrastructure which will begin curtailing the adverse effects of climate change. Individual freedom doesn't mean anything if the individual can't survive in the climate.

Many young people reading this standard will conclude not to have children, to oppose the development of the fossil fuel industry, and believe that any human activity is harmful to the planet. Human activity is not inherently good or bad. It just is. The problem with this standard and the other standards that were rejected is that they only gives one set of facts that promote a certain outcome, and have become political in nature and not scientific.

Response: You've read way too far into this. The standard seeks to educate children on the negative consequences of past human action so they can learn from past experience.

Also, there is only one set of facts. That's why they are facts. There are no "alternative facts," regardless of what Kellyanne says.

The legislature should reject these science standards because they are not science. They are opinion. They are leading questions and don't promote wide understanding of the topic of climate change and its ramifications.

Response: They are science. Your rhetoric is political and detached from reality. Your dismissal of these standards is what prevents an understanding of the topic.

For example, if global temperatures rise and the ice sheet over Greenland melts, what is the net impact on humanity and our environment? Yes, low lying lands area could flood, how many square miles? How many square miles of land in Greenland, Australia, Africa, and the high mountain deserts in the American west will become more fertile? Is it a net loss or a net gain? This is what science would tell us.

Response: Science has answered these questions. NOAA has a great tool for visualizing the impact of sea level rise. As stated previously, the negative consequences far outweigh any potential benefit of higher CO2 concentration. It is most assuredly a net loss for the future of humanity.

Many of those who wish to talk about climate change seem to believe that the current state of the global environment is the ideal and must it must be kept in the exact spot that it is now: no increase in CO2, no increase in temperature, no change in ocean level, and so forth. Who is to say that the present is the ideal?

Response: Scientists are the ones to say it is ideal. Again, humans and the other species on this planet evolved to survive in a certain climate. Changing that climate at a faster pace than evolution will result in massive negative consequences, including extinctions of many species.

It seems to be an arrogant position to believe that the current state of the environment is ideal and should stay the same. I personally believe that CO2 levels should rise. But, this is a belief. What does science say? Will it be beneficial or harmful? How is beneficial or harmful decided? Who says the planet and all of mankind will perish if we don't act? These are political statements. These are ideological statements. These are faith-based statements that have not place in science or the science standards.

Response: Your personal belief has no merit, no basis in science, and no place in discourse on climate change. Science says climate change would be harmful. Harmful is decided by a number of factors - mass extinctions being a pretty big one. The planet, as a rock in space, will survive. The species on it may not. These are in no way faith based statements. That's an absurd characterization.

Finally, the link below is to an article that suggests that NOAA has fudged on the temperature data to show warming when there was none.

<http://www.cfact.org/2017/02/07/29373>

Response: CFACT is a 501(c)(3) organization. It conducts political lobbying on behalf of conservative causes related to refuting the reality surrounding climate change. It is not a scientific organization and has no place in scientific discourse.