

Bid 3411

INSTRUCTIONAL MATERIALS ADMINISTRATOR

Recommendation

No

Comments: Overall, the materials represent a good start, but have many improvements to make before it should be considered for adoption for state use.

The major strength of this major tool is the overall framework, the 5E + IA model of instruction. Through this model, the material within a unit was scaffolded effectively and re-inforced the major themes of the section through many lenses. Many of the hands-on activities within this framework are effective teaching tools.

The materials presented in the major tool, however, are fraught with errors and therefore should not be adopted for state use. For example, in some cases, the content is factually inaccurate, not in line with the current scientific research or standards of practice, or contains typographical or visual errors. (More specifics of this can be found in my "Content" and "Standards" review.) Another weakness is that ethnic minorities (e.g. African Americans and Hispanics) and persons with disabilities are substantially underrepresented in the "Career Connections" videos.

In addition to content deficiencies, the major tool should include more primary scientific sources for student learning, discussion, and analysis. Sources with both qualitative and quantitative information should be better integrated into the Student Guide. More could be done to teach students to evaluate the credibility and accuracy of various sources, both in the Student Materials and also aiding the students when they are doing research online. The inclusion and analysis of more primary sources could help overcome this weakness. Of concern, in one of the Set Up Videos for the teacher (the unit on Microscopes), some of the research is done on Wikipedia. Since students should be taught to utilize and cite more reliable sites (e.g. .gov websites or peer-reviewed scientific research), this model is inappropriate. Encouraging this practice is ineffective as a teaching/learning tool for scientific inquiry and research.

Material for Review

Course: Biology 1 (2000310)

Title: STEMscopes Florida 2.0 - Biology , Edition: 1

Copyright: 2017

Author: Jarrett Reid Whitaker

Grade Level: 9 - 12

Content

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating.

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating from the following scale:

- 5 - VERY GOOD ALIGNMENT
- 4 - GOOD ALIGNMENT
- 3 - FAIR ALIGNMENT
- 2 - POOR ALIGNMENT
- 1 - VERY POOR/NO ALIGNMENT

Upon completion of all Areas of Review, the Recommendation link will become available with a record of how you scored each section of the evaluation.

- Reviewers are instructed that submissions should be consistently rated as 5 or 4 to be recommended for adoption. Materials that are consistently rated 2 or 1 are not expected to be recommended for adoption.

- Justification and Comments are strongly encouraged for each rating. Please use the Justification/Comments section to list any strengths, weaknesses, concerns, issues, and/or to provide examples supporting the rating. Your comments maybe used by publishers to help them improve their products
- Additional information regarding the Content, Presentation, and Learning requirements are located in the Science K-12 Specifications for the 2017-18 Florida State Adoption of Instructional Materials.

Each set of materials submitted for adoption is evaluated based on each benchmark for that course and the Content, Presentation, and Learning items included in this rubric.

A. Alignment with curriculum1. A. The content aligns with the state's standards and benchmarks for subject, grade level and learning outcomes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The content somewhat aligns with the state's standards, although the factual inaccuracies and content that is not in line with the current scientific research or standards of practice are present (see answers specifically addressing these questions).

2. A. The content is written to the correct skill level of the standards and benchmarks in the course.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Generally, the materials are written to the correct skill level, with alternative content for advanced learners (found under "Acceleration" for each unit in the portal) and additional content for students that might take more time (found under "Elaborate" for each unit in the portal). There are places where informal language is used in the Student Material, which is not appropriate for the students. For example, all references to "rhesus monkeys" (e.g. in the section on "Evolution") should be changed to "rhesus macaques" to reflect the proper name of this organism. Also, there are some places where the materials avoid going into detail (perhaps to avoid confusion). However, in most cases, additional detail would facilitate understanding and foster motivation in the learners. For example, in the unit on Individuals and the Environment, the Student Guide states, "Parameters first have to be established, which is not a simple task." Examples of (1) the types of parameters and (2) the parameters used to protect a given environment in a specific environmental law, and (3) how the new law has impacted the particular environment would be helpful for students to understand.

3. A. The materials are adaptable and useful for classroom instruction.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

In general, the materials are adaptable and useful for classroom instruction. There are some factual inaccuracies and content that is not in line with the current scientific research or standards of practice that need to be corrected before implementation for classroom instruction. Furthermore, the Teacher Planning Companion for each unit is unnecessarily busy and convoluted. A simpler, more straightforward design (that looks more like a traditional lesson plan) would be more helpful for teachers trying to adapt the material for classroom instruction.

B. Level of Treatment4. B. The materials provide sufficient details for students to understand the significance of topics and events.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In some cases, examples should be added to facilitate student understanding. For example, in the unit on Individuals and the Environment, the Student Guide states, "Parameters first have to be established, which is not a simple task." Examples of (1) the types of parameters and (2) the parameters used to protect a given environment in a specific environmental law, would be helpful for students to understand. In another example the unit on enzymes, the Student Guide states, "Enzymes speed up chemical reactions by lowering the activation energy needed to start the reaction" and provides a graph showing this concept but should also describe what is happening in the text.

5. B. The level (complexity or difficulty) of the treatment of content matches the standards.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The level would be more appropriate if there were appropriate images and/or informational graphics accompanying the text. For example, The Iron-Sulfur World Theory and RNA World Hypothesis in the Student Materials in "Part I: Spontaneous Generation, Louis Pasteur, Oparin-Haldane, Miller/Urey, Wächtershäuser, Cech, and Margulis" are both extremely complicated. Both of these concepts should be accompanied by diagrams to illustrate the concept (e.g. the Iron-Sulfur World Theory should show mineral deposits near the volcanic vents).

6. B. The level (complexity or difficulty) of the treatment of content matches the student abilities and grade level.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are some sentences that contain multiple, complex ideas and therefore it would benefit students if those were to be broken into multiple sentences. For example, in the unit on Individuals and the Environment, the Student Guide reads, "Scientists have to propose that research be conducted on a situation that is occurring often enough that it is causing, or will cause, damage to an environmental factor such as water, air, soil, or wildlife."

7. B. The level (complexity or difficulty) of the treatment of content matches the time period allowed for teaching.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In general, this is well aligned. Only 1 hour is allowed for assessment, which might not be enough time for the more writing-intensive assessments (e.g. those assessments titled, "Write Science"). However, there is no suggested time on the activities labelled, "ELI", in the Teacher's Guide. Adding a minimum time might be helpful for teacher planning.

C. Expertise for Content Development8. C. The primary and secondary sources cited in the materials reflect expert information for the subject.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The source(s) for in the "Science Today- Read It!" sections are reflect expert information. Sources for the factual material and images found in the Student Guide are not well cited and contain both factual inaccuracies and content that is not in line with the current scientific research or standards of practice.

9. C. The primary and secondary sources contribute to the quality of the content in the materials.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In the (relatively) few places that primary sources are used, they do contribute to the quality of the content. More primary and secondary sources should be used; for example, the unit on Evolution could contain an interview with one of the scientists that discovered an ancient human fossil, specifically focusing on how the fossil they found contributed to our understanding of hominid evolution from early ancestors six million years ago to modern humans.

D. Accuracy of Content10. D. The content is presented accurately. (Material should be devoid of typographical or visual errors).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

See below for a sample of the typographical and visual errors that I found: In the unit on Evolution, in the Student Guide in the image, the h in "heidelbergensis" should be lowercase (because it is a species name). In the Evolution section of the Student Journal, the 5th column in the table in Question 4 is missing the beginning "i" (for the word "internal"). In the unit on DNA Replication, in the Student Materials Station 1, "base pairs is written "basex pairs". In the unit on Mitosis in Part II of the Student Guide, the text states, "DNA is replicated in preparation for the cell to divide. Interphase is broken into three phases: G1". The text should either add S Phase and G2 Phase or delete the text, "G1". In the unit on Comparing and Contrasting Mitosis and Meiosis, the Student Material states, "In normal somatic cells, or the body cells, a human has 23 sets of chromosomes or 46 chromosomes in total." The word "sets" should be replaced with "pairs" for precision. In the Student Guide of the unit on Individuals and Environmental Impact, the text does not explicitly write the shortened form of the Environmental Protection Agency, yet uses the initials in the next sentence. From the text, "...The Clean Air Act, the Clean Water Act, and the Environmental Protection Agency all came about around the 1970s. The events that led to the creation of these acts and the EPA were massive and devastating." After Environmental Protection Agency, there needs to be (EPA) if it is to be used in the next sentence. In the Student Guide of the unit "Photosynthesis and Cellular Respirations", the word "respirations" should not be plural. Also in the student guide of this unit, "cellular respiration" is unnecessarily capitalized in Question 2. In the table in Question 3, the second letter of the word "organism" is capitalized unnecessarily. The word "usable" is spelled incorrectly in the first sentence of the Student Guide (spelled useable).

11. D. The content of the material is presented objectively. (Material should be free of bias and contradictions and is noninflammatory in nature).

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

One example of a contradiction is as follows: In the unit titled, "Photosynthesis and Cellular Respirations", text in the Student Guide says that, "Photosynthesis is the process that plants and other organisms, such as cyanobacteria, use to convert light energy from the Sun into a useable, chemical energy stored in a molecule called ATP." but the accompanying image shows that the products of photosynthesis are sugar and oxygen. Therefore, need to clarify that the products of photosynthesis will then be used to make ATP but ATP is not a direct product of the photosynthesis reaction.

12. D. The content of the material is representative of the discipline? (Material should include prevailing theories, concepts, standards, and models used with the subject area).

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Regarding the standards, many times the materials do not highlight the complexity of the topic and how much of the material are still active areas of research. For example, let's look at the material for standard SC.912.L.15.10: Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools. This does list/demonstrate these basic trends; however, the literature for the students do not emphasize that the evolutionary origins of these are still being researched. For example, the evolution of human language is an area of active research. While the scientific literature suggests that the gene FOXP2 is necessary but not sufficient for human language, we don't know what components (genetics or otherwise) that are sufficient for human language.

13. D. The content of the material is factual accurate. (Materials should be free of mistakes and inconsistencies).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

Here are some of the content mistakes that I found (my answer for 14 might also be relevant for this): 1) From the Evolutionary Mechanisms in the Student Materials, "Free-hanging earlobes are the dominant trait (E). The only way an individual can have attached earlobes is if they are homozygous recessive for this trait. So, even under ideal conditions, you would not expect more than 25 percent of any population to have attached earlobes." This is true only if free-hanging earlobes are a neutral trait and should be specified. If the trait is strongly advantageous, it could reach a percentage greater than 25%. 2) From the Evolutionary Mechanisms in the Student Materials, "Genetic drift is the random change in the frequency of an allele in the gene pool of a small population." Genetic drift happens in populations of all sizes but will most likely have a bigger impact on smaller populations. 3) In the Impact of Biotechnology unit, in the Student Guide answer key, the authors state, "Overuse [of antibiotics] can lead to antibiotic-resistant viruses." Bacteria, not viruses, can become resistant to antibiotics. 4) In the Student Guide of the unit "Photosynthesis and Cellular Respirations", in the Picture Vocabulary (and potentially other places), "Kreb's Cycle" is written. This term should not have an apostrophe. I am not sure if this is merely a typographical error or a content error.

E. Currency of Content14. E. The content is up-to-date according to current research and standards of practice.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

See the following for examples of content being out-of-date: 1) From the Natural Selection section, Student materials for "Mutation in Action", "Many mutations have no effect on an organism's phenotype because it occurs in a noncoding section of DNA or the amino acid sequence of the protein is not affected." Just because something occurs in a noncoding section of the DNA, this change can still alter the phenotype by affecting gene expression levels, which then affects protein levels, which could ultimately affect the phenotype. 2) In the "Mendel's Law" section, there is a graphic organizer of the same name. The answer key says that in the multiple alleles mode of inheritance, "Some genes have more than two alleles." While this is technically true, this answer is incorrect in context. Instead, the word "genes" should be replaced by [genetic] loci." 3) In the Nature versus Nurture activity (Mendel's Law, Student guide Part I), most of the traits that the answer key says is either one or the other are actually likely both. For example, genetics (Nature) can influence the trait of being overweight (see Smemo et al. Nature 2014) and Nurture can be affect whether someone is short in height (see Portrait, van Wingerden, Deeg Economics and Human Biology 2017). 4) In the Impact of Biotechnology unit, in the Student Guide, the authors state, "Scientists can now prescribe certain medicines based off your genes. Some medications may work better for you based off your gene profile." The phrase "gene profile" is not consistent with current research. "Genetic background" should be used instead. 5) In the graphic organizer, "Biological Macromolecules" in the unit with the same title, the elements present are abbreviated to just the first letter of the molecules (e.g. CHO for carbon, hydrogen and oxygen). This is not a scientifically appropriate classification; for example, CHO is the abbreviation for an aldehyde. Therefore, the full word must be written out.

15. E. The content is presented to the curriculum, standards, and benchmarks in an appropriate and relevant context.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are a couple of places where the presentation/context is not appropriate: All references to "rhesus monkeys" (e.g. in the section on "Evolution") should be changed to "rhesus macaques" to reflect the proper name of this organism 2) In the unit on Carrying Capacity in the Student Materials online, the numbers on the x axis squished together and therefore do not constitute an appropriate graph. 3) In the unit on the Food Web, the organism cards and answer key uses "KCal" instead of "kcal" (kilocalories, which I think it was trying to use). "Kcal", which they might have been trying to type instead may also be appropriate, but I am not sure. 4) In the unit on the Human Immune system, in the Reading Science- Functions of the Human Immune system, the phrase "parasitic worm" is used. "Parasite" is the proper term.

16. E. The content is presented in an appropriate and relevant context for the intended learners.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are multiple places where the details presented in the Student Guide are factually accurate, yet appropriate transitions and/or ordering of the details are not utilized. This lack of connections creates confusion. For example, in the Student Guide in the unit on Evolution, the sentences on radioactive dating are factually correct but aren't well connected. Somewhat related to this issue of context, other places use a difficult vocabulary word then do not define it (even in other places like the Picture Vocabulary) nor provide sufficient context for most intended learners to predict meaning effectively. For example, the use of "parameters" in the Student Guide in the unit on Individuals and Environmental Impact, "Parameters first have to be established, which is not a simple task. Scientists have to propose that research be conducted on a situation that is occurring often enough that it is causing, or will cause, damage to an environmental factor such as water, air, soil, or wildlife." Another example is with "high specific heat" in the unit on water. The text states, "Water resists changes in temperature because it has a high specific heat. It takes a lot more heat to increase the temperature of water than most other liquids." The authors should also be careful about both word usage and sentence complexity. For example, In the Student Guide in the unit on Individuals and Environmental Impact, "The establishment of that research then requires specific laws that entail ways in which situations can be monitored accurately." The word "entail" is not appropriate in this sentence and will particularly confuse English Language Learners (ELLs). Furthermore, in the Student Guide in unit on Cell Theory, the text reads, "Many times, people have us believe "facts" that have not been properly tested." This sentence to be clarified to reflect that some claims are presented as "facts" but are actually opinions and/or statements that have not been properly tested.

F. Authenticity of Content 17. F. The content includes connections to life in a context that is meaningful to students.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The units vary widely in their use of connections to life in a context that is meaningful to students. For example, the unit on "Individuals and the Environment" and are very well connected. Others, such as "Parts of the Brain" and "Enzymes" are not.

18. F. The material includes interdisciplinary connections which are intended to make the content meaningful to students.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are materials and activities on connections to math and engineering for each unit.

G. Multicultural Representation 19. G. The portrayal of gender, ethnicity, age, work situations, cultural, religious, physical, and various social groups are fair and unbiased. (Please explain any unfair or biased portrayals in the comments section).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Ethnic minorities (e.g. African Americans and Hispanics) and persons with disabilities are drastically underrepresented in the "Career Connections" videos.

H. Humanity and Compassion 20. H. The materials portray people and animals with compassion, sympathy, and consideration of their needs and values and exclude hard-core pornography and inhumane treatment. (An exception may be necessary for units covering animal welfare).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are a couple of instances where this is are not well aligned. In the unit titled, "Photosynthesis and Cellular Respirations", the use of

the word "choke" in the Student Guide is flippant and inappropriate. See text, "Without plants that perform photosynthesis, the oxygen on our planet would run out, and all humans and other living things that need oxygen would choke in a carbon-dioxide rich atmosphere."

21. In general, is the content of the benchmarks and standards for this course covered in the material.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The variety and creativity of activities used to teach the benchmarks and standards should be applauded. The errors in the content (and occasional lack of clarifying detail), however, can not be overlooked and need to be addressed by the authors.

Presentation

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating.

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating from the following scale:

5 - VERY GOOD ALIGNMENT
4 - GOOD ALIGNMENT
3 - FAIR ALIGNMENT
2 - POOR ALIGNMENT
1 - VERY POOR/NO ALIGNMENT

Upon completion of all Areas of Review, the Recommendation link will become available with a record of how you scored each section of the evaluation.

- Reviewers are instructed that submissions should be consistently rated as 5 or 4 to be recommended for adoption. Materials that are consistently rated 2 or 1 are not expected to be recommended for adoption.
- Justification and Comments are strongly encouraged for each rating. Please use the Justification/Comments section to list any strengths, weaknesses, concerns, issues, and/or to provide examples supporting the rating. Your comments maybe used by publishers to help them improve their products
- Additional information regarding the Content, Presentation, and Learning requirements are located in the Science K-12 Specifications for the 2017-18 Florida State Adoption of Instructional Materials.

Each set of materials submitted for adoption is evaluated based on each benchmark for that course and the Content, Presentation, and Learning items included in this rubric.

A. Comprehensiveness of Student and Teacher Resources 1. A. The comprehensiveness of the student resources address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The comprehensiveness is satisfactory, although a lot of the units require teachers to cut out the pictures/notecards/images or prepare materials for labs ahead of time. Some of the "Extensions" suggested in the Teacher Planning Companion would require additional planning, but these are optional and there are enough other material that the teachers would not have to use these. The multiple choice and short answer assessments are relatively short, and the short answer assessments are fairly straightforward based on the material. Oftentimes, they focus on summarizing the information learned rather than applying it. Therefore, if a teacher wanted a more comprehensive or applied assessment, they would likely have to create it themselves. The authors of the material should ensure that all of the answer keys are provided. For example, I could not find the answer to Question 5 in Part 2 of the "Explore" materials in the unit on Cycles of Matter.

B. Alignment of Instructional Components 2. B. All components of the major tool align with the curriculum and each other.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The components are aligned to the 5E + IA model of instruction and to the curriculum, although the content errors described in the "Content" section of this review hurts the alignment with the curriculum.

C. Organization of Instructional Materials 3. C. The materials are consistent and logical organization of the content for the subject area.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Within a unit the materials are consistent, as they are based on the 5E + IA model of instruction. The order of the units presented in the major tool was somewhat logically organized, although I don't understand why fundamental units like water and enzymes are presented at the very end of the the curriculum. In some cases (such as these) there are not a logical flow or transition between the units. Perhaps the teacher would select the order in which to teach the units?

D. Readability of Instructional Materials 4. D. Narrative and visuals engage students in reading or listening as well as in understanding of the content at a level appropriate to the students' abilities.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

As stated in the questions on "Content", there are places where there are insufficient detail, lack of real-life applications/connections, or unclear phrasing that are not engaging for the students. There are other units that have unclear images or have images that are not well connected to the narrative. For example, The Iron-Sulfur World Theory and RNA World Hypothesis in the Student Materials in "Part I: Spontaneous Generation, Louis Pasteur, Oparin-Haldane, Miller/Urey, Wachtershauser, Cech, and Margulis" are both extremely complicated. Both of these concepts should be accompanied by diagrams to illustrate the concept (e.g. the Iron-Sulfur World Theory should show mineral deposits near the volcanic vents). An additional example includes the relevance of the picture in the Background: Structural Factors and Blood Flow in the Student Guide (a person running with red blood cells in the background) in the unit on the Cardiovascular System. Some of the images or diagrams in the Student Materials contain red underlines (in the style of how Microsoft Word denotes spelling and grammatical errors.) Displays with these red lines still present should not be in the Teacher or Student Materials.

E. Pacing of Content5. E. The amount of content presented at one time or the pace at which it is presented must be of a size or rate that allows students to perceive and understand it.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Generally, the time allotted for the different parts of the 5E + IA model of instruction makes sense. Only 1 hour is allowed for assessment, which might not be enough time for the more writing-intensive assessments (e.g. those assessments titled, "Write Science").

Accessibility6. The material contains presentation, navigation, study tool and assistive supports that aid students, including those with disabilities, to access and interact with the material. (For assistance refer to the answers on the UDL questionnaire).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

Most of the materials will aid students to access and interact with the material. For example, the student videos, e.g. Career Connections, are available with closed captioning. At least one activity, activity 1 in the Human Immune System unit, is not inclusive to students with mobility- and other related disabilities. The activity states, "Activity 1: Split the class in half, with one half representing pathogens and the other half representing the immune system. Have the students in the immune system group interlock their arms and arrange themselves in a straight line. Tell the students in the pathogens group that they are harmful substances that must try to cross the line set up by the immune system. Suggest that the pathogens run and try to break through the linked arms that form the immune system." Additionally, the material developers should be mindful of students that are colorblind. For example, in the unit on "Parts of the Brain", many of the materials rely on a legend with different colors (including red and green). This could make the brain diagrams difficult for students that are colorblind (particularly red/green colorblind). Instead, make sure the parts of the brain in the "Engage" part of the Student Journal are properly labelled as well as how they are currently colored.

7. In general, how well does the submission satisfy PRESENTATION requirements? (The comments should support your responses to the questions in the Presentation section).

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The score was particularly impacted by the deficiencies organization and readability of Instructional Materials discussed in more detail in questions 3 and 4 of this section.

Learning

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating.

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating from the following scale:

- 5 - VERY GOOD ALIGNMENT
- 4 - GOOD ALIGNMENT
- 3 - FAIR ALIGNMENT
- 2 - POOR ALIGNMENT
- 1 - VERY POOR/NO ALIGNMENT

Upon completion of all Areas of Review, the Recommendation link will become available with a record of how you scored each section of the evaluation.

- Reviewers are instructed that submissions should be consistently rated as 5 or 4 to be recommended for adoption. Materials that are consistently rated 2 or 1 are not expected to be recommended for adoption.
- Justification and Comments are strongly encouraged for each rating. Please use the Justification/Comments section to list any strengths, weaknesses, concerns, issues, and/or to provide examples supporting the rating. Your comments maybe used by publishers to help them improve their products
- Additional information regarding the Content, Presentation, and Learning requirements are located in the Science K-12 Specifications for the 2017-18 Florida State Adoption of Instructional Materials.

Each set of materials submitted for adoption is evaluated based on each benchmark for that course and the Content, Presentation, and Learning items included in this rubric.

A. Motivational Strategies1. A. Instructional materials include features to maintain learner motivation.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The variety of activities that have been developed as part of the 5E + IA model of instruction will help to maintain learner motivation. The connections to real world applications seen in many of the units, including the "Career Connections" will also help to maintain motivation. The units with unclear or inaccurate material, including lack of detail and real-world applications (see in particular my answer to questions 13, 14, 16, and 19 of "Content") will hurt learner motivation.

B. Teaching a Few "Big Ideas"2. B. Instructional materials thoroughly teach a few important ideas, concepts, or themes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Each unit does strive to teach a few important ideas, concepts, or themes as illustrated in the title and homepage for each unit. Its efficacy is mixed, as described in my answers in the "Content" and "Presentation" of this review.

C. Explicit Instruction3. C. The materials contain clear statements of information and outcomes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The Student Expectations, Key Concepts, and Fundamental Questions are well described in the "Home" page of each unit. The "Standards Correlations", "Standards Unwrapped", and "Teacher Planning Companion" pages also contain information about the standards and outcomes. There are some errors in the information, which affects the clarity of the information. See in particular my answer to questions 13, 14, and 16, 19 of "Content").

D. Guidance and Support4. D. The materials provide guidance and support to help students safely and successfully become more independent learners and thinkers.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The variety of activities will help students to successfully become more independent learners and thinkers. Most of the materials are safe. At least one activity, activity 1 in the Human Immune System, is not. The activity states, "Activity 1: Split the class in half, with one half representing pathogens and the other half representing the immune system. Have the students in the immune system group interlock their arms and arrange themselves in a straight line. Tell the students in the pathogens group that they are harmful substances that must try to cross the line set up by the immune system. Suggest that the pathogens run and try to break through the linked arms that form the immune system." This activity could lead to upper body injuries for both the students running and linking arms.

5. D. Guidance and support must be adaptable to developmental differences and various learning styles.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In each unit, there are ELL Strategies, Multitiered System of Supports Strategies, graphic organizers, and literacy strategies. Additional resources, include: Tiered Intervention Support, and various development interventions in the areas of Communication, Physical, Cognitive, Social/Emotional and Adaptive Behaviors. For advanced students, there were acceleration elements, extension activities, and varied assessment types to extend and deepen their understanding of the science content.

E. Active Participation of Students6. E. The materials engage the physical and mental activity of students during the learning process.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Labs and activities are engaging mentally and physically, particularly in the units that have multi-stationed activities/labs.

7. E. Rate how well the materials include organized activities that are logical extensions of content, goals, and objectives.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The organized activities are a strong point of this major tool. One activity that I found particularly engaging and a logical extension of content, goals, and objectives were the DNA replication activities with beads, pipecleaners, etc. This "Engage" student activity is both memorable and reinforced the material well.

F. Targeted Instructional Strategies8. F. Instructional materials include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

STEMscopes Florida 2.0 is written based on the 5E + IA model of instruction, a research-based instructional model that says students learn content best through building experiences in a given sequence. This allows understanding to grow naturally.

9. F. The instructional strategies incorporated in the materials are effective in teaching the targeted outcomes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The scaffolding found in the 5E + IA model of instruction is well aligned to this statement. There is not a lot of scaffolding or interdisciplinary connections between the units, which negatively impacted the score.

G. Targeted Assessment Strategies10. G. The materials correlate assessment strategies to the desired learning outcomes.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are multiple ways to evaluate students in every unit. This includes Claim-Evidence-Reasoning, Multiple Choice, short answer and essay responses.

11. G. the assessment strategies incorporated in the materials are effective in assessing the learners' performance with regard to the targeted outcomes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are multiple ways to evaluate students in every unit. This includes Claim-Evidence-Reasoning, Multiple Choice, short answer and essay responses. The multiple choice and short answer assessments are relatively short, and the short answer assessments are fairly straightforward based on the material. Oftentimes, they focus on summarizing the information learned rather than applying it.

Universal Design for Learning12. This submission incorporates strategies, materials, activities, etc., that consider the needs of all students.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The scaffolding in the 5E + IA model of instruction is inclusive to the needs of students. The real-world connections (e.g. Career Connections) should be more inclusive (for more details, see answers to Question 19 in Content and Question 6 in Presentations).

Mathematical Practice13. Do you observe the appropriate application of Mathematical Practices (MP) as applicable?

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Each unit contains a Mathematical Practices (MP) activity, which is applaudable. These applications of Mathematical Practices (MP) are varied in their relevance to the topic being taught. For example, the MP activity in the Plant and Animal Cells and the Microscope units are very appropriate, but the MP activity in the DNA Replication unit doesn't directly relate to the material. MP activities in other units are forced and don't use mathematics as is it used in the discipline/in the context of a given unit (e.g. the activity in the "Biological Macromolecules" and the "Domains and Kingdoms" units).

14. In general, does the submission satisfy LEARNING requirements? (The comments should support your responses to the questions in the Learning section.)

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The materials follow the 5E + IA model of instruction well, but could be made more inclusive. Some of the materials for the Mathematical Practices could be more realistic and/or use mathematical principles that directly relate to the unit (and therefore be more realistic and engaging to students).

Standards

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating.

Answer each item below and select the "Save" button to save your responses. You must select the "Save" button before going to another section or leaving this page to save the answers you have provided. If you are unable to complete the section, you may save your answers and come back to complete at a later time. All items must be answered for a section to be considered complete.

To answer each item, select the appropriate rating from the following scale:

- 5 - VERY GOOD ALIGNMENT
- 4 - GOOD ALIGNMENT
- 3 - FAIR ALIGNMENT
- 2 - POOR ALIGNMENT
- 1 - VERY POOR/NO ALIGNMENT

Upon completion of all Areas of Review, the Recommendation link will become available with a record of how you scored each section of the evaluation.

- Reviewers are instructed that submissions should be consistently rated as 5 or 4 to be recommended for adoption. Materials that are consistently rated 2 or 1 are not expected to be recommended for adoption.
- Justification and Comments are strongly encouraged for each rating. Please use the Justification/Comments section to list any strengths, weaknesses, concerns, issues, and/or to provide examples supporting the rating. Your comments maybe used by publishers to help them improve their products
- Additional information regarding the Content, Presentation, and Learning requirements are located in the Science K-12 Specifications for the 2017-18 Florida State Adoption of Instructional Materials.

When looking at standards alignment reviewers should consider not only the robustness of the standard coverage but also the content complexity (depth of knowledge level) if appropriate. More information on content complexity as it relates to Florida standards can be found at:

http://www.cpalms.org/Uploads/docs/CPALMS/initiatives/contentcomplexity/CPALMS_ccdefinitions_140711.pdf

For example, if the standard is marked as a level 3 (strategic reasoning and complex thinking) then the materials coverage should reflect this. If the materials coverage is only sufficient to allow for recall (level 1) then this should be reflected in the points assigned.

1. **SC.912.E.7.1:** Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.

Remarks/Examples:

Describe that the Earth system contains fixed amounts of each stable chemical element and that each element moves among reservoirs in the solid earth, oceans, atmosphere and living organisms as part of biogeochemical cycles (i.e., nitrogen, water, carbon, oxygen and phosphorus), which are driven by energy from within the Earth and from the Sun.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

I could not find the "Student Reference Sheet" referenced in the "Explore" section of the "Cycles of Matter" unit. Therefore I am scoring this based on the materials that I could find, which defined different biogeochemical cycles but did not analyze the movement of matter and energy through these cycles.

2. **SC.912.L.14.1:** Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.

Remarks/Examples:

Describe how continuous investigations and/or new scientific information influenced the development of the cell theory. Recognize the contributions of scientists in the development of the cell theory.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The information and timeline activities are well aligned to recognize the contributions of scientists in the development of cell theory. One thing that should be made explicit are the connections between the discoveries (e.g. X discovery led to Y because of Z).

3. **SC.912.L.14.2:** Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Hands-on activities and activities in the student journal are well-aligned to this standard.

4. **SC.912.L.14.3:** Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.

Remarks/Examples:

Annually Assessed on Biology EOC. Also assesses SC.912.L.14.2.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In general, it is well aligned to the standard. One suggestion for improved alignment to the standard is to improve the "Plants and Animal Cells" student worksheet to better facilitate student learning. The "Prokaryote" and "Eukaryote" boxes should be in the middle of the "alike" and "different" sets of boxes. There should be a direct line between "prokaryote" and the "different" boxes and "eukaryote" and "different" boxes to better highlight the differences between the two types of cells.

5. **SC.912.L.14.4:** Compare and contrast structure and function of various types of microscopes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

A major component of this section includes an online activity in which students perform a Google search to investigate different properties of the microscopes. I could not find where the Student Materials it discusses the importance of evaluating the source of the information. Furthermore, the "Microscopes" graphic organizer does not have a place where students can cite the information or where they got the material from. This practice is not in line with LAFS.910.RST.1.1 and, if the students find and record inaccurate information, can result in the students not learning this standard.

6. **SC.912.L.14.6:** Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

For the significance of genetic factors to public health, the authors should add that genetic factors can make certain populations more susceptible to specific diseases (e.g. Ashkenazi Jewish populations have a high risk of Tay Sachs disease). The authors should also consider the interplay between multiple categories (e.g. genetic and environmental factors) to health from the perspectives of both individual and public health.

7. **SC.912.L.14.7:** Relate the structure of each of the major plant organs and tissues to physiological processes.

Remarks/Examples:

Annually Assessed on Biology EOC.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The "Plant Organs" graphic organizer combines the structure and the function of each of the major plant organs. As a result, the answer key

usually has a structure or function but not both. Separating these two (into two different columns) in the student materials and answer key would make this worksheet better aligned with this standard.

8. **SC.912.L.14.26:** Identify the major parts of the brain on diagrams or models.

Remarks/Examples:

Annually Assessed on Biology EOC.

Florida Standards Connections: MAFS.K12.MP.4: Model with mathematics.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In general, there is good alignment. The Starters for this section are particularly effective. Because of the reliance on a legend with different colors (including red and green), making the brain diagram might be difficult for students that are colorblind (particularly red/green colorblind). Instead, make sure the parts of the brain in the "Engage" part of the Student Journal are properly labelled as well as colored.

9. **SC.912.L.14.36:** Describe the factors affecting blood flow through the cardiovascular system.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Many parts of this (e.g. the student handout, "Impact of Structure on Blood Flow in the Cardiovascular System, Engage activity, Reading Science, etc.) are well aligned to this standard. The relevance of the picture in the Background: Structural Factors and Blood Flow in the Student Guide (a person running with red blood cells in the background) to this standard is unclear and therefore might be confusing for students. I would recommend changing this picture to an image more aligned with the standards.

10. **SC.912.L.14.52:** Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.

Remarks/Examples:

Annually Assessed on Biology EOC. Also assesses SC.912.L.14.6 HE.912.C.1.7 and HE.912.C.1.5.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In general, it is well aligned. One part that impacted the alignment was the following factual inaccuracy about antibiotics: In the Impact of Biotechnology unit, in the Student Guide answer key, the authors state, "Overuse [of antibiotics] can lead to antibiotic-resistant viruses." Bacteria, not viruses, can become resistant to antibiotics.

11. **SC.912.L.15.1:** Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.

Remarks/Examples:

Annually Assessed on Biology EOC. Also assesses SC.912.L.15.10 SC.912.N.1.3 SC.912.N.1.4 SC.912.N.1.6 SC.912.N.2.1 SC.912.N.3.1 and SC.912.N.3.4.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The text and activities well support this standard; in particular, the molecular biology activity analyzing amino acid structures between different organisms is particularly compelling. To improve the alignment to explain how the scientific theory of evolution is supported by biogeography, in the Student Guide for "Part I: The Fossil Record and Biogeography", it would be helpful to contrast the image of fossils across the plate tectonics with the same fossil regions overlaid on a current map.

12. **SC.912.L.15.4:** Describe how and why organisms are hierarchically classified and based on evolutionary relationships.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The molecular biology activity analyzing amino acid structures between different organisms is particularly compelling and a "real world" application of this standard.

13. **SC.912.L.15.5:** Explain the reasons for changes in how organisms are classified.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

I could not find where this is discussed this directly. It would be helpful to provide an example in the Student Material. For example, the authors could discuss how genetics provided new insight into how organisms were classified. They could give an example of two organisms that are similar morphologically but are genetically very different or two organisms that are morphologically very similar (and therefore originally categorized as similar) but with genetics shown to be very distinct.

14. **SC.912.L.15.6:** Discuss distinguishing characteristics of the domains and kingdoms of living organisms.

Remarks/Examples:

Annually Assessed on Biology EOC. Also assesses SC.912.L.15.4 SC.912.L.15.5 SC.912.N.1.3 and SC.912.N.1.6.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The visuals, student activities, and text well support this standard, particularly the section on cladistics.

15. **SC.912.L.15.8:** Describe the scientific explanations of the origin of life on Earth.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.N.1.3, SC.912.N.1.4, and SC.912.N.2.1.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The scientific explanations are defined but for some of the explanations, the materials do not describe the evidence or experiments as to how the explanations were developed (e.g. Iron-Sulfur World Theory).

16. **SC.912.L.15.10:** Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The materials do list these basic trends; however, the literature for the students does not emphasize that many of these trends are still being researched. For example, the evolution of human language is an area of active research. While the scientific literature suggests that the gene FOXP2 is necessary but not sufficient for human language, we don't know what components (genetics or otherwise) that are sufficient for human language.

17. **SC.912.L.15.13:** Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.15.14, SC.912.L.15.15, and SC.912.N.1.3.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Good informational graphics and data visualization to support alignment to this standard.

18. **SC.912.L.15.14:** Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

Contains some factual inaccuracies that should be addressed. See answer to question on inaccuracies, including From the Evolutionary Mechanisms in the Student Materials, "Genetic drift is the random change in the frequency of an allele in the gene pool of a small population." Genetic drift happens in populations of all sizes but will most likely have a bigger impact on smaller populations.

19. **SC.912.L.15.15:** Describe how mutation and genetic recombination increase genetic variation.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

There are effective student materials and activities for this standard; however the score was decreased due to the following inaccuracy in the text (and therefore misalignment with the standard): From the Natural Selection section, Student materials for "Mutation in Action", "Many mutations have no effect on an organism's phenotype because it occurs in a noncoding section of DNA or the amino acid sequence of the protein is not affected." Just because something occurs in a noncoding section of the DNA, this change can still alter the phenotype by affecting gene expression levels, which then affects protein levels, which could ultimately affect the phenotype.

20. **SC.912.L.16.1:** Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.16.2.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This unit contains engaging hands-on and mathematical practices activities to effectively teach this standard.

21. **SC.912.L.16.2:** Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In the "Mendel's Law" section, there is a graphic organizer of the same name. The answer key says that in the multiple alleles mode of inheritance, "Some genes have more than two alleles." While this is technically true, this answer is incorrect in this particular context. Instead, the word "genes" should be replaced by [genetic] loci."

22. **SC.912.L.16.3:** Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.

Remarks/Examples:

Integrate HE.912.C.1.7. Analyze how heredity and family history can impact personal health. Annually assessed on Biology EOC. Also assesses SC.912.L.16.4 SC.912.L.16.5 SC.912.L.16.9.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This section presents the concepts of "the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information" but does not discuss how heredity and family history can impact personal health as much. One of the few activities that do discuss genetics and personal health contains information that is not up-to-date. In the Nature versus Nurture activity (Mendel's Law, Student guide Part I), most of the traits that the answer key says is either one or the other are actually likely both. For example, genetics (Nature) can influence the trait of being overweight (see Smemo et al. Nature 2014) and Nurture can affect whether someone is short in height (see Portrait, van Wingerden, Deeg Economics and Human Biology 2017).

23. **SC.912.L.16.4:** Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Materials do a good job talking about gene mutations and chromosomal mutations. The materials should then connect this material to how these types of mutations, when found in gametes, may result in phenotypic changes in offspring. Should also include examples of specific diseases that result from these types of mutations (e.g. a deletion in chromosome 7 can cause William's Syndrome.)

24. **SC.912.L.16.5:** Explain the basic processes of transcription and translation, and how they result in the expression of genes.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Describes the basic processes of transcription and translation, but does not explicitly connect the products of translation back to the expression of genes. To connect these concepts better, the text should start with a description of the Central Dogma of Biology (because then the pathway of DNA sequence to protein--expression of genes-- are apparent) and then break down the steps into transcription and translation).

25. **SC.912.L.16.8:** Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.

Remarks/Examples:

Integrate HE.912.C.1.7. Analyze how heredity and family history can impact personal health.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Good emphasis on not just defining mutations, cell cycle, and uncontrolled cell growth, but how these concepts can result in cancer.

26. **SC.912.L.16.9:** Explain how and why the genetic code is universal and is common to almost all organisms.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The text does a good job addressing how the genetic code is universal but I could not find a direct discussion of reasons why the genetic code is universal.

27. **SC.912.L.16.10:** Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.

Remarks/Examples:

Annually assessed on Biology EOC.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This standard is well supported by student text and activities.

28. **SC.912.L.16.13:** Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.

Remarks/Examples:

Annually assessed on Biology EOC.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Content is taught and re-inforced well.

29. **SC.912.L.16.14:** Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In the Student materials of the Mitosis unit, the authors write, "Some organisms even reproduce using this as a form of asexual reproduction. With each cycle, each parent cell will produce two daughter cells that contain an exact copy of genetic material." This text should specify the chromosome number for clarity.

30. **SC.912.L.16.16:** Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Well supported by the materials for the students, including the kinesthetic activities.

31. **SC.912.L.16.17:** Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.16.8 SC.912.L.16.14 SC.912.L.16.16.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

These topics are compared and contrasted through multiple activities in the student materials.

32. **SC.912.L.17.2:** Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

While there is a discussion of how temperature of aquatic ecosystems varies but I could not find where the unit explicitly addressed the general distribution of life based on temperature.

33. **SC.912.L.17.4:** Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Seasonal variations, climate change and succession are well defined and the changes that results are also well defined.

34. **SC.912.L.17.5:** Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.17.2 SC.912.L.17.4 SC.912.L.17.8 SC.912.N.1.4.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The qualitative descriptions are well aligned to this standard but there are not many quantitative analyses supporting this standard.

35. **SC.912.L.17.8:** Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The examples given were well aligned to this standard, but there are not many quantitative analyses and/or activities supporting this standard.

36. **SC.912.L.17.9:** Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.E.7.1.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There were nice images and diagrams to support this text. However, in the unit on the Food Web, the organism cards and answer key uses "KCal" instead of "kcal" (kilocalories, which I think it was trying to use). "Kcal", which they might have been trying to type instead may also be appropriate, but I am not sure. This inaccuracy affects the alignment to the standard because the standard discusses energy transfer through the trophic levels.

37. **SC.912.L.17.11:** Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The materials tend to focus on the costs of nonrenewable energy and benefits of renewable energy. Also, the authors may want to include more about why nonrenewable resources have been used historically to then motivate the cost-benefit analysis of nonrenewable resources.

38. **SC.912.L.17.13:** Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In the unit on Individuals and the Environment, the Student Guide states, "Parameters first have to be established, which is not a simple task." Examples of (1) the types of parameters and (2) the parameters used to protect a given environment in a specific environmental law, would be helpful for students to understand.

39. **SC.912.L.17.20:** Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.17.11, SC.912.L.17.13, SC.912.N.1.3.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Effective use of real-life examples in the student materials.

40. **SC.912.L.18.1:** Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.18.11.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

I could not find the "Student Reference Sheet" referenced in the "Explore" section of the "Biological Macromolecules" unit, so my score was based on what I could find in the portal. In the portal, the basic molecular structures were described well but I did not describe the primary functions of the four major categories of biological macromolecules well.

41. **SC.912.L.18.7:** Identify the reactants, products, and basic functions of photosynthesis.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The text says that, "Photosynthesis is the process that plants and other organisms, such as cyanobacteria, use to convert light energy from the Sun into a useable, chemical energy stored in a molecule called ATP." but the accompanying image shows that the products of photosynthesis are sugar and oxygen. Therefore, the authors need to clarify that the products of photosynthesis will then be used to make ATP but ATP is not a direct product of the photosynthesis reaction in order to increase alignment.

42. **SC.912.L.18.8:** Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The Krebs Cycle and electron transport chain (part of cellular respiration) are not defined or described in the Student Materials but multiple questions in the student materials refer to these two concepts. It is unclear where/how in the students are supposed to gain knowledge about this.

43. **SC.912.L.18.9:** Explain the interrelated nature of photosynthesis and cellular respiration.

Remarks/Examples:

Annually assessed on Biology EOC. Also assesses SC.912.L.18.7 SC.912.L.18.8 SC.912.L.18.10.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Well supported in the images and text of the student materials.

44. **SC.912.L.18.10:** Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The material provides minimal description addressing this standard. The Student Guide states that, "In turn, the energy provided by the ATP drives a process called the Calvin Cycle, which produces carbohydrates that store energy for the organism to use." No other details about the the transfer or the Calvin Cycle are provided.

45. **SC.912.L.18.11:** Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In the "Enzymes" unit, the Student Guide states, "Enzymes speed up chemical reactions by lowering the activation energy needed to start the reaction." This is confusing because they don't speed up the reactions themselves, just make it easier for them to begin. It should be made more clear in the "Engage Student Materials- Potato Slice" in this unit that the hydrogen peroxide is the catalyst.

46. **SC.912.L.18.12:** Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

Remarks/Examples:

Annually assessed on Biology EOC.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The properties and their contributions are well described in the unit titled "Water".

47. **SC.912.N.1.1:** Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. Pose questions about the natural world, (Articulate the purpose of the investigation and identify the relevant scientific concepts).
2. Conduct systematic observations, (Write procedures that are clear and replicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines).
3. Examine books and other sources of information to see what is already known,
4. Review what is known in light of empirical evidence, (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models).
5. Plan investigations, (Design and evaluate a scientific investigation).
6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), (Collect data or evidence in an organized way. Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration, technique, maintenance, and storage).
7. Pose answers, explanations, or descriptions of events,
8. Generate explanations that explicate or describe natural phenomena (inferences),
9. Use appropriate evidence and reasoning to justify these explanations to others,
10. Communicate results of scientific investigations, and
11. Evaluate the merits of the explanations produced by others.

Remarks/Examples:

Florida Standards Connections for 6-12 Literacy in Science

For Students in Grades 9-10

LAFS.910.RST.1.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LAFS.910.RST.1.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.

LAFS.910.RST.3.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LAFS.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LAFS.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

For Students in Grades 11-12

LAFS.1112.RST.1.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

LAFS.1112.RST.1.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks analyze the specific results based on explanations in the text.

LAFS.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LAFS.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LAFS.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

Florida Standards Connections for Mathematical Practices

MAFS.K12.MP.1: Make sense of problems and persevere in solving them.

MAFS.K12.MP.2: Reason abstractly and quantitatively.

MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others. [Viable arguments include evidence.]

MAFS.K12.MP.4: Model with mathematics.

MAFS.K12.MP.5: Use appropriate tools strategically.

MAFS.K12.MP.6: Attend to precision.

MAFS.K12.MP.7: Look for and make use of structure.

MAFS.K12.MP.8: Look for and express regularity in repeated reasoning.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The place where this standard is most closely aligned to the standard is in "Engage" section. While these activities frequently uses tools to gather, analyze, and interpret data and to pose answers, explanations, or descriptions of events, the activities should be more focused on posing questions about the natural world, conducting systematic observations and Generate explanations that explicate or describe natural phenomena (inferences), using appropriate evidence and reasoning to justify these explanations to others, and communicating results of scientific investigations. For example, regarding (2), in the teacher answer keys, the number of significant figures are often incorrect. For example, the Blood Vessel Structure vs. Blood Flow Lab in the unit on the Cardiovascular System uses 100 mL graduated cylinders. The measurements using the 100 mL graduated cylinders should have a significant figure to the right of the decimal place, but the answer key does not (e.g. 5 mL instead of 5.0 mL). In general, rigorous scientific inquiry and effective scientific communication are not stressed in this set of materials.

48. **SC.912.N.1.3:** Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

Remarks/Examples:

Assess the reliability of data and identify reasons for inconsistent results, such as sources of error or uncontrolled conditions.

Florida Standards Connections: MAFS.K12.MP.2: Reason abstractly and quantitatively MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

There are some units that require data collection. A question(s) could be added to assess the reliability of data and ask if the data collected are consistent or inconsistent. If the results are inconsistent, students should be asked to identify why, including sources of error or uncontrolled conditions. One such place that this could be added is in the "Math Connections" of the unit on Cardiovascular systems.

49. **SC.912.N.1.4:** Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

Remarks/Examples:

Read, interpret, and examine the credibility and validity of scientific claims in different sources of information, such as scientific articles, advertisements, or media stories. Strict standards of science include controlled variables, sufficient sample size, replication of results, empirical and measurable evidence, and the concept of falsification.

Florida Standards Connections: LAFS.910.RST.1.1 / LAFS.1112.RST.1.1.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The way the material of Theories, Laws, and Pseudoscience is presented (and lack of reinforcement of in other units) is not well aligned to the standard. While the differences between the three are well defined, I think that there is not enough concrete examples in the Student Guide before the students begin to identify the 3 with the activity in the student journal. As a result, some students will struggle with the activity identifying theories, laws, and pseudoscience in the student journal activity because of the relatively short explanation in the Student Guide. More scientific articles, advertisements, and media stories could be added as examples.

50. **SC.912.N.1.6:** Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

Remarks/Examples:

Collect data/evidence and use tables/graphs to draw conclusions and make inferences based on patterns or trends in the data.

Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Labs in many of the units require data collection and the labs ask questions which require students to draw conclusions about the main patterns in the data.

51. **SC.912.N.2.1:** Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).

Remarks/Examples:

Science is the systematic and organized inquiry that is derived from observations and experimentation that can be verified or tested by further investigation to explain natural phenomena (e.g. Science is testable, pseudo-science is not science seeks falsifications, pseudo-science seeks confirmations.)

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are many opportunities to add this in multiple units. For example, in the "Cell Theory" unit where theories, laws, and pseudoscience are defined, it would be good to provide an example(s) in the Student Guide of pseudoscience where the text "sounds" scientific but does not contain controlled variables, have sample size, demonstrate replicability, contain empirical and measurable evidence, and/or contains the concept of falsification. Then, the text should point out exactly where these principles apply and why the document can be labelled as pseudoscience. Additionally, in the exercise in the student journal on this topic, students must label whether the written examples are theories, laws, or pseudoscience. In addition to this categorization, a column should be added that students have to justify their answer.

52. **SC.912.N.2.2:** Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.

Remarks/Examples:

Identify scientific questions that can be disproved by experimentation/testing. Recognize that pseudoscience is a claim, belief, or practice which is presented as scientific, but does not adhere to strict standards of science (e.g. controlled variables, sample size, replicability, empirical and measurable evidence, and the concept of falsification).

Florida Standards Connections: MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

In the "Cell Theory" unit where theories, laws, and pseudoscience are defined, it would be good to provide an example(s) in the Student Guide of pseudoscience where the text "sounds" scientific but does not contain controlled variables, have sample size, demonstrate replicability, contain empirical and measurable evidence, and/or contains the concept of falsification. Then, the text should point out exactly where these principles apply and why the document can be labelled as pseudoscience. Additionally, in the exercise in the student journal on this topic, students must label whether the written examples are theories, laws, or pseudoscience. In addition to this categorization, a column should be added that students have to justify their answer. This topic should be reinforced in other units, but currently is not frequently done. For example, a frequently used exercise in introductory biology and chemistry classes is an article on "the dangers of dihydrogen monoxide (water)" e.g. <http://www.dhmo.org/facts.html>. This type of activity could be included in the unit on water.

53. **SC.912.N.3.1:** Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.

Remarks/Examples:

Explain that a scientific theory is a well-tested hypothesis supported by a preponderance of empirical evidence.

Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them and, MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This concept is explained in the unit on Cell Theory and is well illustrated in the unit on Natural Selection. In other sections, the empirical evidence used to support a theory is not well described.

54. **SC.912.N.3.4:** Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.

Remarks/Examples:

Recognize that theories do not become laws, theories explain laws. Recognize that not all scientific laws have accompanying explanatory theories.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This standard is discussed in the text but could be better supported in the units that contain theories (e.g. the theory of natural selection) by containing a question in the Student Journal about why a given theory is a theory and not a law.

55. **LAFS.910.RST.1.1:** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

The "Argue: Claim-Evidence-Reasoning" writing section in each unit does require students to give their reasoning for a given argument. Students are sometimes required to justify their answers to questions in the Student Journal. Many of the activities that include/require student research do not discuss or have an area for students to cite the sources of their information. Examples of this are in the units on Microscopes and on the Individuals and Environmental Impact.

56. **LAFS.910.RST.1.2:** Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The students are required to this occasionally but not consistently. For example, some units require synthesis from longer articles but not always.

57. **LAFS.910.RST.1.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Many of the labs are multistep procedures.

58. **LAFS.910.RST.2.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

In general, this is well done but there are some places in the student materials which use a difficult vocabulary word then do not define it (even in other places like the Picture Vocabulary) nor provide sufficient context for most intended learners to predict meaning effectively. For example, the use of "parameters" in the Student Guide in the unit on Individuals and Environmental Impact, "Parameters first have to be established, which is not a simple task. Scientists have to propose that research be conducted on a situation that is occurring often enough that it is causing, or will cause, damage to an environmental factor such as water, air, soil, or wildlife." Another example is with "high specific heat" in the unit on water. The text states, "Water resists changes in temperature because it has a high specific heat. It takes a lot more heat to increase the temperature of water than most other liquids."

59. **LAFS.910.RST.2.5:** Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This skill is frequently tested through the use of graphic organizers or questions which ask about connections between words in the text.

60. **LAFS.910.RST.2.6:** Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This standard could be better reinforced throughout the unit, particularly the "Reading Science" in the Elaborate section.

61. **LAFS.910.RST.3.7:** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Graphic organizers and/or activities with visuals are employed in most, if not all, units.

62. **LAFS.910.RST.3.8:** Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Materials frequently rely on qualitative rather than quantitative reasoning and evidence.

63. **LAFS.910.RST.3.9:** Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

Students may do this organically in the activities that require students to do research on the internet, but I could not find a section where this skill of contrasting findings is explicitly and specifically developed. One place where this type of activity could be added would be in the unit on Mendel's Law. In this section, there could be text on Mendelian inheritance and there could be a text on Lamarckian inheritance. Students could then compare and contrast the two theories and designate which is better supported based on current evidence.

64. **LAFS.910.RST.4.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This skill is developed by reading the texts in the Student Guide and the "Reading Science" section in each unit. This skill could be further developed by adding additional scientific primary sources e.g. a passage from Darwin's journal on the Beagle during the unit on Natural Selection.

65. **LAFS.910.SL.1.1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to

evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

- b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.
- c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
- d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

The units follow the 5E + IA model of instruction, in which students initiate and participate effectively in a range of collaborative discussions.

66. **LAFS.910.SL.1.2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

There are a handful of activities that require Internet searches. I could not find anyplace in the Student Materials it discusses the importance of evaluating the source of the information. Additionally, many of the documents where students record the information that they found online (e.g. "Microscopes" graphic organizer in the unit of the same name) does not have a place where students can cite the information or where they got the material from.

67. **LAFS.910.SL.1.3:** Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

This could be incorporated more frequently into the materials, including in the Write Science and the "Argue: Claim-Evidence-Reasoning" writing section.

68. **LAFS.910.SL.2.4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This skill mostly is taught in the "Argue: Claim-Evidence-Reasoning" writing section, but since the sections are divided (into claim, evidence, etc.), development and style is not focused on.

69. **LAFS.910.SL.2.5:** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT **VERY POOR/NO ALIGNMENT**

Justification:

I could not find a place where the material provide much guidance about how to use digital media in the student presentations.

70. **LAFS.910.WHST.1.1:** Write arguments focused on discipline-specific content.

- a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
- b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
- c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- e. Provide a concluding statement or section that follows from or supports the argument presented.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This skill is introduced in the "Argue: Claim-Evidence-Reasoning" writing section, but the lack of sophistication of the prompt does not allow for multiple claim(s), counterclaims, reasons, and evidence or supplying data and evidence for each. This section could be developed further to increase alignment to this standard.

71. **LAFS.910.WHST.1.2:** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

- c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.
- d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
- e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

This standard is addressed in the writing assignments. More emphasis could be put on formatting; developing the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples (particularly in the Write Science sections); using varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts (particularly in the "Argue: Claim-Evidence-Reading assessment"); and providing a concluding statement (particularly for the "Argue: Claim-Evidence-Reading assessment").

72. **LAFS.910.WHST.2.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are multiple opportunities for writing in each unit, although most of the tasks are extremely short.

73. **LAFS.910.WHST.2.5:** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT **VERY POOR/NO ALIGNMENT**

Justification:

I could not find where planning, revising, editing, rewriting, or trying a new approach for student writing is stressed in the Teacher Planning Companion. For example, most of the writing assessments are only assigned 15 minutes in the Teacher Planning Companion. This time allotted does not allow time for planning, editing, etc.

74. **LAFS.910.WHST.2.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Some activities include using the Internet for research and/or creating a website about a given scientific topic.

75. **LAFS.910.WHST.3.7:** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

There are multiple times where students use online searches for short searches (e.g. in the "Microscopes" unit) and for longer ones (e.g. in the "Individuals and the Environment").

76. **LAFS.910.WHST.3.8:** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

Plagiarism nor following a standard format for citations are not discussed as part of online searches.

77. **LAFS.910.WHST.3.9:** Draw evidence from informational texts to support analysis, reflection, and research.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Most of the texts are from the Associated Press (in the "Science Today" sections of each unit) rather than texts written by scientists.

78. **LAFS.910.WHST.4.10:** Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Most of the writing assessments are only assigned 15 minutes in the Teacher Planning Companion. This time allotted does not allow time for planning, editing, etc. The student-created presentations do allow for writing over extended time frames.

79. **HE.912.C.1.3:** Evaluate how environment and personal health are interrelated.

Remarks/Examples:

Food options within a community; prenatal-care services; availability of recreational facilities; air quality; weather-safety awareness; and weather, air, and water conditions.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

In the unit on Individuals and the Environment, most of the emphasis was on how humans impacted the environment rather than how the environment could impact health. The impact of environment on health could be added in this unit or better described and asked about in the units titled the "Cardiovascular system", "Parts of the Brain", and the "Human Immune System".

80. **HE.912.C.1.5:** Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.

Remarks/Examples:

Health prevention, detection, and treatment of: breast and testicular cancer, suicide, obesity, and industrial-related chronic disease.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

I did not see much information on the strategies for prevention, detection, and treatment of chronic diseases.

81. **HE.912.C.1.7:** Analyze how heredity and family history can impact personal health.

Remarks/Examples:

Drug use, family obesity, heart disease, mental health, and non-communicable illness or disease.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT POOR ALIGNMENT **VERY POOR/NO ALIGNMENT**

Justification:

This standard was not attempted but the information was not always accurate. For example, in the Nature versus Nurture activity (Mendel's Law, Student guide Part I), most of the traits that the answer key says is either one or the other are actually likely both. For example, genetics (Nature) can influence the trait of being overweight (see Smemo et al. Nature 2014) and Nurture can be affect whether someone is short in height (see Portrait, van Wingerden, Deeg Economics and Human Biology 2017).

82. **MAFS.912.N-Q.1.1:** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

Proper units appear to be used in the answer keys of all of the labs. Despite this, the student materials frequently requires the students to record their data in tables (e.g. the Blood Vessel Structure vs. Blood Flow Lab in the unit on the Cardiovascular System). I think these materials could be improved to match the standard by having the students create graphs or other data displays from their raw data. Then, students could more easily present and make conclusions based on their graphs and data displays.

83. **MAFS.912.N-Q.1.3:** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

VERY GOOD ALIGNMENT GOOD ALIGNMENT FAIR ALIGNMENT **POOR ALIGNMENT** VERY POOR/NO ALIGNMENT

Justification:

This standard is not emphasized in this set of materials. In the teacher answer keys, the number of significant figures are often incorrect. For example, the Blood Vessel Structure vs. Blood Flow Lab in the unit on the Cardiovascular System uses 100 mL graduated cylinders. The measurements using the 100 mL graduated cylinders should have a significant figure to the right of the decimal place, but the answer key does not (e.g. 5 mL instead of 5.0 mL). Additionally, I did not see a discussion of significant figures or measurement accuracy in the student or teacher materials in any of the units, although it is possible that I missed it.

84. **ELD.K12.ELL.SC.1:** English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science.

VERY GOOD ALIGNMENT GOOD ALIGNMENT **FAIR ALIGNMENT** POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Each "Engage" activity contains a "ELL Strategy" in the Engage Teacher Instructions which supports the communication of information, ideas and concepts necessary for academic success in the content area of Science. The Visual Glossary available in Spanish should contain both the Spanish and English vocabulary word to promote recognition of the word and understanding. The occasional use of informal language in the Student materials, however, does not support this standard. For example, the use of the phrase "run out" in the unit titled "Photosynthesis and Cellular Respirations". See text, "Without plants that perform photosynthesis, the oxygen on our planet would run out, and all humans and other living things that need oxygen would choke in a carbon-dioxide rich atmosphere."

85. **ELD.K12.ELL.SI.1:** English language learners communicate for social and instructional purposes within the school setting.

VERY GOOD ALIGNMENT **GOOD ALIGNMENT** FAIR ALIGNMENT POOR ALIGNMENT VERY POOR/NO ALIGNMENT

Justification:

Each "Engage" activity contains a "ELL Strategy" in the Engage Teacher Instructions which supports English language learners communicating for social and instructional purposes within the school setting. The authors may consider adding a "Starter" activity present in each unit specifically for classrooms with English language learners or to designate which Starter would be best for a classroom with ELL students.