Policy Division
New Mexico Public Education Department
Transmitted via e-mail rule.feedback@state.nm.us

October 13, 2017

To Whom It May Concern,

Thank you for the opportunity to comment on the proposed NM-STEM Ready Standards. The Environmental Education Association of New Mexico (EEANM) stands firmly behind Next Generation Science Standards (NGSS) and looks forward to working with the New Mexico Public Education Department (NMPED) on opportunities to provide professional development to teachers statewide.

EEANM and the hundreds of classroom teachers and non-formal educators along with dozens of organizations and agencies we represent have a strong background in supporting NGSS and are well poised to support the implementation of NGSS statewide in 2018. In 2015, EEANM coordinated a series of workshops for the informal science education community to better understand NGSS and encourage these educators to begin to align and correlate environmental education activities and programs with NGSS in hopes of NMPED adopting NGSS. As the State Coordinator for Project Learning Tree, we have been learning how other states have used this award-winning, well tested and evaluated, long standing (four decades) curriculum to support teachers in their understanding of NGSS as well as how to apply NGSS to all grade levels. **The Environmental Education Association of New Mexico along with its organizational partners are ready and willing to support the implementation of Next Generation Science Standards statewide through professional development of teachers and school administrators beginning in 2018.**

On October 21, 2016 during the Science, Technology, and Telecommunications Legislative Committee meeting, the following statement was shared after being unanimously approved by EEANM's Board of Directors:

"As an Environmental Education Association of New Mexico Board member, I fully support the adoption of New Mexico of Next Generation Science Standards as they are written. We in the environmental education community along with the support of the Environmental Education Association of New Mexico are ready to support teachers and administrators in the implementation of Next Generation Science Standards through professional development statewide."

During the week of October 2nd, 2017, EEANM along with two of its organizational members, Pajarito Environmental Education Center in Los Alamos and Asombro Institute for Science Education hosted the following in-person community meetings for our Environmental Education Community (classroom teachers, non-formal educators, school administrators, funders, and interested community members):

Albuquerque – ***Monday, October 2 at 4 p.m. at Bachechi Open Space*** (9521 Rio Grande Blvd NW, Albuquerque, NM 87114) hosted by EEANM Staff and Board of Directors.

Las Cruces – ***Tuesday, October 3 at 4:30 p.m. at Asombro Institute for Science Education*** (401E. College Ave., Las Cruces) hosted by valued EEANM Organizational Member Asombro Institute for Science Education (http://asombro.org).

Los Alamos – ***Wednesday, October 4 at 7 p.m. at Los Alamos Nature Center***(2600 Canyon Rd, Los Alamos) hosted by valued EEANM Organizational Member Pajarito Environmental Education Center (http://peecnature.org). Questions: educator@peecnature.org

The purpose of these meetings was two-fold:

1) Provide information on New Mexico STEM-Ready Science Standards (Next Generation Science Standards with Revisions)

2) Allow for a community conversation, using the lens of environmental education, to collect ideas and input for meaningful comments to NM Public Education Department.

In addition to these in-person opportunities, the recorded presentation along with ways to provide ideas to EEANM was made available on our website at eeanm.org during the week of October 2nd, 2017. This opportunity was used to collect ideas from around the state which helped provide the following comments and feedback to improve the proposed NM-STEM Ready Standards:

1) EEANM recommends the addition of the crosscutting concepts, disciplinary core ideas, and the science and engineering practices as outlined at nextgenscience.org. The three dimensions of Next Generation Science Standards are fundamental to implementation and we would like to see this reflected in New Mexico.
2) EEANM recommends the development of a statewide professional development plan for the new standards to support teachers and school administrators in the implementation of these new standards.
3) EEANM, along with its partner organizations and agencies, stands ready to support professional development for teachers and school administrators statewide and would be a valuable resource for implementation. Many of our partner organization and agencies have already developed and implemented programs that are aligned with Next Generation Science Standards and we are well positioned to assist NMPED with implementation.
4) EEANM recommends the following revisions to the proposed NM-STEM Ready Standards (all proposed revisions are highlighted in red):

Note: Suggested revisions are listed in red.

Kindergarten (1 additional standard)

K-LS-1 NM-1: Use observations of New Mexico plants and animals to describe patterns, that animals, need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirements of plants to have light; and, that all living things need water.

Suggested revision: Using observations of New Mexico plants and animals outside, describe what animals and plants need to survive including that all living things need water and the basics of a food chain.

Grade 1 (3 additional standards)

1-ESS1-2 NM: Make observations at different times of year to relate the amount of daylight to the time of year emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring (e.g., snow melting, spring break, flowers) or fall (e.g., fall colors, starting school, state fair, balloon fiesta).

Suggested revision: Make observations at different times of year outside to relate the amount of daylight to the time of year, recording (writing and drawing) those observations each time in a journal.

(4) New Mexico science and society:
1-NMSS-1: Read texts to discover that men and women of all ethnic and social backgrounds practice science and technology.

Suggested revision: Read texts to discover that people of all ethnic and social backgrounds practice science and technology.

1-NMSS-2: Use media to discover that men and women of all ethnic and social backgrounds practice science and technology.

Suggested revision: Use media to discover that people of all ethnic and social backgrounds practice science and technology.

Grade 2 (5 additional standards; 1 typo)

2-ESS1-1 NM: Use information from several sources to provide evidence that Earth events can occur quickly or slowly. Although there are no active volcanoes in New Mexico, many extinct volcanoes exist throughout the state.

Recommend that this be removed as it would already be covered in 2-ESS1-1. If this is included, would recommend consulting a volcanologist to determine if "extinct volcanoes" is correct terminology.

2-ESS2-2 NM: Develop a model to represent the state of New Mexico and the Rio Grande river and related water systems.

Suggested revision: Using first-person observations of a local water source, develop a model to represent the state of New Mexico, including the Rio Grande and other rivers along with related water systems.

2-ESS2-3 NM: Obtain information to identify where fresh water is found on Earth, including the Rio Grande river and mountains.

Suggested revision: After a trip to a local source of fresh water, obtain additional information to identify where fresh water is found on Earth, including the Rio Grande and mountains.

(4) New Mexico science and society:
2-NMSS-1 Understand that everybody can do science, invent things, and formulate ideas.

No suggested revisions.

2-NMSS-2 Use information from several sources to know that science has discovered many things about objects, events, and nature and there are many more questions to be answered.

No suggested revisions.

(5) Engineering and design

K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each.

We believe that the word "performs" was inadvertently left off at the end of this standard.

Grade 3 (2 additional standards)

3-LS4-1 NM: Analyze and interpret data from fossils to provide evidence of the organisms and the environments include the state fossil Coelophysis, a theropod dinosaur.

Suggested revision: Remove this standard and add the "including the state fossil Coelophysis, a theropod dinosaur" to standard 3-LS4-1.

3-LS3-2 NM: Obtain information on plants and animals in New Mexico and their ecosystem to use as evidence to support the explanation that traits can be influenced by the environment.

Suggested revision: Take a local field trip or make observations outdoors to investigate the local plants and animals and then obtain additional information on the plants and animals in New Mexico and their ecosystem to use as evidence to support the explanation that traits can be influenced by the environment.

Grade 4 (1 revised standard; 3 additional standards)

4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from ~~natural~~ renewable and non-renewable resources and how their uses affect the environment.

No suggested revisions.

4-ESS1-1 NM: Identify evidence from patterns in rock formation and fossils in rock layers to support possible explanations of New Mexico's geological changes over time.

Recommend removal of this standard and adding "New Mexico" to standard 4-ESS3-1.

4-ESS3-1 NM: Obtain and combine information to describe the energy sources in the school's community and New Mexico and how it benefits the community.

No suggested revisions.

4-ESS3-2 NM: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on New Mexico's people and places.

Recommend that this standard be removed as it can be covered in 4-ESS3-2.

Grade 5 (3 additional standards)

5-ESS2-1 NM: Develop a model using an example to describe the way the geosphere, biosphere, hydrosphere, and/or atmosphere interact in New Mexico.

Suggested Revision: Based upon outdoor observations of a wild or natural area, develop a model using an example to describe ways that the geosphere, biosphere, hydrosphere/or atmosphere interact in NM.

5-ESS2-1 NM: Obtain and combine information about ways your school communities use science ideas to protect the Earth's resources and environment.

Recommend that this standard be removed as it is already covered in 5-ESS3-1 (also please note typo with numbering of this standard).

(5) New Mexico science and society
5-NMSS-1: Use information to discover STEM careers throughout the state and know that both men and women of all races and social backgrounds have these careers.

Suggested Revision: Use information to discover STEM careers throughout the state and know that people of all races and social backgrounds have these careers.

Grades 6-8 (1 omitted standard; 3 revised standards; 8 new standards)

MS-LS2-1 NM: Analyze and interpret data to provide evidence for how organisms and populations (i.e. big horn Sheep, black bears, cougars, elk, deer, fish, coyote, wolves) exist together to create an ecosystem.

Proposed revision: Analyze and interpret data to provide evidence for how local organisms and populations co-exist to create an ecosystem.

MS-LS2-4 NM: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem in New Mexico (forest, grasslands, desert, bosque) affect populations.

Recommend that this standard be removed adding "New Mexico" to standard MS-LS2-4.

MS-LS2-5 NM: Evaluate competing design solutions for maintaining biodiversity and ecosystem services in New Mexico (i.e. soil erosion protection, forest fire control, watershed planning, recycling, water purification and conservations).

Proposed revision: Evaluate competing design solutions for maintaining biodiversity and ecosystem services in New Mexico (i.e. soil erosion protection, forest fire control, watershed planning, , water purification and conservations) after observing at least one of these processes outdoors.

MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in embryological development across multiple species to identify relationships not evident in the full formed anatomy.

No suggested revisions.

2. MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's ~~4.6 billion year old~~ geologic history.

No suggested revisions.

MS-ESS2-1 NM: Obtain and combine information to describe the impact of volcanoes and faults on New Mexico geology.

Suggested revision: Describe the impact of volcanoes and faults on New Mexico geology.

MS-ESS3-1 NM: Gather and synthesize information on what geologic processes/formations account for the concentration of oil and gas in certain regions of New Mexico.

No suggested revision.

MS-ESS2-5 NM: Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions in New Mexico due to regional geography.

Suggested revision: Collect data outdoors to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in New Mexico due to regional geography.

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

Request to keep the original language: 3. MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

MS-ESS3-5 NM: Ask questions to clarify evidence of the factors that have caused the fluctuation in global temperatures, and consider the risks and benefits associated with technologies related to energy production.

Suggest removal of this standard.

4. MS-ESS3-3: Apply scientific principles to design a method for monitoring, <u>evaluating</u>, and managing a human impact on the environment.

Request to keep the original language: 4. MS-ESS3-3: Apply scientific principles to design a method for monitoring and managing a human impact on the environment.

MS-ESS3-3 NM: Describe the benefits associated with technologies related to the local industries and energy production

Suggested removal of this standard. If the disciplinary core ideas along with crosscutting concepts are adopted as well, then this will be covered.

High School (5 revised standards; 10 new standards)
HS-PS-8 NM: Describe NM's role in nuclear science (Manhattan Project, WIPP, National Laboratories).

Suggested revision: Describe New Mexico's historical role in nuclear science.

HS-PS-8a NM: Explore and communicate a 21st Century innovation created by the National Laboratories in New Mexico that demonstrates how advances in technology enable further advances in science.

Suggested revision: Explore and communicate a current innovation created by the National Laboratories in New Mexico that demonstrates how advances in technology enable further advances in science.

HS-LS2-7 NM: Using a local issue, in your solution design, include the benefits of human activities that support the local population including reclamation projects, building dams and habitat restoration.

No suggested revision.

HS-LS4-6 NM: Identify a problem within the school community and create or revise a simulation to test a solution to reduce impacts on biodiversity.

Suggested revision: Identify a problem within the school community and propose a solution to reduce impacts on biodiversity.

5. HS-LS4-1: Analyze, interpret, and communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

Do not approve of revisions. If crosscutting concepts, disciplinary core ideas, and the science and engineering practices are included, the "analyze" and "interpret" piece would be included.

6. HS-LS4-2: Construct an explanation based on evidence that ~~the process of evolution primarily results from four factors~~: biological diversity is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

Do not approve of revisions. Would like to see original language in NGSS used: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to

mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

7. HS-ESS2-7: Construct an argument based on evidence about the ~~simultaneous co-~~evolution of Earth's systems and life on Earth.

Do not approve of revisions. Would like to see original language in NGSS used: Construct an argument based on evidence about the simultaneous co-evolution of Earth's systems and life on Earth.

HS-ESS2-4 NM: Use a model to describe how variations in the flow of energy into and out of Earth's systems that were caused by natural occurrences that are not related to human activity.

Do not approve of revisions. If crosscutting concepts, disciplinary core ideas, and the science and engineering practices are included, this would be included.

8. HS-ESS3-5: Analyze ~~geoscience~~ data and the results from global climate models to make an evidence-based forecast of the current rate of global or ~~regional climate change~~ climate fluctuation and associated future impacts to Earth's systems.

Do not approve of revisions. Would like to see original language in NGSS used: Analyze geoscience data and the results from global climate models to make an evidence- based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems.

HS-ESS3-2 NM: Describe how scientific knowledge helps decision makers with New Mexico national and global challenges (e.g., waste isolation pilot project [WIPP], mining, oil and gas production, and population growth).

Suggested revision: Describe how scientific knowledge helps decision-makers with New Mexico, national, and global challenges.

HS-ESS3-4 NM: Evaluate the influences of technology on society (e.g., communications, petroleum, transportation, nuclear energy) including desired and undesired effects, and including some historical examples (e.g., telegraph, printing press, model-t ford, discovery of electricity, manhattan project).

Do not approve of addition of this standard as this is already covered in HS-ESS3-4.

9. HS-ESS3-6: Use a computational representation to illustrate the relationships among Earth's systems and how those relationships are being modified due to human activity.

Do not approve of revisions. Would like to see original language in NGSS used: Use a computational representation to illustrate the relationships among Earth's systems and how those relationships are being modified due to human activity.

HS-ESS3-6 NM: Explain how societies can change ecosystems and how these changes can be reversible or irreversible.

New Mexico science and society:
HS-NMSS-1: Identify important questions that science cannot answer (e.g., questions beyond today's science, decisions that science can only help make, and questions that are inherently outside the realm of science).

Suggested revision: Identify important questions where science is crucial to making informed decisions and questions that science cannot answer (e.g., questions beyond today's science, decisions that science can only help make, and questions that are inherently outside the realm of science).

HS-NMSS-2: Identify ways that science plays a role in many different kinds of careers and activities (e.g., public service, legislators, teachers, farmers, ranchers, construction workers, ranchers, oil and gas workers, miners, movie industry support, landscapers, ski resort snowmakers).

Do not approve of addition. If crosscutting concepts, disciplinary core ideas, and the science and engineering practices are included, this would be covered.

This letter and all of the comments provided have been approved by the Environmental Education Association of New Mexico's Board of Directors on October 13,2017.

As an organization, we are willing and able to assist with additional feedback and assistance in the final drafting of the NM STEM-Ready Standards with the assistance of the hundreds of educators we represent around the state. We can be reached via e-mail at info@eeanm.org or by phone at 505-859-3366.

Lastly, thank you for the opportunity to provide comments and once again, the **Environmental Education Association of New Mexico along with its organizational partners are ready and willing to support the implementation of Next Generation Science Standards statewide through professional development of teachers and school administrators beginning in 2018.**

Sincerely,

Eileen Everett

Executive Director on behalf of the Environmental Education Association of New Mexico's Board of Directors