

Concerns Regarding The Next Generation Science Standards (NGSS)

Lack of Quality

- Rated “C” by the Fordham Institute
- there is so little advanced content that it would be impossible to derive a high school physics or chemistry course
- misses several opportunities to build important links between grade- appropriate math and required science content

Oppose Some Wyoming Values

- Wyoming's economy revolves around mining and agriculture, the NGSS have a heavy negative slant at the use of such resources
- Are regulations, international treaties and alternative energy sources Wyoming’s ideal for solutions to the “negative impacts of human activity?”
- Does Wyoming value one-sided, unsupported viewpoints as fact?

Non-Objective

- Religiously non-neutral which would lead to indoctrination, not education
- Fail to distinguish for students the various definitions of evolution, leading them to assume that the word always denotes the same thing
- Unconstitutional according to the Wyoming Constitution

Pending Court Case

- A non-profit in Kansas has filed a complaint against the Kansas Department of Education regarding the Next Generation Science Standards
- Kansas and Wyoming are both under the 10th Circuit Court of Appeals. Therefore, if a ruling is made at that level, it will apply to Wyoming as well
- Wyoming should delay the consideration of the NGSS until this case is resolved

Lack of Quality

Nine scientists and mathematicians reviewed NGSS for the Thomas B. Fordham Institute. **Fordham gave the standards an overall grade of “C,”** (the NAEP and TIMSS standards received the grade of A- from the Fordham Institute).

Overview: “The NGSS fall short of excellence in several ways, including:

- overemphasis on practices over essential context
- omission of much essential content
- failure to integrate mathematics content that is essential to science learning
- use of assessment boundaries that put arbitrary ceilings on the content that will be assessed and therefore taught at each grade”

“Clarity and Specificity: The presentation of **the NGSS is cumbersome and difficult to navigate.** In addition, too many individual performance expectations are **vague and poorly worded,** with broad references to concepts that **lack specific guidance** about what, precisely, students should know and be able to do.”

<http://www.edexcellencemedia.net/publications/2013/20130820-NGSS-Appendix-Review-and-State-Comparisons/NGSS-comparison-table-wyoming.pdf>

Another problem Fordham reviewers found is NGSS focuses on students “performing” at the expense of “memorizing.” They indicate that in this case **“content takes a backseat to practices.”** The Fordham report suggests that science education should “build knowledge first so that students will have the storehouse of information and understanding that they need to engage in scientific reasoning and higher level thinking.”

<http://www.eagleforum.org/publications/educate/july13/next-generation-science-standards-common-core-incognito.html>

In regards to Physical Science Fordham states:

"NGSS physical science coverage is **mediocre** throughout grades K–5 and **declines rapidly** in middle school, and still further at the high school level. Overall, the physical science standards **fail to lay the foundation for advanced study** in high school and beyond, and ***there is so little advanced content that it would be impossible to derive a high school physics or chemistry course*** from the content included in the NGSS."

"Much of the NGSS document was **not written with mathematics in mind.**"

"(NGSS) **misses several opportunities to build important links** between grade- appropriate math and required science content."

"Given the critical overlap between science and math, as well as the NGSS authors’ intention to align their science expectations with the Common Core math standards, these **shortcomings signal a need for caution** on the part of states that are serious about implementing the CCSS but that are also considering adopting the NGSS."

http://www.edexcellence.net/sites/default/files/publication/pdfs/20130612-NGSS-Final-Review_7.pdf

Wyoming Values

- Does Wyoming believe that all/most human actions lead to negative consequences for the earth?

Agriculture and mining are essential to Wyoming. There are responsible Wyomingites out there who are involved with agriculture and/or mining that make a living responsibly, efficiently and without destroying the earth. This perspective is not mentioned in the NGSS. On the contrary, the unproven negative effects of such practices are taught. The following example is taken from the NGSS:

Disciplinary Core Idea: ESS3.C: HUMAN IMPACTS ON EARTH SYSTEMS

“How do humans change the planet? Recorded history. . . indicates that human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air. Humans affect the quality, availability, and distribution of Earth’s water through the modification of streams, lakes, and groundwater. Large areas of land, including such delicate ecosystems as wetlands, forests, and grasslands, are being transformed by human agriculture, mining, and the expansion of settlements and roads. Human activities now cause land erosion and soil movement annually that exceed all natural processes. Air and water pollution caused by human activities affect the condition of the atmosphere and of rivers and lakes, with damaging effects on other species and on human health. The activities of humans have significantly altered the biosphere, changing or destroying natural habitats and causing the extinction of many living species. These changes also affect the viability of agriculture or fisheries to support human populations.

The activities and advanced technologies that have built and maintained human civilizations clearly have large consequences for the sustainability of these civilizations and the ecosystems with which they interact.”

Performance Expectation: HS – Human Sustainability (Grade 9-12)

HS-ESS3-4.

Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

HS-ESS3-3.

Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ESS3-6.

Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

- Does Wyoming value freedom and enterprise, or federal/international regulation?

The following is taken from the Framework behind the NGSS: “Some negative effects of human activities are reversible...Regulations regarding water and air pollution have greatly reduced acid rain and stream pollution, and international treaties on the use of certain refrigerant gases have halted the growth of the annual ozone hole...”

http://www.nap.edu/openbook.php?record_id=13165&page=195

- Does Wyoming value objective or unobjective, non-objective education? See next page for further explanation.

Non-Objective

- The standards fail to present controversial issues objectively (such as climate change, renewable energy and sustainability.)
- The standards are one-sided in that they disproportionately focus on negative effects of human interaction with the environment

Example: ESS3.D: Global Climate Change

Performance Expectation: MS-ESS3 Earth and Human Activity (Grades 6-8) **MS-ESS3-5.**

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion . . . and agricultural activity) . . . Emphasis is on the major role that human activities play in causing the rise in global temperatures.]

Disciplinary Core Idea: ESS3.D: Global Climate Change

Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming).

- Teaches evolution as a fact, starting in elementary grades (current WY standards teach evolution as a theory, and not until 8th grade)

Example: "By the end of grade 2. Some kinds of plants and animals that once lived on Earth (e.g., dinosaurs) are no longer found anywhere, although others now living (e.g., lizards) resemble them in some ways."

(Grade Band Endpoints for LS4.A)

- The standards address ultimate religious questions and then use a doctrine or "Rule" that permits only materialistic or functionally atheistic answers
- The standards require a materialistic explanation for any phenomenon addressed by science
- The standards are neither educationally objective nor religiously neutral, because an atheistic or materialistic worldview is consistently affirmed throughout.
- The Standards fail to present legitimate scientific critiques of materialistic theories regarding the origins of the universe, of life and its diversity

Examples: Core Idea LS4: Biological Evolution: Unity and Diversity

LS4.A: Evidence of Common Ancestry and Diversity

LS4.B: Natural Selection

LS4.C: Adaptation

LS4.D: Biodiversity and Humans

(See next page for descriptions of these Core Ideas)

The Framework for the NGSS describes **the reasoning** behind the Core Ideas:

- ***There is diversity within species as well as between species.*** Yet what is learned about the function of a gene or a cell or a process in one organism is relevant to other organisms because of their ecological interactions and evolutionary relatedness. (Framework, page 139, emphasis added)
- “Finally, the core ideas in the life sciences culminate with the principle that *evolution can explain how the diversity that is **observed within species has led to the diversity of life across species*** through a process of descent with adaptive modification. ***Evolution also accounts for the remarkable similarity of the fundamental characteristics of all species.*** (Framework, page 140, emphasis added)
- Evolution and its underlying genetic mechanisms of inheritance and variability are key to understanding both the unity and the diversity of life on Earth. (Framework, page 141)
- Evolution thus explains both the similarities of genetic material across all species and the multitude of species existing in diverse conditions on Earth—its biodiversity—which humans depend on for natural resources and other benefits to sustain themselves. (Framework, page 161)
- Biological evolution, the process by which all living things have evolved over many generations from ***shared ancestors***, explains both the unity and the diversity of species.(Framework, page 162,emphasis added)

Bullets source: http://www.copeinc.org/docs/NGSS_PressRelease_final.pdf

Standards source: http://edu.wyoming.gov/sf-docs/default-document-library/science_standards_draft_09-20-13_sbe_10-7-13.pdf2

Framework Source: <http://www.nextgenscience.org/framework-k%E2%80%9312-science-education>

The NGSS Are Unconstitutional In Wyoming

The Wyoming Constitution states in Article 7, Section 12 titled “Sectarianism prohibited.”

“No sectarian instruction, qualifications or tests shall be imparted, exacted, applied or in any manner tolerated in the schools of any grade or character controlled by the state, nor shall attendance be required at any religious service therein, nor shall any sectarian tenets or doctrines be taught or favored in any public school or institution that may be established under this constitution.”

The word “sect” is defined as “a group adhering to a distinctive doctrine.” And doctrine is defined as “a set of ideas or beliefs that are taught or believed to be true.”

The adoption of the Next Generation Science Standards would seem to be a violation of the state constitution.

Pending Court Case

- The Framework for K-12 Science Education and Next Generation Science Standards is the subject of a lawsuit filed in a Federal District Court in Kansas in September.
- Kansas case is relevant to Wyoming because any appeal that goes to the 10th Circuit Court of Appeals establishes the federal law, which will be applicable to Wyoming as well.
- The lawsuit claims that the program seeks to establish an atheistic worldview in our children. Let me read you the first paragraph of the complaint:

"The Plaintiffs, consisting of students, parents and Kansas resident taxpayers, and a representative organization, complain that the adoption by the Defendant State Board of Education on June 11, 2013 of Next Generation Science Standards will have the effect of causing Kansas public schools to establish and endorse a non-theistic religious worldview (the "Worldview") in violation of the Establishment, Free Exercise, and Speech Clauses of the First Amendment, and the Equal Protection Clauses of the 14th Amendment."