Policy 2520.3C, West Virginia College- and Career-Readiness Standards for Science
Comment Log

June 9, 2021 – July 12, 2021

Action

A/S Comment was accepted and supports the proposed policy.
A/C Comment was accepted and resulted in changes to the proposed policy.
N Comment was not accepted.

Date	Commenter	Comments	Action	Rationale
§126-44CC-1 General				
2021-07-12 15:56:12	Emily Helton Education outreach specialist NASA IV&V ERC / Fairmont State University Morgantown West	I think its important that we remain 50% hands on. I was shocked at that requirement when I started teaching in West Virginia - so unlike what I had experienced in Illinois, but I am sold. My students were more engaged and learned more because I had to push myself to meet this requirement. Keep it please!	A/S	
§126-44CC-4 Summary of the Content Standards				
06-16 10:50:08	Elizabeth Gallaher Teacher Clay County Middle School Clay WV	Clear and concise	A/S	
§College- and Career-Readiness Indicators for Science comments				
05:41:06	CHARLES M WILSON BERKELEY SPRINGS WV	If instruction is to be 50% hands on will there be suggestions for these activities? Funding for materials?	N	Response 1 - The 50% language was found in the 21st Century Science Content Standards, prior to the Next Generation Content Standards and Objectives for Science in West Virginia Schools. Though it was implied in the Next Generation Content Standards and Objectives for Science in West Virginia Schools, it was recommended by the stakeholders that it be specifically be put back in the current

				policy. Labs, active inquiries, and investigations all indicate hands on science, so that all students are actively learning and not just sitting in front of a book or computer learning about science.
2021-06-23 12:45:46	Kathy Jacquez C&I Coordinator Marion County Schools FAIRMONT WV	The inclusion of the grade-appropriate science indicators highlights the importance of teaching science to all age groups.	A/S	
§Earth and Space Science Grade 9				
07-12 14:21:25	Deb Hemler Science Methods Instructor Fairmont State University Fairmont WV	Excellent decision to leave Earth & space science at the high school level to give all students exposure to every branch of science. There are many earth & space majors and careers available to WV students and until a few years ago students had little experience with them at the high school level. The new standards specifically outline the preparation in chemistry and physics incorporated in the ESS standards to help transition all students into biology and then physical sciences. Additionally, all students will have the math skill necessary to be successful in this class. The science is more engaging and relevant to WV students who see the geology every day and less likely to turn them away from STEM disciplines. These are now more career and college readiness standards as opposed to just college readiness standards.	A/S	
2021-07-12 14:36:02	Josh Revels Education Outreach Specialist Fairmont State University Fairmont WV	So happy that this is in the 9th grade. All WV students (regardless of STEM pathway) should be required to complete this course.	A/S	

2021-07-12 14:38:51	Victoria Carter Teacher Winfield WV	I teach mainly 9th grade science. I have participated heavily in PD to make sure I am the best ESS teacher I can be. I really enjoy the subject, but with that being said, we need Physical Science to be the 9th grade class again. I try to integrate the skills that my students need for upper levels as much as possible, but honestly it's not doing the topics justice. Students need physical science topics to help them quickly be more successful in biology, chemistry, and physics. The upper level teachers are having to teach topics that the students should already have working knowledge of; such as dimensional analysis, basic chemical equations and balancing, density, and many more. Please start to consider moving physical science back to 9th grade. The students need this to be successful!	N	Response 2 - High School grade Levels were removed from this Policy. However, Policy 2510 (*Assuring Quality of Education: Regulations for Education Programs*) identifies required prescribed courses. This comment regarding Physical Science will be shared with the Policy 2510 stakeholders' group which will meet in the Fall of 2021. For the 2021-2022 school year, per Policy 2510, Earth Space Science will remain the prescribed 9th grade course and Biology will remain the prescribed 10th grade course. Third and fourth science course recommendations were removed from this policy because those suggestions and options are in Policy 2510 along with those prescribed courses. Additionally, physical science standards were added to the Earth Space Science course in this policy that will help prepare students for upper-level science courses.
2021-07-12 14:58:39	Katie Hottinger Teacher Raleigh County Schools Beckley WV	It's great to see these content standards made more explicit.	A/S	
2021-07-12 14:59:25	Kaitlyn Carter Gilbert WV	The current standards have students lacking the skills they need to succeed in upper level science classes. A physical science class would better prepare the students for success in upper level science classes.	N	See Response 2

2021-07-12 15:00:28	Madora Saunders Teacher Scott Depot WV	These standards have students lacking skills they need for upper level sciences and it needs to go back to physical science.	N	See Response 2
2021-07-12 15:03:13	Cassidy Cline Teacher Mingo County BOE Delbarton WV	I feel that the standards in this course do not prepare students for the higher level science courses. With that, in personal opinion, it should go back physical science.	N	See Response 2
2021-07-12 15:05:10	Kim Sayre Parent Hometown WV	These students have students lacking skills they need for upper level science and should go back to physical science.	N	See Response 2
2021-07-12 15:10:52	Linda Wollaber Teacher Winfield High School Winfield WV	This course needs to be in 11 grade.	N	See Response 2
2021-07-12 15:16:14	Celeste Winfield WV	These standards have students lacking skills they need for upper level sciences. They need to go back to physical science.	N	See Response 2
2021-07-12 15:17:05	Christy Walls Teacher Winfield High School Winfield WV	Please change the standards so Physical Science is the 9th grade course.	N	See Response 2
2021-07-12 15:56:12	Emily Helton Education outreach specialist NASA IV&V ERC / Fairmont State University Morgantown West	Earth and space science is so foundational to the other content standards. To understand geology, you have to know chemistry and physics. This is such an engaging and rewarding course for students as they figure out the high school experience.	A/S	
§Environmental Science (Elective)				
7-12 14:36:02	Josh Revels Education Outreach Specialist Fairmont State	Wish this was required as a 4th science credit.	A/S	

	University Fairmont WV			
§Introduction comments				
2021-07-12 09:57:20	Gay Stewart Professor of STEM Education West Virginia University Morgantown WV	These standards are a great effort. I have a few small concerns and quibbles listed in the content, primarily. My largest concern except for some wording choices that have been shown to lead to later confusion but that are fairly standard, so I understand them sneaking in, is the 50% hands on requirement. If students are given productive "minds-on" tasks for 50% of class time this is excellent. If teachers are not carefully supported in understanding what this should look like and what the goals are, you often encounter students doing things, but not constructing any understanding from them. I think i would strengthen support for this need to ensure that the doing of science has to include this knowledge construction piece.	N	See Response 1
§Physical Science (recommended third course option)				
2021-06-15 16:31:34	Chris Dunaway Teacher Ohio County Schools Wheeling WV	I recommend this go back to the freshman course. It is a great introduction to chemistry, physics, and the old standards had Earth and Space. These foundations with help STEM majors as they move to more rigorous chemistry and physics. Physical science also helps students as freshman understand what they may be passionate about, while giving them a basis for all sciences. The educators I have spoken with do not prefer the Earth and Space option for freshman.	N	See Response 2
2021-07-12 09:57:20	Gay Stewart Professor of STEM Education West Virginia	SP.8.16 not clear from this standard that the extremely widespread misunderstanding is not part of the standard: Internal forces do not do work, only external forces exerted on the objects within a system can change the energy of the system.	A/C	Changes made to policy for clarification

	University Morgantown WV	Internal forces only change the type of energy within the system SP.8.23 not clear from this standard that the extremely widespread misunderstanding is not part of the standard: It sounds like momentum is only conserved in closed systems. Momentum is always conserved, this is fundamental in the universe. Momentum is CONSTANT in closed systems because none can be transferred in or out. change by transfer is not same as not conserved. not conserved means created or destroyed, which does not happen to momentum or energy.	N	
2021-07-12 15:10:52	Linda Wollaber Teacher Winfield High School Winfield WV	This course needs to go back to the 9th grade curriculum. This class standards prepares the students for Biology, Chemistry, Physics, Earth and Space, Environmental, and Forensic. Students are lacking the basics skills that are not part of the standards in the present 9th grade Earth and Space Sciences. Physical Science provides the platform to connect all sciences in the basic understanding of the mathematical connections of the physical and chemical science.	N	See Response 2
§Physics (recommended fourth course STEM option)				
2021-07-12 09:57:20	Gay Stewart Professor of STEM Education West Virginia University Morgantown WV	If a student wishes to study engineering, physics is a more useful course than chemistry for most fields, so I am not sure why chemistry is a 3rd course option and physics is a 4th? Group work does not need to all be hands on, so not sure about the 50%. The students need time to design and test, but also to argue, reason and explain to each other.	N N	Policy 2510 allows students to choose any science course as a third or fourth science credit. This is only a recommendation. See Response 1

		S.P.3. I am a bit confused. the Free-body diagram is an extremely useful tool to visually model Newtons second law, and is easily converted into a mathematical statement of it. Not sure why listed with Newton 1?	A/C	Changes made to policy for clarification
		S.P.6 not clear from this standard that the extremely widespread misunderstanding is not part of the standard: It sounds like momentum is only conserved in closed systems. Momentum is always conserved, this is fundamental in the universe. Momentum is CONSTANT in closed systems because none can be transferred in or out. change by transfer is not same as not conserved. not conserved means created or destroyed, which does not happen to momentum or energy.	N	
		S.P.13 not clear from this standard that the extremely widespread misunderstanding is not part of the standard: Internal forces do not do work, only external forces exerted on the objects within a system can change the energy of the system. Internal forces only change the type of energy within the system	A/C	Changes made to policy for clarification
		S.P.17-bouyancy does not seem to be related to states of matter as described.	N	
		s.p.27, i would say bar magnets instead if dipoles, since all magnets are at least dipoles.	A/C	Changes made to policy for clarification
		s.p.29-charge is a property of an object or system, not an object or system. point charge is a model, but to just say the force on a charge is wrong.	N	Physics teachers in the stakeholder group felt this was appropriate language

		s.p.31-not sure what an ohms law problem is for a parallel circuit? Ohms law is just v=ir	N	
§Science Content K-12				
2021-06-22 16:15:06	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Science Standards for Middle School Comment 2021 I have been teaching for over 15 years and have raised two children (one is a doctor, and the other is a petroleum engineer, my husband is a mechanical engineer, and my mom was a nurse, I was a registered dietitian before becoming a science teacher) and have a good handle on science and the need for science. Why do we hamper student learning by having the standards jump around in content? This has not worked for years and why be a follower and not a leader! WV could take the national standards and make them like the "old days" when students learned the content by having the same vocabulary from day one to day 180. Students do not retain the information for two reasons: it is easier to be passive and not care and it is ok because in a couple of weeks the topic will change and maybe they might care. Please take the national standards and assign them as a year topic. 7th grade used to be biology focused, 8th grade was Earth science and 9th was introductions to physical science and 6th grade was a touch of all preparing them for their future. Now to comment on the standards. They do not work often because no one knows what they are to teach. You can look at many different resources for this and still come away with different opinions and ideas about what the students are to know. We have four science teachers in my school, and I have	N	Response 3 – Middle school science standards were placed in each grade level to allow exposure to all four domains of science during the middle school experience. The science courses and standards have been written, organized, and vetted by teams of programmatic and content specialists, and other stakeholders. All stakeholders felt the standards were organized and placed in a developmentally appropriate course sequence.

		asked for interpretation on a standard I have gotten four different ideas. Totally different with no overlap. Why not state the standard and then put a, b, c, etc. and actually spell out what is to be taught/the intention? Students do not do well on the tests besides not being interested in it because the questions often do not match the 8th grade content and they do not remember anything prior. They are also being tested on their reading ability not their knowledge and understanding of science. They are tested in reading on the reading test, they are tested in reading on the math test, and they are tested in reading on the science test. I work on reading but why set up the students to fail before they begin? Those that read poorly are discouraged by the quantity and challenge. You also expect us to teach so much material that it can not be taught well due to time constraints. You may not realize that in elementary school students may have a half hour of science a week. I have talked to my fellow teachers who have elementary students, and some elementary teachers and science only happens if there is time. Thus, in middle school the students do not have a good foundation to work with and all must be presented from the most basic level for each grade level. This is time consuming but necessary. 7th grade does do some work in preparing students for the content on organisms. You also have not thought about the development of the brain. Mathematical models and formulas are often beyond this age group. They are not yet ready/prepared for this type of thinking and the		

		students just give up. Physical science is a tremendous amount of math, and the skills are not there when the science teacher would be teaching these concepts. I frequently ask the math teachers about the student's skills when my students cannot balance equations, use a formula, or read simple graphs or find percentages and I am told they are not taught, or these concepts in math are for the end of the year. Please adjust the standards to match the students' abilities not a fantasy you may have. Back to too much content. If you were to do a good job with the material and get the students to master the content, there should be no more than 3 "topics" per school year. I am new to 6th grade curriculum this year and it is going to be stressful challenge to get 2/3 of the content presented (not necessarily taught due to time constraints) let alone the addition of knowledge of the periodic table and the ability to differentiate an atom from a molecule. The students will not remember this concept and it will have to be retaught in the 8th grade. Why use valuable time on something they will not see again or need until 8th grade. I also teach 8th grade and I teach this each year and it takes a significant amount of time to get this down. I do not teach 7th grade and I am glad. The amount of content there is, is very overwhelming to me as an adult let lone being a student. To teach the Life science portions should take over a nine week and half period. That would be at least 13 weeks. The Energy portion should also take a nine- week period. The Earth science contents should take at		

		least another nine and half week period of time and that would be really pushing this concept. Forces would also take at least half of a nine -week period so we are now up to 4.5 nine weeks and that does not include the human impact portion and the engineering and design portions. (Engineering and design, takes the teachers in my school a nine -week period alone, I polled they for how much time they need to do this) There are only 4 nine weeks in a year. With the spelling out of the organ systems in the "new" proposed standards this would take at over half of a nine -week period alone. This is before we have school events, fire drills, advisory, delays, testing, and any other interruptions that may happen. Is there any wonder why there is a teacher shortage? 8th grade has material that is also rushed to have students presented with the concepts. Teaching and mastering are different ideas here. Presenting to have students recognize the wording is different from being able to use the vocabulary and apply it/master it to the concepts of science. We also have the literacy concepts to integrate. I must spend 3 weeks on graphing during the engineering and design phase of class because students do not have a clue about graphing until later in the year. (The math teachers always say they can tell which students are mine because they have an easier time in their class). Taking out two portions on engineering and design is not helpful due to the fact you need use a multitude of examples anyway and this encompasses those standards automatically. The design process is a difficult concept for students to grasp at this age. Again,		

		there is a lot of math; obtaining data, interpreting it and showing it in a graph or chart is challenging for most let alone the special education students. This is however one of the concepts that is used for the entire year. Basically, you did not change the standards much thus they are still going to be a poor format to follow and hope to have time to teach. Again, why be a follower and why not be a leader and go to one type of science for each grade level to get the material thoroughly covered and have students work with it long enough to master the content. I am so disappointed in the lack of improvement in these standards. This all looks good on paper, that is if you can decipher the mumbo jumbo of the standard and the fact that the standards are too taxing for our young minds to grasp as quickly as needed to get the entire set of standards covered. Please look at this. Students are tested in 8 th grade and they can not remember what they did yesterday let alone when they were a 6th grader. The test also has questions dealing with the old standards such as electricity. Really, is it their fault they get tired of reading, and they know they did not learn anything about electricity, and they already feel defeated thus students just mark answers to be done with it. I love Science but if I had been taught this in this manner, I doubt that I would have liked it. Why put standards out for comment when there is no improvement? Please give the teachers who are in the trenches actual, defined, clear, manageable, and doable standards! It is very hard to answer a student when they ask why they need to know some of the		

		present standards. I can often find no other answer than the state said so. Please relook at these standards and see how a student could benefit from the content that is to be taught. 7th grade standards should be used for the entire middle school grades. This would allow ample practice and time to get the concepts mastered. Please know, I cover all of the standards for my grade level, some better than others due to lack of time and the lack of prior knowledge on the concept. I have talked with my fellow teachers, and they agree we need to limit the content, not expand it. Please give the teachers who are in the trenches actual, defined, clear, manageable, and doable standards!		
2021-06-23 12:45:46	Kathy Jacquez C&I Coordinator Marion County Schools FAIRMONT WV	The inclusion of the requirement for instructional time to include 50% hands-on types of activities is important and perhaps should be bolded in the final document. There is a definite flow of subject matter from one grade to the next and the standards are written clearly and succinctly.	A/S	
2021-07-08 20:46:53	Candace Deweese Science Department Chair and Teacher Roane County High School Spencer WV	I'm concerned about the requirement stating 50% of learning must be hands-on labs. I have no issue with this, except we get very little county or state support. We are given very little money to spend on materials. My teachers usually only get $100 dollars a year and spend a great deal of their own money to pay for the supplies to run the labs we do now. Please consider the financial implications when making this decision. For example, I teach 6 different subjects this year alone. We go to school 180 days. 50% of that class time makes 90 days of	N	See Response 1

		hands-on lab instruction, times 6 different subjects. That is 540 lab periods across all the subjects.		
2021-07-09 20:50:33	Candace Deweese Science Department Chair and Teacher Roane County High School Spencer WV	I'm concerned about the requirement stating 50% of learning must be hands-on labs. I have no issue with this, except we get very little county or state support. We are given very little money to spend on materials. My teachers usually only get $100 dollars a year and spend a great deal of their own money to pay for the supplies to run the labs we do now. Please consider the financial implications when making this decision. For example, I teach 6 different subjects this year alone. We go to school 180 days. 50% of that class time makes 90 days of hands-on lab instruction, times 6 different subjects. That is 540 lab periods across all the subjects.	N	See Response 1
§Science Grade 4				
2021-07-12 09:57:20	Gay Stewart Professor of STEM Education West Virginia University Morgantown WV	s.4.2 would avoid generating a misconception by changing the word "heat" to "heating". Heat is the amount of energy transferred by a thermal process. Heating is the process. Heat is not a type of energy. In fact, heat might include energy transferred in the infrared of the light spectrum, for instance.	N	In this instance, with teacher guidance, the word heat, like sound and light, is more developmentally appropriate for grade 4.
§Science Grade 6				
2021-06-22 16:15:06	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Science Standards for Middle School Comment 2021 I have been teaching for over 15 years and have raised two children (one is a doctor, and the other is a petroleum engineer, my husband is a mechanical engineer, and my mom was a nurse, I was a registered dietitian before becoming a science teacher) and have a good handle on science and the need for science. Why do we hamper student learning by having the standards jump around in content? This has not worked for years	N	See Response 3

		and why be a follower and not a leader! WV could take the national standards and make them like the "old days" when students learned the content by having the same vocabulary from day one to day 180. Students do not retain the information for two reasons: it is easier to be passive and not care and it is ok because in a couple of weeks the topic will change and maybe they might care. Please take the national standards and assign them as a year topic. 7th grade used to be biology focused, 8th grade was Earth science and 9th was introductions to physical science and 6th grade was a touch of all preparing them for their future. Now to comment on the standards. They do not work often because no one knows what they are to teach. You can look at many different resources for this and still come away with different opinions and ideas about what the students are to know. We have four science teachers in my school, and I have asked for interpretation on a standard I have gotten four different ideas. Totally different with no overlap. Why not state the standard and then put a, b, c, etc. and actually spell out what is to be taught/the intention? Students do not do well on the tests besides not being interested in it because the questions often do not match the 8th grade content and they do not remember anything prior. They are also being tested on their reading ability not their knowledge and understanding of science. They are tested in reading on the reading test, they are tested in reading on the math test, and they are tested in reading on the science test. I work on reading but why set up the students to fail before they begin?		

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2021-06-22 20:08:37	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Sixth grade learns about the cycles of nature for the food part of the standard and then it is also part of the 7thgrade standards. Why?	N	Response 4 - In grade 6, cycles of nature references food, but in grade 7 cycles of nature refers to earth materials.
§Science Grade 7				
2021-06-16 10:50:08	Elizabeth Gallaher Teacher Clay County Middle School Clay WV	I appreciate the streamlining of the standard numeration.	A/S	
2021-06-22 16:15:06	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Science Standards for Middle School Comment 2021 I have been teaching for over 15 years and have raised two children (one is a doctor, and the other is a petroleum engineer, my husband is a mechanical engineer, and my mom was a nurse, I was a registered dietitian before becoming a science teacher) and have a good handle on science and the need for science. Why do we hamper student learning by having the standards jump around in content? This has not worked for years and why be a follower and not a leader! WV could take the national standards and make them like the "old days" when students learned the content by having the same vocabulary from day one to day 180. Students do not retain the information for two reasons: it is easier to be passive and not care and it is ok because in a couple of weeks the topic will change and maybe they might care. Please take the national standards and assign them as a year topic.	N	See Response 3

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2021-06-22 20:08:37	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Sixth grade learns about the cycles of nature for the food part of the standard and then it is also part of the 7thgrade standards. Why? There is too much for 7th grade already	N	See Response 4
§Science Grade 8				

2021-06-22 16:15:06	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Science Standards for Middle School Comment 2021 I have been teaching for over 15 years and have raised two children (one is a doctor, and the other is a petroleum engineer, my husband is a mechanical engineer, and my mom was a nurse, I was a registered dietitian before becoming a science teacher) and have a good handle on science and the need for science. Why do we hamper student learning by having the standards jump around in content? This has not worked for years and why be a follower and not a leader! WV could take the national standards and make them like the "old days" when students learned the content by having the same vocabulary from day one to day 180. Students do not retain the information for two reasons: it is easier to be passive and not care and it is ok because in a couple of weeks the topic will change and maybe they might care. Please take the national standards and assign them as a year topic. 7th grade used to be biology focused, 8th grade was Earth science and 9th was introductions to physical science and 6th grade was a touch of all preparing them for their future. Now to comment on the standards. They do not work often because no one knows what they are to teach. You can look at many different resources for this and still come away with different opinions and ideas about what the students are to know. We have four science teachers in my school, and I have asked for interpretation on a standard I have gotten four different ideas. Totally different with no overlap. Why not state the standard and then put a, b, c, etc. and actually spell out what is to be	N	See Response 3

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2021-07-12 09:57:20	Gay Stewart Professor of STEM Education West Virginia University Morgantown WV	S.8.13 contains something that might be confusing. Thermal energy is commonly used to describe energy due to internal particle motion so I am assuming that is what is meant when I see it although this can be problematic. the big thing here however, is that you can change the thermal energy of the system by a mechanical process. I am not sure that is clear here. So, if i squeeze a box of gas, I did not add thermal energy, technically. i increased the energy of the system by adding mechanical energy, this energy is converted to thermal energy in the system. I would probably say something like "when energy is added or removed so that a change in the thermal energy of the system results"	N	The specification of thermal energy in this standard is required to ensure mastery of the standard. This standard deals directly with thermal energy and is appropriate here, however it is expected that a teacher would explain how different types of energy could also impact the system.
§Science Indicators Grades 6 - 8				
2021-06-22 16:15:06	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Science Standards for Middle School Comment 2021 I have been teaching for over 15 years and have raised two children (one is a doctor, and the other is a petroleum engineer, my husband is a mechanical engineer, and my mom was a nurse, I	N	See Response 3

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2021-06-22 20:08:37	Deborah Shaffer-Palmer Science teacher Moundsville Middle School Moundsville WV	Please list specifically as sub points what the students are to learn; it presently is hard to interpret. Each person who reads them read and infer something different.	N	Current standards do not include learning targets. Science teachers identify those specific targets while creating their curriculum.
§Science Indicators Grades 9 - 12				
2021-07-12 14:21:25	Deb Hemler Science Methods Instructor Fairmont State University Fairmont WV	I applaud the inclusion of the nature of science and lab safety in secondary. Science is not just about content. Students need to understand the processes of science and the way science works. The return of the 50% hands on requirement is needed to teach this. Thank you for including this!	A/S	