

What Parents and Informed Citizens Really Want For Our Wyoming State Science Standards

The Wyoming legislature, in response to the People, intervened in the process of science standards adoption in Wyoming by placing a moratorium on any consideration of the NGSS in 2014. This has left the State Board of Education confused, in limbo, and immobilized. Rather than revert back to the NGSS path for a lack of any other, a wide variety of engaged parents and citizens have joined together to produce a clear statement of goals for science standards that will meet the needs and address important concerns that fueled such a fire last year.

Those who have joined together in this endeavor are parents, grandparents, and taxpaying citizens who fund K-12 public education. Some of us are former public school educators, have taught science, and are still involved in education activities and alert to public school policy. However, many are *non-educator parents*, a voice we feel is very much lacking in the standards adoption process in Wyoming. Several of us lend the perspective of business owners. Others have worked or are still working in the field of science and can contribute that experience. A number are simply struck with a need to become involved based on a common-sense reading of the situation and a desire to protect the integrity of the education system, as we all must live with its results. We have sought to set goals that are *inclusive* so that the concerns of all parents, students, and taxpayers will be satisfied, *regardless of their particular religious or political perspective*.

This group's ultimate mission can be stated simply: We are advocating that our state distinguish itself with a superb set of science standards characterized by **autonomy**, **academic excellence**, **objectivity**, and **transparency**.

Autonomy

- Retain Wyoming ownership and control over science standards
 - Ensure that the state and school districts can be responsive to the needs of parents and students, who are the ultimate consumers of this product.
 - Prevent outside forces, unaccountable to Wyoming voters, from directly or indirectly controlling the development, use, and revision of standards.
 - Ensure educators have the freedom to select educational materials that will meet the goals laid out in this document.

- Establish standards unique to Wyoming
 - Wyoming standards should be *informed by*, but not *dictated by*, other state standards.
 - These should be uncommon standards that distinguish Wyoming with their academic excellence, simplicity and clarity; they may ultimately serve as a model for other states.

Academic Excellence

- Scientific Foundation
 - Standards provide appropriate, foundational science *knowledge and skills* that parents know and remember, and have been historically recognized as the basis on which higher level science concepts are understood.
 - Knowledge and skills are presented in historical context.
 - A detailed glossary so ambiguity is removed from important concepts.

- Sufficient Content

Standards should provide complete content for high school science classes in all four basic areas, which are a springboard into college-level work for STEM careers:

- Chemistry
- Physics
- Biology
- Earth and Space Science

- Strong Mathematical Links

Written with current state math standards in constant view and the finished product should:

- Clearly connect science concepts taught at each grade level to math concepts taught at each grade level.

- Identify gaps, if any, in the math standards (at present, Common Core) that would need to be addressed in order for students to master content in advanced science classes.
- Incorporate mathematical concepts (*e.g.*, equations, formulas, calculations) that are appropriate for understanding a particular topic in science.

Objectivity

- Appropriate Introduction of Controversial Scientific Issues

- Introduce subjects that address religious and political questions only:
 - When **age appropriate** – students are mentally mature enough to deal with these complexities
 - When enough **foundational knowledge** of science has been accumulated by the students to be **equipped** to make an **informed** decision about these questions
 - While informing students of **key assumptions and the controversial aspects of the issue**, and engaging students in **critical analysis** using a comprehensive base of knowledge.
 - While encouraging **debate** and stimulating **thinking** and **questioning**.
- Standards should also make certain that students:
 - Are informed about the issues and know **why they implicate religion or politics**
 - Have the controversies defined for them.
 - Are taught the actual state of our scientific knowledge, what we actually KNOW, and will not confuse **fact and opinion**.
- **Standards should always set the example to *inform, not indoctrinate*.**

- Maintain Political and Religious Neutrality

- Anywhere political or religious questions are addressed in science, standards must treat that science objectively with the goal of informing about relevant controversies rather than imbuing students with a particular religious or political view.

- Origins science (origins of the universe, of life, and life's diversity) engages in religious questions which affect both theistic and non-theistic religious views.
 - Students must be adequately informed of both the use and effect of use of any theistic, atheistic, materialistic or naturalistic assumption used in explaining historical events about *religious* questions such as:
 - What is the cause and nature of life?
 - How should life be lived ethically and morally?
 - A *foundation* is necessary to develop objective standards that seek religious and political neutrality.
 - *Competing definitions* about the nature of science; how some definitions limit science to only materialistic/atheistic explanations.
 - *Scientific method and inquiry*; description of different methods depending on the scientific question.
 - **Methodological naturalism** - define explicitly and make clear key points:
 - Many institutions operate on its assumptions.
 - It excludes evidence and ideas such as:
 - Evidence that is inconsistent with a robust materialistic explanation.
 - Evidence consistent with the idea that the apparent design of many systems in nature may not be an illusion.
 - Teleological and non-natural or supernatural explanations.
 - *Differences between **historical** vs. **operational** science*
 - Different methods of inquiry are used.
 - Historical narratives are tentative explanations.
 - *Origin of the universe (**cosmological evolution**)*.
 - Critical analysis of Big Bang compared to other hypotheses (*e.g.*, steady state, multiverse, oscillating universe)
 - Evidence for the fine tuning of the universe and earth for life
 - First cause for the universe
 - *Origin of life (**chemical evolution**)*.
 - Critical analysis of materialistic and teleological hypotheses for formation of the first living cell
 - Origin of specified complexity in biological structures and systems
 - Origin of biological information and the genetic code

- *Origin of life's diversity (biological evolution).*
 - Definitions and mechanisms of microevolution and macroevolution
 - Cause for the sudden appearance of new species in the fossil record
 - Cause for the stasis of species and a lack of transitional forms in the fossil record
 - Cause for homologies (physical and biochemical similarities) in different species
 - Critical analysis of materialistic and teleological hypotheses for life's diversity
 - Why origins science is an **opinion science**.
- **Environmental science** often engages in *political* questions.
- Students should clearly understand the *political* questions and not be restrained by an assumed viewpoint.
 - The following issues require a careful neutral presentation:
 - *Sustainable development* – clear definition; the conflict generated between individual liberty and government regulation.
 - *Renewable and nonrenewable energy sources* – the conflict generated between ideals of conservation (stewardship of the environment) and potential costs for energy, and how those costs can adversely impact humans; cost-benefit analysis of various renewable and non-renewable energy sources.
 - *Impact of human activities on the environment* – fair presentation of how humans have preserved or made improvements to the environment, resulting advances in health, technology, etc. vs. detrimental impacts on the environment.
 - *Climate Change and Global Warming* – debate about the reliability of predictions being made; presentation of evidence from both sides; discussion of conflicts generated between potential results of suggested interventions vs. material costs and loss of freedoms that would be required to implement them.
 - Why these areas of environmental science are **opinion science**.

Transparency

- Employ Simplicity and Clarity

- New standards that won't require significant additional teacher training to implement.
- Standards that parents educated beyond high school can easily read and understand.
- Standards that avoid educational jargon that may exclude readers outside the education community.
- Standards that define scientific or necessary educational terms in a glossary.
- Provide for Accessibility (likely a State Board role)
 - Where science standards deal in political and religious issues, consumers must know what is being taught and how, so they are assured their children are being *informed* rather than indoctrinated.
 - Plan for making standards easily available for consumers to view (state and district websites. paper copies at schools).
 - Plan for making associated curriculum materials known to parents (district and school websites, book and movie lists, etc.).

We believe that attention to the four pillars of **autonomy**, **academic excellence**, **objectivity**, and **transparency** will eliminate the controversial elements from state standards and satisfy *all* stakeholders that children in Wyoming are being educated rather than indoctrinated, and educated *well*.