Bid 3410

# INSTRUCTIONAL MATERIALS ADMINISTRATOR

**Recommendation**

Yes

**Comments:** I recommend this instructional resource for adoption since it addresses the entire Physics Honors Curriculum. The platform provides vast amount of activities, videos, readings, assessments and additional resources for acceleration and for intervention. The videos are high quality and most importantly attains real world scenarios and career options in STEM. It has a holistic approach where science can be taught inclusively. The activities are self-inquiry and involves higher order thinking. The weaknesses are that some of the activities require consumable materials which depends on the school and teacher budget, the acquisition of the materials and equipment. Another weakness is the need of a computer when assigning activities for the students. Therefore, most of the activities must be completed during school hours, which is a downsize because the platform has excellent reviews games that could be assigned to the students at home to practice and improve their skills. Overall, it includes the background information and the lesson plan more than needed by teachers that are essentially new to the course which is a plus.The 5E lesson plan is complete and aims each Florida standard for the course. These are the major reasons to recommend its adoption.

**Material for Review**

**Course:** Physics 1 Honors (2003390)
**Title:** STEMscopes Florida 2.0 - Physics, Honors , 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.
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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

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- 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 curriculum**1. 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:
Every standard that the curriculum map includes for Physics Honors is included in this platform. Each scope is built based on a state standard and its benchmark for the subject. The grade level and learner style is considered and the learning objectives are state in the home page under each scope that addresses a standard.

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:
The content addresses the standard as their main scope including the benchmark. Each scope aims a specific standard that will be supplemented with additional standards. For example in the scope of Static Charges the following standards and benchmarks are included: SC.912.N1.1 SC.912.P10.16 SC.912.P.10.17 MAFS.912.N-Q.1.1 MAFS.912.N-Q.1.3 MAFS.912.F-IF.3.7 MAFS.912.S-ID.1.4 LAFS.1112.RST.1.2 LAFS.1112.SL.1.1 SC.912.N.1.2 SC.912.N.1.7 ELD.K12.ELL.SC.1 SC.912.P 10.13 However, the main standard is SC.912.P 10.13.

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:
For some scopes the materials needed are included within the activity and in most of the scopes the teacher needs to supply the materials but the materials are accessible such as silver spoon, mirrors, lenses, flashlights, meter sticks, electronic balance, graduated cylinders, hammer, beakers, corks among others. Once the teacher have acquire such materials, it can be reused. All the activities included are student friendly and easy to adapt in case changes need to be made. Consumables may be needed for some activities and it depends on the science budget to acquire some however most of the materials can be acquired cheaply for example eggs, candles,lighters, sulfuric acid, shampoo and salt, however if the teacher has many periods then more consumables need to be bought.

**B. Level of Treatment**4. 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:
Each activity has a Student Handbook that can be printed. The handbook has specific instructions for the students and the task to be performed. Also it includes data tables or observations to be filled out during the data collection process. At the completion of the activity some questions are included to explain their collected observations. As shown on the Engage activity for Matter and Its Properties.

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 rigor on each activity is taken into consideration. The explore activities take a longer time span usually about 2 hours which needs to be performed on a block day. The explore activities are intentionally made to discover the properties that were initially exposed. Basically is a experiment that has being designed to find the conclusions which are the basis of the lesson. Instead of the student being told this characteristics, the students will inquire and find it out by themselves. The inquiry based activities escalated the rigor since it involves a discovery that the students need to make in order to learn as shown on the Explore Student Journal under the scope Matter and its Properties.

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:
The student expectation is clearly stated in each scope/standard. The activities planned ensure that those expectations at met with the rigor expected in an honor's class.

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:
Differentiation is included in each scope. There is an intervention section that includes a guided practice and an independent practice to reinforce the concepts and ensure the student comprehension. Mostly, on this section, you can find additional worksheet and charts to aid the student. Also the section includes an assessment that corroborates the student mastery. On the contrary there is also an acceleration section that increases the complexity for students that need to be challenged. This particular section includes a project based learning according to the scope whereas students have to research deeper towards the topic and present their findings. Activities for the 21st Century Skill and PBL are included. Also another type of activities are offered such as Science Art where the students illustrate their understanding. For the scope Matter and its Properties, the students are asked to illustrate their names in the form of a solid, liquid or gas going through a physical or chemical change. Also in acceleration, the students need to solve a problem and provide solutions to it or to deliver a product to raise awareness. Also under the scope of Matter and its Properties, the students are given a series of activities that raise awareness on the ozone depletion layer due to CFC. They are given the opportunity to learn more about a refrigerator, research on career roles and read several published articles on the problem presented. Since there are so many options, you can empower the student and also depending on the difficulty the teacher have the liberty to assign it as need it.

**C. Expertise for Content Development**8. 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:
Since this platform is designed to be standard based, all the resources included aligns to each standard aimed. The background information offered to the teacher supports the standard and extend it. The STEMscopedia offered to the students is relevant and reflect important concepts to be understood by the students to achieve mastery. This information can be assigned electronically or printed depending on student/teacher choice.

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:
As stated above, the resources offered in this platform aligns with each standard therefore each resource contributes to the quality of the content. For example under the scope of Atomic Theory, the engaging activity will ask the student to match the scientists, model of the atom and what each scientist stated to contribute to the progression of the atomic theory, then the students must create a timeline to organize its progression. The explore activity provides background information of each experiment performed to discover the existence of each sub-atomic particle. Students are asked to create a memorial that illustrate each atomic model. Under the explain section students can reflect on what the Greeks hypothesized and our current postulates. As seen each activity reinforces the learning of the standard.

**D. Accuracy of Content**10. 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:
The materials are well-written and neatly presented with images or diagrams that helps to explain the concept.

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:
The materials is presented objectively as physics is a science and scientist must abstain to give their opinions or subjectivity.

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:
As stated previously since each scope is designed to address a standard, the background information provided is representative of the concept that will be taught.

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:
The material aligns with the standard and the information provided is accurate. I have given previous examples however if you are about to teach lenses and mirrors, the teacher background information will address reflection from a plane mirror, predictions of the position and size of the image, reflection with convex and concave lenses and the ray tracing rules involved. Finally, the mirror equations is explained with a concave and convex mirror.

**E. Currency of Content**14. 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:
The content includes reading with science, engineering connections, math connections, how we are using the same concept under study today (real world applications) and career connections which will give a major understanding to the student about the standard being taught. For example under Lenses and Mirrors, the science connection is about the physics of the mirrors, the math connection is about describing and predicting images formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens. The engineering connection is designing a prototype of a telescope. The science today includes a video of the Spain Observatory and within career connections you have an interview with an eye doctor.

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:
Since each scope addresses a particular standard the content matches the curriculum, however the order presented is not as MCPS curriculum was designed. This is not a problem since these are tabs, the teachers can make their own order according to their curriculum map by using the lesson planner tools included in the platform.

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:
This platform takes into consideration differentiation and many options are offered for each scope. With the teacher planning companion, the teacher is provided with the big idea, the benchmark and the content. Following he/she has a scope line that works with his/her time pacing. Then the 5E's are explained in detailed. The engage activity has suggestions and/or strategies for ELL. The explore activity has a self-inquiry lab to be performed by the students to draw conclusions which are the facts to be discussed during the lesson. Under explain, a picture vocabulary is provided linking content and literacy. Under explain Blooms taxonomy is taken into consideration with a set of questions proposed. Under the Elaborate section math, career, science and engineering connections are offered as the next inquiry step with an activity and extensions. Finally under Evaluate, there is a concept review and several options of assessment that includes a concept builder and writing in science (CER). To provide differentiation, intervention and acceleration activities are included. Thereof, the learners are taken into serious consideration within each resource.

**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:
Each scope has engineering, science, math and career connections. Also a science today video is included to provide a real world scenario. For example under the scope of Electrical Circuits, the engineer connection is about the design and construction of a flashing doorbell. The reading in science is about designing a circuit in a commercial building. The math connection is about characterizing materials as conductors or insulators based on the calculations of current, potential difference, resistance and power. In science today, the students explore the application of artificial skin. Finally with career connections, students interact with a video made to a computations surgeon.

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:
The platform is holistic where each scope has a representation of STEM. They show clearly how is each standard utilized in science, technology, engineering and math. Most importantly, the student grasp the relevance of the concept nowadays.

**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:
Different genders (women and males), ethnicity (Hispanic, Caucasian, Asian, European, African) age (several) , work situations, cultural, religious, physical and various social groups are represented in each video without bias. The videos are respectful and informative.

**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:
The videos portray people in work situations that are respectful and informative. Mainly they explain their career line and how it pertains to the topic being covered. No pornography is seen neither inhumane treatment.

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 content is standard based thereof careful attention has been placed to address each standard effectively and its benchmark that pertains to the Honors Physics Curriculum.

**Presentation**

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**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:
Within each section, the teacher has the opportunity to create her/his lesson plan with the standards to be addressed. Starters are provided and the resources are able to be assigned online or to be print out. The questions provided are aligned with the Bloom's taxonomy to ensure critical thinking. Plenty of kinesthetic activities or mini-labs are included to deliver the lesson as formative checks throughout the lesson. As a google classroom user, it will be best if StemScopes assignments could be attached to the class itself through Google classroom rather creating a class with their program but overall it seems to be a great resource for a science teacher to deliver the lesson without the need of any other supplemental material.

**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:
Each topic is standard based thus the resources included and embedded within each section are aimed to successfully deliver the standard to ensure students mastery. An useful resource for the teacher is the background knowledge needed to effectively deliver the standard prior to the lesson itself. The resource doesn't follow the order of our curriculum map however it includes every single standard aimed by the state.

**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:
The organization of the standards are different from our curriculum map in MCPS, however the teacher will be able to organize her/his lesson according to the lesson planner so you don't need to follow the order of the tabs in this specific aspect the resource is flexible and easy to modify as needed per the teacher need.

**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:
Each resource according or pertaining to a specific standard has plenty of different activities to engage the students in the lesson. Specific instructions are included to the teacher that involves the time spent, the preparation and facilitation. Special notes to enhance the activities and options in case the teacher doesn't have the materials required such as a video instead of a specific demonstration stated on Conservation of Momentum Section. The activities are kinesthetic and includes notes to the student as critical thinking questions. There are activities that involves writing in science, today's application and simulations.

**E. Pacing of Content**5. 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:
The teacher planning companion includes the scope timeline. The timeline is realistic however, when the teachers are implementing all the activities during the first time, it might require a longer pacing.

**Accessibility**6. 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:
Fonts can be adjusted as the background, text to speech tools is included, all videos are captioned and have alt tags. Their content can be sent to refreshable Braille display. They include a visual glossary. The readable information can be highlighted and extracted to another document while taking notes. Screen zoom is available however text to American Sign language is not available. All the student content can be downloaded and printed as any type of assessment.

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 presentation of all the resources and leaning materials is impeccable, it has accessible tabs that helps you to find the information fast. The lesson material is based on the 5E and each E is a tab within additional tabs that helps you to navigate easier to find exactly what you need. The home page within the scopes includes the students expectations, key concepts and fundamental questions that will guide you through the lesson. Also essentials are included on the side with answers keys, teacher background essential information and a graphic organizer among others.

**Learning**

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**A. Motivational Strategies**1. A. Instructional materials include features to maintain learner motivation.

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

Justification:
Each standard to be addressed has starters activities to the students that verifies their prior knowledge and motivates the student to gather new knowledge or expanding what they already know. To continue the lesson more engaging activities or mini labs are included to investigate the topic. In the explain section for heat, temperature and energy, a Socratic dialogue student led is utilized to extend the lesson, a variety of videos are included to relate the concept to thermodynamics and the endothermic/exothermic concepts. In the elaborate section engendering is utilized as career connections and real world applications. As stated there are several ways to present the information where students will be receptive and perceptive.

**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 module relates to a prior concept learned in the past to link it with the over viewed topic. The platform provides a holistic view of science which is an integral part when it comes to learn science since the concepts itself are related and NOT isolated. On the section Conservation of Energy and Calorimetry, the publishers bring back exothermic/endothermic and how we are able to determine it by conducting calorimetry experiments. There is a written section with explanations and then an assessment section that ensures student's comprehension. In the elaborate section, engineering is brought back as a real world application, a calorimeter will be devised to solidify the knowledge learned.

**C. Explicit Instruction**3. C. The materials contain clear statements of information and outcomes.

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

Justification:
When an activity is introduced in the module as engineering connections, a reading is included to explain the concept and its use. Then the activity or mini lab will be offered and the students will work on it. The teacher has special notes and the key with real expectations of the activity. When data needs to be collected a data table pre-made is provided to ease the process of data collection. Not all the activities a mini-labs, there are graphic organizers to be completed throughout the lesson by the students. There are opportunities to link to literacy using the CER model (claim/evidence/reasoning). Also reflection activities are included with examples and reading comprehension questions. Each activity is different and provides guidance to the students, teacher and parents.

**D. Guidance and Support**4. 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:
This platform is user-friendly. A help section is included if needed, however since its so easy to navigate, I doubt students will use it frequently. Each activity is well-explained with clear objectives and with questions that will guide the students offering them, the opportunity to be self-led in their learning. Each activity at the end, provides them the opportunity to reflect, by doing this reflections, the students will be able to express their comprehension of the topic as some questions that will be addressed by the teacher later on. Extension activities are also included to learn the opposite. For example if the students are learning about heat transfer, then the activity will be about insulation which tries to avoid and or minimize heat transfer. By knowing what it doesn't do, then the students will deduct what it does. Additional resources are included for students that needs to be challenge it or to simply know more about the concept itself. Also intervention opportunities are given for the students that needs more help are included.

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:
This publication offers guidance and support as acceleration opportunities to affect each learning style. It is very solid in the kinesthetic approach with the mini-labs. Also the visual learners have the same opportunities with graphical organizers included as the videos embedded in each module. The students that are good listeners have the opportunity to be empowered by talking about what they learned and to listen to what others might have learned. There are extensive opportunities to verify knowledge and to assess in case of remediation.

**E. Active Participation of Students**6. 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:
The materials provide plenty of opportunities of engaging in mental activity for example in the Matter and its properties module at the explain tab under linking literacy, the students will be provided with a reading (STEMscopedia) using the 4 corners activity, the students will analyze the reading. A handout will be provided Guide with Evidence and the students will agree or disagree with the given statements. Also the students are asked to provide evidence based on the article that they read. The students have the opportunity to agree or dissent but with evidence. To conclude the activity, the students will transfer their knowledge by providing explanations about each state of matter. Even a writing assignment turns out to be dynamic and embedded with cooperative learning.

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:
This resource does an excellent job at organizing activities that goes along with the objective of the lesson and the aims of the standard. Once you have selected a scope, the students expectations, key concepts and fundamental questions are presented. These fundamental questions will guide the activities included. For example, one of the questions under the scope Property of Waves is: "How do properties change when the wave moves from one medium to another?, the activity that explore the answer is wave station. The students must investigate about reflection, interference, refraction and resonance by doing swift pulses, sharp pulses, using different mediums and by producing loud sounds. The students will record their results and draw a conclusion which explains the phenomena rather than memorizing facts and explanations of the phenomena.

**F. Targeted Instructional Strategies**8. 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:
The activities included in each scope/module utilizes different teacher strategies. Some of the strategies includes demonstrations, hand-on, mini-labs that are inquiry based, cooperative learning by pairing or grouping students, inclusion of graphic organizers in each scope and utilizing technology in the classroom. Another great strategy included is the real world application of each scope and the career connection. For example in the Properties of Waves you have a video about an Audio Engineer and with the scope Conservation of Energy and Calorimetry, we have a Storm Chaser.

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 instructional strategies included are effective since these activities had put in mind each learner style and the Bloom's taxonomy before its devise. On each scope the student expectation is stated, as the key concepts and the fundamental questions. A graphic organizer is provided to guide the lesson and to effectively deliver the key concepts. Engaging activities motivates the students and catches their attention. The explore activities initiate the research on the topic, under the explain tab, the depth of knowledge is achieved by utilizing Blooms Taxonomy in the level of each question, writing assignments are included as videos to explain the forces of nature. On the elaboration tab match connections are included as engineering connections, extensions, real world applications and careers connections. At the end of the session assessments are included within games or traditional approaches. Intervention and acceleration are always included to differentiate learning.

**G. Targeted Assessment Strategies**10. 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:
Assessments are always kept throughout the lesson. Within each activity reflection questions are included to ensure comprehension. On the evaluate tab, a concept game is provided to review. A variety of assessment are offered as multiple choice, open-ended questions, CER analysis, writing in science and a concept builder. All of these assessments addresses the strategies used and effectively assess the learning objective.

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:
The assessments included throughout each scope are based on the fundamental questions which are given at the beginning of the lesson. The students need to ensure comprehension of those questions prior to taking any type of assessment.

**Universal Design for Learning**12. 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:
Each scope include differentiation and there are always extension activities included to accelerated learners and remediation included for learners. Also it included recommendation for ELL to embed in each activity.

**Mathematical Practice**13. 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:
On the elaborate tab for each scope, a mathematical connection is included for the four fundamental forces scope, the students are asked to use ratios and mathematical relationships to derive the Inverse Square Law in regards to gravity while on the static charge scope, the students are asked to evaluate how the magnitude of the electrical force and field between two objects depend on their charges and distance between them.

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 publisher takes into consideration each learner style and differentiation when it includes a designated resource under each scope, activities such as acceleration and intervention are already being designed to address each student style and ability. Also Blooms Taxonomy is heavily included which ensures that the students are able to explain and elaborate based on each standard addressed.

**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.5.2:** Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.

**Remarks/Examples:**
Identify patterns that influence the formation, heirarchy, and motions of the various kinds of objects in the solar system and the role of gravity and inertia on these motions (include the Sun, Earth, and Moon, planets, satellites, comets, asteroids, star clusters, galaxies, galaxy clusters). Recognize that the universe contains many billions of galaxies, and each galaxy contains many billions of stars. Recognize that constellations are contrived associations of stars that do not reflect functional relationships in space.

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

(●) **VERY GOOD ALIGNMENT** ( ) GOOD ALIGNMENT ( ) FAIR ALIGNMENT ( ) POOR ALIGNMENT ( ) VERY POOR/NO ALIGNMENT

Justification:
The student is expected to identify patterns that influence the formation, hierarchy, and motions of the various kinds of objects in the solar system and the role of gravity and inertia on these motions (including the Sun, Earth, the Moon, planets, satellites, comets, asteroids, star clusters, galaxies, and galaxy clusters). The student is expected to recognize that the universe contains many billions of galaxies and each galaxy contains many billions of stars. The student is expected to recognize that constellations are contrived associations of stars that do not reflect functional relationships in space. Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy.A specific scope was created to addressed standard. Activities embedded and suggested to the teacher aligns with the standard itself. For example, under the engage tab, a google form was developed. Students must make a timeline for the formation of the solar system and answer questions about the effect of gravity on the formation of the solar system and what will the student think will be the next step in the timeline in billions of years from now. The last question addresses higher order thinking since students must make a prediction based on the product that they created.

2. **SC.912.E.5.6:** Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.

**Remarks/Examples:**

Explain that Kepler's laws determine the orbits of objects in the solar system and recognize that Kepler's laws are a direct consequence of Newton's Law of Universal Gravitation and Laws of Motion.

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

Justification:
The scope is intended to explain Kepler's Laws of Planetary Motion and how Newton provided the explanations with mathematical calculations. Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy.A specific scope was created to addressed standard. Activities embedded and suggested to the teacher aligns with the standard itself. For example, under the explore section students must prove the three Kepler's scientific laws. The students must show that orbits are elliptical rather circular as believed by Aristotle and Ptolemy. With the given materials, students will recreate the planetary motion and explain it.

3. **SC.912.E.5.8:** Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.

**Remarks/Examples:**
Describe how frequency is related to the characteristics of electromagnetic radiation and recognize how spectroscopy is used to detect and interpret information from electromagnetic radiation sources.

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

Justification:
The student is expected to explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy and relating them to phenomena and applications.The student is expected to connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observation tools. Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy. The standard is found under the electromagnetic spectrum scope since it must be taught as an extension to the physics honors classes. Both standards are intended to be taught inclusively. Under the explain tab, a honors STEMscopedia is intended to address the standard itself. Students are asked to match emission wavelengths in nm with their corresponding emission spectra after reading an article that supports the standard.

4. **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 standard doesn't have a specific scope, it is intended to be explained and addressed as a connection between physics and life science. It will be taught as a Big Idea between Matter and Energy Transformation. The correlation of the standard can be found at the scope 912.E.5.6 Kepler's Laws and Planetary Motion. This standard is part of the honors curriculum and its addressed under the explain tab at Honors STEMscopedia. The description of the Copernican model can't be read properly but if you place the cursor on the image you can read the description. Under the reflect section the standard is addressed and well-explained.

5. **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:
This platform embeds in each scope literacy standards and mathematical standards. Each scope has under the explain tab a section to link literacy that goes along with the article provided at STEMscopedia. The students has pre-reading instructions to asses their knowledge, reading instructions to visualize and define the concepts introduced and at the end, a post-reading instruction where students must discuss their reading, cite evidence, explain and draw inferences. Under elaborate tab math connections take place, the task varies depending on the scope. For example at Kepler's Laws and Planetary Motion, the students need to attend precision in their readings, make sense of the problem and model mathematics. The standard SC.912.N.1.1 is addressed on-going on several scopes Static Charges, Properties of Waves, Lenses and Mirrors, Conservation of Energy and Calorimetry and Work, Energy and Power. For example under the explore activity for work, energy and power on Part I, students are introduced to work and its definition. Students identify what is correctly defined as work and what is not defined as work. Students will investigate the transformation of potential energy into kinetic energy as they lift and drop an object. Students will calculate work and energy using the work-energy theorem. In Part II, students develop definitions of mechanical energy, momentum, impulse, and power. Students then perform an experimental investigation to measure the potential energy, kinetic energy, velocity, work and power. Students must follow the scientific reasoning to accomplish the task asked.

6. **SC.912.N.1.2:** Describe and explain what characterizes science and its methods.

**Remarks/Examples:**
Science is characterized by empirical observations, testable questions, formation of hypotheses, and experimentation that results in stable and replicable results, logical reasoning, and coherent theoretical constructs.

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:
This standard is addressed on the following scopes: Heat, Temperature and Energy, Static Charges, Work, Energy and Power, Two Dimensional Motion and Conservation of Momentum. On each scope, the standard is addressed at the explore tab. For example at Conservation of Momentum scope, the students must carry on an experimental investigation. The students must observe collisions that demonstrate the conservation of momentum in a closed system. In order to achieve this objective, the students must make empirical observations, test questions, form a hypothesis, and perform an experiment to show results that are stable and replicable results. Students must use logical reasoning, and coherent theoretical constructs in order to draw inferences that will demonstrate the conservation of the momentum. Students must plan their investigation and implement it, the model is scientific inquiry based.

7. **SC.912.N.1.5:** Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.

**Remarks/Examples:**
Recognize that contributions to science can be made and have been made by people from all over the world.

○ VERY GOOD ALIGNMENT ◉ **GOOD ALIGNMENT** ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
The students can overview this standard under the elaborate section of the scopes. For example under the scope of the Doppler Effect on Science today the students will explore connections and applications of science content through interactions with authentic, real world media provided by Associated Press. By watching and analyzing this video the students will recognize that contributions to science can be made from people all around the globe.

8. **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:
This standard is addressed in the following scopes under the explore tab: Electromagnetic Spectrum, Conservation of Energy and Calorimetry, Two Dimensional Motion, One Dimensional Motion and Newton's Laws of Motion. For example under the Newton's Laws of Motion Scope on the explore tab, the students complete two parts in this activity. First, students use dry ice to investigate the effects of forces on a nearly frictionless object. Next, students experiment with balanced and unbalanced forces, add vectors, and calculate acceleration. In order to pursue that objective, the pupils must follow a procedure already set up for them where they must collect data, use tables to draw conclusions and inferences.

9. **SC.912.N.1.7:** Recognize the role of creativity in constructing scientific questions, methods and explanations.

**Remarks/Examples:**
Work through difficult problems using creativity, and critical and analytical thinking in problem solving (e.g. convergent versus divergent thinking and creativity in problem solving).

Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them and MAFS.K12.MP.2: Reason abstractly and quantitatively.

◉ **VERY GOOD ALIGNMENT** ○ GOOD ALIGNMENT ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
This standard is addressed in the following scopes under the explore tab: Static Charges, Properties of Waves, Lenses and Mirrors, Conservation of Energy and Calorimetry and Work, Enery and Power. For example under the Static Charges scope, the pupils will investigate, describe and calculate the magnitude of the electric forces between two objects. They pick up paper pieces of various sizes with a statically-charged Styrofoam plate and then apply Coulomb’s law, using their measurements to calculate charge. To aim this objective the students must make sense of the problem to critically tackle it and solve it. Students must master the preparation of charged materials and in a self-inquiry lab, they must plan and implement their investigation so they can graph the relationship between the mass of the paper and the distance between the paper and the charged object.

10. **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:
Under the Big Idea of the Characteristics of Scientific Knowledge this standard can be found. In each self-inquiry lab, the students can only prove what the experimentation led them. Students will recognize that claims that aren't adhered to an experiment cannot be proven and

therefore won't be recognized as science. Also under the scope of Teacher Toolbox:Secondary under Science and It's Limitations, the fast facts explains clearly what is science and what is not.

11. **SC.912.N.2.3:** Identify examples of pseudoscience (such as astrology, phrenology) in society.

**Remarks/Examples:**
Determine if the phenomenon (event) can be observed, measured, and tested through scientific experimentation.

○ VERY GOOD ALIGNMENT ◉ **GOOD ALIGNMENT** ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
Under the scope of Teacher Toolbox:Secondary under Science and It's Limitations, the fast facts explains clearly what is science and what is not by giving examples of pseudosciences and their scopes. An extraction of the passage is included: "...physics students may miss the interconnections or functionality of separate scientific disciplines without the opportunity to find that connectedness in the realities that affect their lives and the world around them. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable. We call those pseudoscience. These would include areas such as astrology and phrenology. The pursuit of science is also limited to some extent by cultural restraints. The expense of pursuing scientific truth through experimentation and research requires funding which varies among institutions, corporations, and a country's priorities. Science can be limited by the requirement that experiments only test a narrow set of variable. Until repeated experimentation can verify hypotheses and sufficient evidence is gathered to formulate a theory, conclusions will have to be tentative and only applicable to the parameters of that particular investigation". This passage differentiates science from pseudosciences. Students with a Try it Out worksheet will write down all of the limitations that they know science has and why they exist. Do they make learning science harder or easier? It's the questions that they need to elaborate on.

12. **SC.912.N.2.4:** Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

**Remarks/Examples:**
Recognize that ideas with the most durable explanatory power become established theories, but scientific explanations are continually subjected to change in the face of new evidence.

Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them 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:
Under the scope of Teacher Toolbox:Secondary at Science and It's Limitations, at the Hypothesis subject, it is explained that durable hypothesis can lead to theories. A fast fast recognizes that ideas with the most durable explanatory power become established theories, but scientific explanations are continually subjected to change in the face of new evidence. An activity is offered to address the standard and to help students understand that important theories in physics were preceded by well-substantiated hypotheses that were repeatedly confirmed. The teacher will provide partners or teams with a set of current theories such as the atomic theory, Big Bang theory, perturbation theory, theory of relativity (successor to classical mechanics), quantum field theory, etc. Their research goal is to document which hypotheses led to that particular theory becoming widely accepted; and how experimental observations were explained by that theory. This activity addresses the standard and ensures, the students mastery.

13. **SC.912.N.2.5:** Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

**Remarks/Examples:**
Recognize that scientific questions, observations, and conclusions may be influenced by the existing state of scientific knowledge, the social and cultural context of the researcher, and the observer's experiences and expectations. Identify possible bias in qualitative and quantitative data analysis.

◉ **VERY GOOD ALIGNMENT** ○ GOOD ALIGNMENT ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
This standard is addressed under the Atomic Theory scope at the explore tab. Under the explore activity, students learn about four major scientists who contributed to the understanding of modern atomic theory. These scientists include John Dalton, J.J. Thomson, Ernest Rutherford, and Niels Bohr. Each group researches a scientist and develops a memorial to that innovator by writing a speech that praises the significant contributions made by that scientist. This activity includes the construction of a 3-D model of each scientist's concept of the atom at the time they were studying it, a presentation evaluating the limitations of the model, and each scientist's contributions to the development of atomic theory. Within this particular activity the students will be able to describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations. The progression of the model of the atom well explains how new evidence add to support explanations.

14. **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:
Under the scope of Teacher Toolbox:Secondary at Science and It's Limitations, at theories fast facts, it is explained 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. An activity is suggested, teachers can ask students to compare and contrast classical physics, which is generally concerned with matter and energy on the normal scale of observation, with modern physics, which is concerned with the behavior of matter and energy under extreme conditions or on the very large or very small scale. Also under Theories: Highly reliable explanations more in depth discussion is included.

15. **SC.912.N.3.2:** Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.

**Remarks/Examples:**
Recognize that scientific argument, disagreement, discourse, and discussion create a broader and more accurate understanding of natural processes and events.

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:
This standard is addressed under the Atomic Theory scope at the explore tab. Under the explore activity, students learn about four major scientists who contributed to the understanding of modern atomic theory. These scientists include John Dalton, J.J. Thomson, Ernest Rutherford, and Niels Bohr. Each group researches a scientist and develops a memorial to that innovator by writing a speech that praises the significant contributions made by that scientist. This activity includes the construction of a 3-D model of each scientist's concept of the atom at the time they were studying it, a presentation evaluating the limitations of the model, and each scientist's contributions to the development of atomic theory. Within this particular activity the students will be able to describe the role consensus plays in the historical development of a theory in any one of the disciplines of science. The progression of the model of the atom exemplifies how consensus leads to the development of a theory.

16. **SC.912.N.3.3:** Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.

**Remarks/Examples:**
Recognize that a scientific theory provides a broad explanation of many observed phenomena while a scientific law describes how something behaves.

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

Justification:
This standard is addressed under the following scopes at the explore tab: Newton's Law of Motion and Kepler's Laws and Planetary Motion. On both scopes students are learning laws and their applications. Students will identify that laws merely are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships contrary to theories.

17. **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 addressed under the following scopes at the explore tab: Atomic Theory, Newton's Law of Motion and Kepler's Laws and Planetary Motion. By exploring and learning laws and theories, the students will recognize their differences and distinctions. Students will know that theories are well supported explanations and laws are well supported descriptions.

18. **SC.912.N.3.5:** Describe the function of models in science, and identify the wide range of models used in science.

**Remarks/Examples:**
Describe how models are used by scientists to explain observations of nature.

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

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

Justification:
This standard is addressed under the following scopes at the explore tab: Atomic Theory, The Doppler Effect, Gravitational Force and Kepler's Laws and Planetary Motion. Under the explore activity at the Gravitational Force scope, students will use scientific notation to describe, calculate, and graph how the magnitude of the gravitational force between two objects, a basketball and a golf ball, depends upon

their masses and the distance between their centers. While the students are working in the activity, they will recognize how models are used to explain the observations that they gather during their experimentation.

19. **SC.912.N.4.1:** Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

**Remarks/Examples:**

Recognize that no single universal step-by-step scientific method captures the complexity of doing science. A number of shared values and perspectives characterize a scientific approach.

MAFS.K12.MP.1: Make sense of problems and persevere in solving them, and MAFS.K12.MP.2: Reason abstractly and quantitatively.

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

Justification:
Under the scope of Teacher Toolbox:Secondary at Science and It's Limitations, at What is Science? It is recognized that "Science, as defined by the National Academy of Sciences, is the “use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." Thus it is empirically based characterized by a scientific approach.

20. **SC.912.P.8.1:** Differentiate among the four states of matter.

**Remarks/Examples:**

Differentiate among the four states of matter (solid, liquid, gas and plasma) in terms of energy, particle motion, and phase transitions. (Note: Currently five states of matter have been identified.)

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

Justification:
In this scope, the student is expected to differentiate among the four states of matter AND differentiate between physical and chemical properties and physical and chemical changes of matter.Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy. A specific scope was created to addressed standard. Activities embedded and suggested to the teacher aligns with the standard itself. For example, the engage activity asks students to sort items as physical or chemical properties. Also students must identify and differentiate between physical and chemical changes and based on the example, they will explain their answer.

21. **SC.912.P.8.3:** Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.

**Remarks/Examples:**

Describe the development and historical importance of atomic theory from Dalton (atomic theory), Thomson (the electron), Rutherford (the nucleus and "gold foil" experiment), and Bohr (planetary model of atom), and understand how each discovery leads to modern atomic theory.

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 this scope, the student is expected to explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy. A specific scope was created to addressed standard. Activities embedded and suggested to the teacher aligns with the standard itself. For example, under the explore tab, the students learn about four major scientists who contributed to the understanding of modern atomic theory. These scientists include John Dalton, J.J. Thomson, Ernest Rutherford, and Niels Bohr. Each group researches a scientist and develops a memorial to that innovator by writing a speech that praises the significant contributions made by that scientist. This activity includes the construction of a 3-D model of each scientist’s concept of the atom at the time they were studying it, a presentation evaluating the limitations of the model, and each scientist’s contributions to the development of atomic theory. A student reference sheet is included in this activity that includes the progression of the atomic theory and each scientist postulate and experiment.

22. **SC.912.P.8.4:** Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.

**Remarks/Examples:**

Explain that electrons, protons and neutrons are parts of the atom and that the nuclei of atoms are composed of protons and neutrons, which experience forces of attraction and repulsion consistent with their charges and masses.

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

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

Justification:
This standard is found under the atomic theory scope. The student is expected to explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons, and electrons; differentiate among these particles in terms of their mass, electrical charges, and locations within the atom. Questions prompt are provided according Blooms Taxonomy that addresses this particular standard. For example at Create- Extended Thinking students are asked to create a timeline of the major scientific contributors to modern atomic theory, including John Dalton, J.J. Thomson, Ernest Rutherford, and Niels Bohr. Include a brief summary of each scientist’s findings, and how each scientist affected the experiments of the others. The standard is also addressed at the explain tab

under Honors STEMscopedia where students must reflect on the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom. To assess comprehension, the pupils are asked to identify atoms based on its number of protons, neutrons and electrons also must complete electronic configurations and Lewis Dot Structure.

23. **SC.912.P.10.1:** Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.

**Remarks/Examples:**

Differentiate between kinetic and potential energy. Recognize that energy cannot be created or destroyed, only transformed. Identify examples of transformation of energy: Heat to light in incandescent electric light bulbs Light to heat in laser drills Electrical to sound in radios Sound to electrical in microphones Electrical to chemical in battery rechargers Chemical to electrical in dry cells Mechanical to electrical in generators [power plants] Nuclear to heat in nuclear reactors Gravitational potential energy of a falling object is converted to kinetic energy then to heat and sound energy when the object hits the ground.

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

Justification:
This standard is found under the Work, Energy and Power Scope. The student must differentiate among the various forms of energy and recognize that they can be transformed from one form to others. The cognitive complexity rating is level 2 since its a basic application of skills and concepts. The standard is addressed under the explain tab on Honors Stemscopedia. At What Do you Think? Subtitle, Kinetic, Potential and Mechanical Energy are addressed. Students are asked to solve a problems that involves kinematics.

24. **SC.912.P.10.2:** Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.

**Remarks/Examples:**

Use calorimetry to illustrate conservation of energy. Differentiate between the different types of systems and solve problems involving conservation of energy in simple systems (Physics).Explain how conservation of energy is important in chemical reactions with bond formation and bond breaking (Chemistry).

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

Justification:
This standard can be found as a correlation standard to SC.912.P.10.1 and SC912.P.10.6. Is intended to be taught as a Big Idea in the Forms of Energy. The standard can be found under the scope Conservation of Energy and Calorimetry. The student is expected to explore the law of conservation of energy by differentiating among open, closed, and isolated systems and explaining that the total energy in an isolated system is a conserved quantity. Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy. A specific scope was created to addressed standard. Activities embedded and suggested to the teacher aligns with the standard itself. For example, the explore activity under its tab, contain multiple parts to lead students through the topics of systems, thermodynamics, and calorimetry. In Part I, a modified jigsaw activity, groups of students explore examples of conservation of energy and the law of entropy. After each group explores one station, groups will be reconstituted in a way that allows every student to present on the station they visited to a group of students who visited different stations. In Part II, students analyze two different chemical reactions to determine what happens to the temperature and the heat energy from the beginning to the end of the reaction and to distinguish between endothermic and exothermic reactions. In Part III, students will follow a demonstration dealing with calorimetry and heat transfer to learn how to calculate heat released. A student guide worksheet is provided to the students which explains each part in detail with background information. Additional worksheets are included to record data and to perform calculations.

25. **SC.912.P.10.3:** Compare and contrast work and power qualitatively and quantitatively.

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

Justification:
This standard can be found at the Work, Energy and Power Scope. The standard has a level 2 rating in Cognitive Complexity Rating since its a basic application of skills and concepts. Under the Work, Energy and Power scope, the student is expected to differentiate among the various forms of energy and recognize that they can be transformed from one form to others AND compare and contrast work and power qualitatively and quantitatively. Under the explain tab at Honors STEMscopedia, the standard is being addressed specific equations are discussed which addressed the quantitative aspect and descriptors such as no work is done on the car if it does not moves provides qualitative examples.

26. **SC.912.P.10.4:** Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.

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

Justification:
This standard is found under the scope Heat, Temperature and Energy. The student is expected to describe heat as the energy transferred by convection, conduction, and radiation AND explain the connection of heat to change in temperature or states of matter AND relate temperature to the average molecular kinetic energy. Questions prompts are provided for each depth or complexity knowledge along with Blooms Taxonomy. A specific scope was created to addressed standard. Activities embedded and suggested to the teacher aligns with the standard itself. For example, under the explore tab, the students will observe examples of conduction, convection, and radiation while working at four different lab stations. A student guide is included with background information to describe the heat transfer and the procedure of the activity is included. To finish up the activity, the pupils must complete reflections and conclusions section on their student journal where they will also record their data.

27. **SC.912.P.10.5:** Relate temperature to the average molecular kinetic energy.

**Remarks/Examples:**

Recognize that the internal energy of an object includes the energy of random motion of the object's atoms and molecules, often referred to as thermal energy.

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

Justification:
This standard is taught as part of Big Idea 10 about the forms of energy. The standard is correlates with SC.912.P.11.1 and SC.912.11.4 about Thermal Energy. The standard is found under the scope on Heat, Temperature and Energy. It is rated as level 2 on the Cognitive Complexity Rating since it's based on application of skills and concepts. The standard is addressed under the explain tab at Honors STEMscopedia. Under the reflection section, the students will learn on thermodynamics and kinetic energy. Their acquired knowledge will be assessed under the section: What do you know?

28. **SC.912.P.10.6:** Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.

**Remarks/Examples:**

Construct and interpret potential energy diagrams for endothermic and exothermic chemical reactions, and for rising or falling objects. Describe the transformation of energy as a pendulum swings.

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

Justification:
The standard is found under the scope on Conservation of Energy and Calorimetry. This standard is part of the Honors Curriculum. The student is expected to create and interpret potential energy diagrams, for example, chemical reactions, orbits around a central body, motion of a pendulum. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The standard is addressed under the explain tab at Honors STEMscopedia. Under the Look out! section, potential energy diagrams for endothermic and exothermic chemical reactions are shown and explained in depth, and for rising or falling objects. Also with a diagram the transformation of energy as a pendulum swings is described in detailed with a diagram. In the student handout probing questions are included to assess the student comprehension.

29. **SC.912.P.10.7:** Distinguish between endothermic and exothermic chemical processes.

**Remarks/Examples:**

Classify chemical reactions and phase changes as exothermic (release thermal energy) or endothermic (absorb thermal energy).

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

Justification:
The standard is found under the scope on Conservation of Energy and Calorimetry. It is part of the Big Idea number 10 about forms of Energy. This standard is part of the Honors Curriculum. The student is expected to create and interpret potential energy diagrams, for example, chemical reactions, orbits around a central body, motion of a pendulum. The standard is addressed under the explain tab at Honors STEMscopedia. Under the Look out! section, potential energy diagrams for endothermic and exothermic chemical reactions are shown and explained in depth. In the student handout probing questions are included to assess the student comprehension.

30. **SC.912.P.10.8:** Explain entropy's role in determining the efficiency of processes that convert energy to work.

**Remarks/Examples:**

Recognize that there is a natural tendency for systems to move in a direction of disorder or randomness (entropy). Describe entropy as a quantity that measures the order or disorder of a system and that this quantity is larger for a more disordered system.

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

Justification:
The standard is found under the scope on Heat, Temperature and Energy. It is part of the Big Idea number 10 about forms of Energy. This standard is part of the Honors Curriculum. The student is expected to explain entropy's role in determining the efficiency of processes that convert energy to work. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The standard is addressed under the explain tab at Honors STEMscopedia. Under The Second Law of Thermodynamics and Entropy section, where it's explain the entropy's role in determining the efficiency of processes that convert energy to work. It covers the natural tendency towards the disorder in a system. It explains that the measure of disorder in a system is called entropy. More disorder equals greater entropy. In the student handout probing questions are included to assess the student comprehension.

31. **SC.912.P.10.10:** Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).

**Remarks/Examples:**

Recognize and discuss the effect of each force on the structure of matter and the evidence for it.

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

Justification:
The standard is found under its own scope: The Four Fundamental Forces. It is part of the Big Idea number 10 about forms of Energy. The student is expected to compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear). Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under the evaluate or extended thinking, students are asked the following: Of the scientists who played roles in developing our knowledge of the fundamental forces, which scientist do you think had the greatest effect on history? Explain your choice and cite specific examples of the effects of his or her discoveries. Students should use background information to address the force and the scientist who contributed to its discovery. All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, the students will collect, describe, and analyze evidence for the four fundamental forces in nature as well as their effects. The student

guide provides relevant background information and the instructions to perform the activity itself along with reflections and conclusions found in the Student Journal.

32. **SC.912.P.10.13:** Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.

**Remarks/Examples:**

Using Coulomb's law, determine the force on a stationary charge due to other stationary charges, and explain that this force is many times greater than the gravitational force. Recognize the relationship between forces and their associated potential energies and that the electric field is directly related to the rate of change of the electric potential from point to point in space.

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

Justification:
The standard is found under its own scope: Static Charges. It is part of the Big Idea number 10 about forms of Energy. The student is expected to relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under apply- skill/concept , students are asked to find the electrical force between a cloud and the ground. All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students describe and calculate the magnitude of the electric forces between two objects. They pick up paper pieces of various sizes with a statically-charged Styrofoam plate and then apply Coulomb's law, using their measurements to calculate charge. A student guide is included with relevant background information and explanation on how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

33. **SC.912.P.10.14:** Differentiate among conductors, semiconductors, and insulators.

**Remarks/Examples:**

Describe band structure, valence electrons, and how the charges flow or rearrange themselves between conductors and insulators.

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

Justification:
The standard is found under its own scope on Electrical Circuits. It is part of the Big Idea number 10 about forms of Energy. The student is expected to differentiate among conductors, semiconductors, and insulators. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under the recall section, students are asked: What is a conductor? What are some examples of conductors?All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students design and construct a combination series and parallel circuit to meet a particular goal. Using their working circuit, students obtain data to calculate current, voltage, resistance, and power. A student guide is included with relevant background information and explanation on how they should plan (construct a circuit and identify its characteristics) and implement their investigation. In order to conduct the activity, students must know when they need to include conductors and which kind and if they need any insulators and why. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

34. **SC.912.P.10.15:** Investigate and explain the relationships among current, voltage, resistance, and power.

**Remarks/Examples:**

Use Ohm's and Kirchhoff's laws to explain the relationships among circuits.

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

Justification:
The standard is found under its own scope on Electrical Circuits. It is part of the Big Idea number 10 about forms of Energy. The student is expected to investigate and explain the relationships among current, voltage, resistance, and power. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under the understand section, students are asked: What is the relationship between voltage, current, and resistance? All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students design and construct a combination series and parallel circuit to meet a particular goal. Using their working circuit, students obtain data to calculate current, voltage, resistance, and power.A student guide is included with relevant background information and explanation on how they should plan (construct a circuit and identify its characteristics) and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

35. **SC.912.P.10.16:** Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.

**Remarks/Examples:**

Explain that moving electric charges produce magnetic forces and moving magnets produce electric forces. Recognize the Lorentz force is the force on a point charge due to electromagnetic fields and occurs in many devices, including mass spectrometers.

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

Justification:
The standard is found under its own scope: Static Charges. It is part of the Big Idea number 10 about forms of Energy. The standard is part of the Honors Curriculum. The student is expected to explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under the evaluate section students must explain the usefulness of a product, the question is the following: Some researchers have raised concerns about the health effects of electric fields, such as those produced by power lines or cell phones. There are now various products available that supposedly mitigate these dangers. Research one of these products. After researching this product in-depth, would you recommend this product as useful or not? Explain your answer.he standard is explained in depth under the explain tab at Honors STEMScopedia. The section Look Out! explains the relationship

between Electric Current and Magnetic Fields. The student handbook includes questions at the end to assess understanding and comprehension.

36. **SC.912.P.10.17:** Explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields.

**Remarks/Examples:**

Recognize that an oscillating charge creates an oscillating electric field which gives rise to electromagnetic waves. Recognize a changing magnetic field makes an electric field, and a changing electric field makes a magnetic field, and these phenomena are expressed mathematically through the Faraday law and the Ampere-Maxwell law.

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

Justification:
The standard is found under its own scope: Static Charges. It is part of the Big Idea number 10 about forms of Energy. The standard is part of the Honors Curriculum. The student is expected to explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. The standard is explained in depth under the explain tab at Honors STEMScopedia. The section Getting Technical explains the everyday applications of electric and magnetic forces. The student handbook includes questions at the end to assess understanding and comprehension.

37. **SC.912.P.10.18:** Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.

**Remarks/Examples:**

Describe the electromagnetic spectrum (i.e., radio waves, microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays) in terms of frequency, wavelength and energy. Solve problems involving wavelength, frequency, and energy.

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

Justification:
The standard is found under its own scope: Electromagnetic Spectrum. It is part of the Big Idea number 10 about forms of Energy. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The student is expected to explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy and relating them to phenomena and applications. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under the understand section, students are asked: Kidney stones are a solid piece of material that forms in the kidney when there is an imbalance in the chemicals in the urine in the kidney. Small stones can pass through the urinary tract, but sometimes stones are too large to pass and become very painful. People who have stones that are too big undergo a medical treatment called lithotripsy that uses high-energy shock waves (sound waves) to break up the stones. Why is this a good medical treatment to break up kidney stones? To answer the question, students must know that the high-energy shock wave breaks up the kidney stone, proving an understanding of the electromagnetic spectrum. All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, In Part I of this activity, students explore how astronomers use the electromagnetic spectrum to gain information about celestial objects and match symbols to each type of wave. In Part II, students examine how frequency and wavelength relate to one another and how they correlate to the visible light spectrum. In Part III, students examine and describe different applications of waves in medicine and industry. Students should be able to explain how its particular characteristics make each type of wave useful for each application.

38. **SC.912.P.10.20:** Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.

**Remarks/Examples:**

Describe the measurable properties of waves (velocity, frequency, wavelength, amplitude, period, reflection and refraction) and explain the relationships among them. Recognize that the source of all waves is a vibration and waves carry energy from one place to another. Distinguish between transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves). Describe sound as a longitudinal wave whose speed depends on the properties of the medium in which it propagates.

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

Justification:
The standard is found under its own scope: Properties of Waves. It is part of the Big Idea number 10 about forms of Energy. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The student is expected to describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, at the explain tab under the section of apply, students are asked: How is a wave affected by an increase in energy? and Can you explain the relationship between velocity, wavelength, and wave frequency? All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students complete multiple activities to thoroughly investigate the measurable properties of waves, the types of waves and examples of each, and the nature of wave characteristics. In Part I, students perform the descriptive investigation nature of waves generating transverse waves on strips of paper moving to the beat of music. They record measurements and make calculations to describe the relationships between variables. In Part II, students develop definitions for different categories of waves and categorize them using those definitions. This activity leads into Part III, a descriptive investigation, where students explore characteristics and behaviors of transverse and longitudinal waves using a spring toy and the wave equation. In Part III, students also experiment at various stations to observe and investigate wave behaviors, including reflection, interference, refraction, and resonance.

39. **SC.912.P.10.21:** Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.

**Remarks/Examples:**

Describe the apparent change in frequency of waves due to the motion of a source or a receiver (the Doppler effect).

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

Justification:
The standard is found under the Doppler Effect Scope. It is part of the Big Idea number 10 about forms of Energy. It is rated as level 2 on the Cognitive Complexity Rating since it's based on application of skills and concepts. The student is expected to qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must apply the Doppler effect to make observations about an incoming train. The standard is addressed under the explain tab at STEMscopedia where the Doppler effect is explained in depth. The student handbook includes questions at the end to assess understanding and comprehension.

40. **SC.912.P.10.22:** Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.

**Remarks/Examples:**

Use examples such as converging/diverging lenses and convex/concave mirrors. Use a ray diagram to determine the approximate location and size of the image, and the mirror equation to obtain numerical information about image distance and image size.

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

Justification:
The standard is found under the Lenses and Mirrors Scope. It is part of the Big Idea number 10 about forms of Energy. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The student is expected to construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must apply the concept to predict the approximate location. All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students explore and describe the images formed by convex lenses and plane mirrors. The student guide provides them with important background information and explains how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

41. **SC.912.P.12.1:** Distinguish between scalar and vector quantities and assess which should be used to describe an event.

**Remarks/Examples:**

Distinguish between vector quantities (e.g., displacement, velocity, acceleration, force, and linear momentum) and scalar quantities (e.g., distance, speed, energy, mass, work).

MAFS.912.N-VM.1.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.

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

Justification:
The standard is found under Two Dimensional Motion Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The benchmark includes solving problems involving velocity and other quantities that can be represented by vectors. The student is expected to distinguish between scalar and vector quantities and assess which should be used to describe an event. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must understand: What are the differences between scalar and vector quantities?, How can you differentiate between velocity and acceleration? and How do free-fall problems relate to projectile problems? All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students examine two-dimensional motion. They compare and differentiate between horizontal motion and vertical motion. Students then simulate the motion of a projectile that has been dropped from the back of an airplane. They compare the velocity of the airplane with the range of the projectile. The student guide provides them with important background information and explains how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

42. **SC.912.P.12.2:** Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.

**Remarks/Examples:**

Solve problems involving distance, velocity, speed, and acceleration. Create and interpret graphs of 1-dimensional motion, such as position versus time, distance versus time, speed versus time, velocity versus time, and acceleration versus time where acceleration is constant.

Florida Standards Connections: MAFS.912.N-VM.1.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.

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

Justification:
The standard is found under One Dimensional Motion Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The benchmark includes solving problems involving velocity and other quantities that can be represented by vectors. The student is expected to analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must evaluate: During a late night discussion, a friend of yours says, “I believe there is no right or wrong; everything is relative. Just like in physics, where everything is relative, I believe that there are no absolutes.” Setting aside your own views of your friend’s moral relativism, is your friend’s reference to physics accurate? Explain your answer. and determine : What should a position–time graph include? Draw a position–time graph showing the different motions an object experiences. Label the x and y axis. All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students create position versus time graphs and use a motion detector to perform experiments on how motion affects the shape

of the graph. They act out different graphs for their classmates to sketch. Finally, students use a truck driver's journal to calculate quantities related to one-dimensional motion. The student guide provides them with important background information and explains how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

43. **SC.912.P.12.3:** Interpret and apply Newton's three laws of motion.

**Remarks/Examples:**

Explain that when the net force on an object is zero, no acceleration occurs thus, a moving object continues to move at a constant speed in the same direction, or, if at rest, it remains at rest (Newton's first law). Explain that when a net force is applied to an object its motion will change, or accelerate (according to Newton's second law, F = ma). Predict and explain how when one object exerts a force on a second object, the second object always exerts a force of equal magnitude but of opposite direction and force back on the first: F1 on 2 = -F1 on 1 (Newton's third law).

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

Justification:
The standard is found under Newton's Laws of Motion Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The student is expected to interpret and apply Newton's three laws of motion. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must apply: Can you apply your knowledge of Newton's laws of motion to bowling at a bowling alley? All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students complete two parts in this activity. First, students use dry ice to investigate the effects of forces on a nearly frictionless object. Next, students experiment with balanced and unbalanced forces, add vectors, and calculate acceleration. The student guide provides them with important background information and explains how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

44. **SC.912.P.12.4:** Describe how the gravitational force between two objects depends on their masses and the distance between them.

**Remarks/Examples:**

Describe Newton's law of universal gravitation in terms of the attraction between two objects, their masses, and the inverse square of the distance between them.

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

Justification:
The standard is found under Gravitational Force Scope. It is part of the Big Idea number 12 about Motion of Objects. It is rated as level 2 on the Cognitive Complexity Rating since it's based on application of skills and concepts. The student is expected to describe how the gravitational force between two objects depends on their masses and the distance between them. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must apply the concepts learned to find the force on gravity between the Earth and the Moon. The question is the following: What is the magnitude of the force of gravity between Earth and the Moon when they are separated by a distance of 3.8 x 105 km? The mass of Earth is 5.97 x 1024 kg, and the mass of the Moon is 7.35 x 1022 kg. (Source: NASA) All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students will use scientific notation to describe, calculate, and graph how the magnitude of the gravitational force between two objects, a basketball and a golf ball, depends upon their masses and the distance between their centers. The student guide provides them with important background information and explains how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

45. **SC.912.P.12.5:** Apply the law of conservation of linear momentum to interactions, such as collisions between objects.

**Remarks/Examples:**

(e.g. elastic and completely inelastic collisions).

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

Justification:
The standard is found under Conservation of Momentum Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The student is expected to apply the law of conservation of linear momentum to interactions, such as collisions between objects, and qualitatively apply the concept of angular momentum. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must understand the concept. Pupils are asked to compare velocity and momenta. The question is the following: Two physics students, one heavier than the other, decide to do a momentum experiment using rollerblades. The students stand facing each other and then push off from each other. How do the velocities and momenta of the students compare after they push off from each other? All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, students observe collisions that demonstrate the conservation of momentum in a closed system. The student guide provides them with important background information and explains how they should plan and implement their investigation. To culminate the activity students must complete the Reflections and Conclusions section on their Student Journal.

46. **SC.912.P.12.6:** Qualitatively apply the concept of angular momentum.

**Remarks/Examples:**

Explain that angular momentum is rotational analogy to linear momentum (e.g. Because angular momentum is conserved, a change in the distribution of mass about the axis of rotation will cause a change in the rotational speed [ice skater spinning]).

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

Justification:
The standard is found under Newton's Laws of Motion Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is

based on Level 3: Strategic Thinking and Complex Reasoning Strand in Physics. The standard is part of the Honors Curriculum. The student is expected to qualitatively apply the concept of angular momentum. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. The standard is explained in depth under the explain tab at Honors STEMScopedia. Under the Reflect section angular momentum is being addressed. On What do you think? section, questions are included to assess the student's knowledge.

47. **SC.912.P.12.7:** Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.

**Remarks/Examples:**

Recognize that regardless of the speed of an observer or source, in a vacuum the speed of light is always c.

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

Justification:
The standard is found under Speed of Light Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 1: Recall in Physics and its intended to be taught along the standard SC.912.P.12.9. Students are expected to recognize that nothing travels faster than the speed of light in a vacuum, which is the same for all observers, no matter how they or the light source are moving. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must understand the concept. Pupils are asked: If the person on the train turns on a flashlight, what is the speed the light travels for each observer? and Picture that a person is standing in the middle of a moving train car. If he or she flashes one flashlight towards the front of the train car and another one towards the back of the train car, which will hit the wall of the train car first? Why? All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, Part I, students become acquainted with the concept of time as it is used in physics, understanding that it always relates to measurement with a clock. In Part II, students distinguish how distances traveled at a very high speed appear to the traveler to be shortened or contracted. In Part III, students acknowledge that measured values of mass and energy depend on the reference frame of the observer. In Part IV, students discover that the speed of light, c, is relative to the observer, no matter where that person is.

48. **SC.912.P.12.8:** Recognize that Newton's Laws are a limiting case of Einstein's Special Theory of Relativity at speeds that are much smaller than the speed of light.

**Remarks/Examples:**

Recognize that the speed of light in any reference frame is the central postulate of the Special Theory of Relativity. As speeds approach zero, Special Relativity tends towards equivalence with Newton's Laws of Motion.

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

Justification:
The standard is found under Speed of Light Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 1: Recall in Physics and its intended to be taught along the standard SC.912.P.12.7 and SC.912.P.12.9. This standard is part of the Honors Curriculum. The student is expected to recognize that Newton’s Laws are a limiting case of Einstein’s Special Theory of Relativity at speeds that are much smaller than the speed of light. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. The standard is explained in depth under the explain tab at Honors STEMScopedia. Under the Look Out section Newton's laws limitations are being addressed. On What do you know? section, questions are included to assess the student's knowledge.

49. **SC.912.P.12.9:** Recognize that time, length, and energy depend on the frame of reference.

**Remarks/Examples:**

The energy E and the momentum p depend on the frame of reference in which they are measured (e.g. Lorentz contraction).

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

Justification:
The standard is found under Speed of Light Scope. It is part of the Big Idea number 12 about Motion of Objects. The standard is based on Level 1: Recall in Physics and its intended to be taught along the standard SC.912.P.12.7. Students are expected to know that Newton’s laws are a limiting case of Einstein’s special theory of relativity at speeds that are much smaller than the speed of light and that time, length, and energy depend on the frame of reference, while the speed of light is the same for all observers, no matter how they or the light source are moving. Question prompts are provided according Blooms Taxonomy that addresses this particular standard. For example, students must understand the concept. Pupils are asked: What measurements are dependent on the frame of reference of the observer? and Time dilation says that time passes differently depending on the movement of the objects in relation to each other. This differs from the thought that time is constant. Describe how time dilation is explained by the theory of special relativity. All the activities embedded and suggested in the scope aligns with the standard. For example under the explore tab, Part I, students become acquainted with the concept of time as it is used in physics, understanding that it always relates to measurement with a clock. In Part II, students distinguish how distances traveled at a very high speed appear to the traveler to be shortened or contracted. In Part III, students acknowledge that measured values of mass and energy depend on the reference frame of the observer. In Part IV, students discover that the speed of light, c, is relative to the observer, no matter where that person is.

50. **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.

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

Justification:
Under Matter and Its Properties Scope at the explain tab, dragging until finding Linking Literacy, a during- reading activity is found. Students are asked to read carefully the statements below. They must think about each statement and determine if the student generally agree or disagree with it by marking an X next to their answer. As they read the article, they must select text that provides evidence for or against the statements. This activity assesses the literacy standard above.

51. **LAFS.1112.RST.1.2:** Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

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

Justification:
Under the Atomic Theory Scope at the explain tab, dragging until finding Linking Literacy, a during- reading activity is found. Students are asked to take Anchor Notes about each scientist that contributed to the Atomic Theory and their model of the atom. To accomplish the activity students must determine the central ideas or conclusions from the text (STEMscopedia); summarize complex concepts, processes (scientist's experimentation), or information presented in a text by paraphrasing them in simpler but still accurate terms.

52. **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.

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

Justification:
Under the Electromagnetic Scope at the acceleration tab, a project based learning (PBL) is suggested on the electromagnetic radiation, the question is Do You See What I See? This PBL asks students to research and describe whether the grocery store industry has applied any wave characteristics or wave behaviors to create lightning systems for their product presentation advantage. The physics students will present their conclusions and their reasoning behind the conclusions to the interested community members or to representatives of the Texas Advertising Commission. The students will present their research and experimentation, describing if the store industry has applied any wave characteristics or wave behaviors to create lightning systems for their product presentation advantage. The presentation can include Power Points slides, posters, brochures, infomercials, graphs, charts, or other representations of their predictions. An entry Document and Expert roles is included to guide students. The students must follow a multistep procedure when carrying out their experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in text.

53. **LAFS.1112.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 11–12 texts and topics.

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

Justification:
Under Electric Circuits Scope at the explain tab, dragging until finding Linking Literacy, a pre-reading activity is found, students must observe a circuit diagram and indicate where the following parts (Conductor, Semiconductor, Insulator, Voltage, Current and Resistor) are and why will them placed it in certain locations. Also the post- reading activity asks students to define each word according to the text and provide an example within each word.

54. **LAFS.1112.RST.2.5:** Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

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

Justification:
Under Heat, Temperature and Energy Scope at the explain tab, dragging until finding Linking Literacy, a during-reading activity is found, students must complete each box by identifying and writing down comparisons for each of the word sets (Compare/Contrast) where the students analyze the ideas and categorized it. Also, the students must complete the section on conduction, convection, and radiation where they need to demonstrate understanding of the ideas presented in the text (STEMscopedia).

55. **LAFS.1112.RST.2.6:** Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

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

Justification:
Under the Four Fundamental Forces Scope at the explain tab, dragging until finding Linking Literacy, a during-reading activity is found, while reading, students must describe each topic, with support from the text. Thereof students must analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text to identify the four fundamental forces and understand each one. The post-reading activity asks students to use the reflections from the reading of the text to describe real-world examples of each of the four fundamental forces. A significant sentence is one standout sentence about the force and it should describe it.

56. **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.

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

Justification:
Under the acceleration tab, a Model Eliciting Activity is provided about the Discovery of the "God Particle" at the Four Fundamental Forces Scope. The student's mission is to create an infomercial that raises awareness of the significance of the recent discovery of the long sought after Higgs boson. The student must view the CBS News video listed. The purpose of this entry event is to generate interest and curiosity. The Guiding Question is: How will the discovery of the Higgs boson shape our understanding of the four fundamental forces of nature? The students must evaluate multiple sources: a CBS News Video, How Stuff Works about the 4 fundamental forces, an article under Live Science, another article on Science Daily: "Proton Dripping Tests a Fundamental Force..., on phys.org: "Getting to Know the Strong Force, One of the F..., on POPSCI: "Physicists Probe The Deep Earth For A Fifth Fund..., under NOVA: "Why Is Gravity Such a Weakling?", National Geographic, Discover Magazine, Yahoo News among others. Therefore, to create an infomercial, the student must integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address the guiding question.

57. **LAFS.1112.RST.3.8:** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

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

Justification:
Under the Static Charges Scope at the acceleration tab, a project based activity is suggested about Are Energy Vampire Real? This project-based learning (PBL) asks students to discover how a transformer works, why a transformer draws an electrical current anytime it is plugged in (even when it is not in use), how much energy is being consumed by households and city employees through phone chargers, and how

much money an average household could potentially save over an entire year. The students will demonstrate learning through experimentation and a presentation to interested community members or class members. The students are expected to learn about how a transformer works, why a transformer draws an electrical current anytime it is plugged in (even when it is not in use), how much energy is being consumed by households and city employees through phone chargers, and how much money an average household could potentially save over an entire year. The presentation can include PowerPoint slides, posters, brochures, infomercials, graphs, charts, or other representations of their predictions. An entry and expert roles form is given to guide students during their experimentation.

58. **LAFS.1112.RST.3.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

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

Justification:
Under the acceleration tab, a Model Eliciting Activity is provided about Refrigerants at the Properties of Matter Scope. The guiding question is: Are there viable, stable refrigerants available that do not harm the environment? Students must research several internet sources on the Ozone Hole, Health Effects of the CFCs, the Ozone Hole, CFCs and their replacements, about Natural Refrigerants and Why Move to Natural Refrigerants? The final task is to develop a script for a public service announcement. The script should be compelling; it should prompt the listening audience to take action. As seen, the students must synthesize information from the range of sources described into a coherent understanding of the Ozone Hole and how we can solve the problem moving towards natural refrigerants.

59. **LAFS.1112.RST.4.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.

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

Justification:
Most of the articles provided under the explain tab in each scope are aligned with the complexity level of 11-12 grades. Also, under the elaborate tab on each scope on reading science have the text complexity needed. Thereof, students must comprehend the text at this lexile level.

60. **LAFS.1112.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 11–12 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 promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.
**c.** Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
**d.** Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

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

Justification:
Under the Matter and Its Properties Scope, at the explain section on Communicate Science, inner/outer circles dialogue activity is suggested. will engage in an inner circle/outer circle dialogue about materials that are used in wiring houses. Students will discuss the advantages and disadvantages of aluminum wiring and copper wiring. For the set up of the activity, the teacher must have the students make two equal circles with their chairs. (For example, if the teacher have 30 students, she/he will make a small circle with 15 chairs, and then a larger circle on the outside of that with the other 15 chairs.Student A is sitting in the inner circle. Student B is sitting in the outer circle. A student handout is included to facilitate the activity and a rubric is attached.

61. **LAFS.1112.SL.1.2:** Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

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

Justification:
Under the Static Charges Scope at the acceleration tab, a model eliciting activity (MEA) is suggested on Laser Printers. The student must design an innovative laser printer. Their design should reflect cutting-edge speed and resolution features. The pupils should submit their design to an established, industry-leading laser printer design team. The guiding question is: How can physics principles be applied to address current laser printing technology challenges? The student should watch the video POPSCI on Super High-Res 3-D Laser Printer Prints at Five Meters Pe...To achieve the objective, the student must integrate multiple sources of information presented such as Videos, articles on NASA, How Stuff works, wiseGEEK, Curiosity.com and Buzzle. The student must make informed decision to design an innovative laser printer. They must evaluate the credibility and accuracy of each source to make their final design.

62. **LAFS.1112.SL.1.3:** Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.

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

Justification:
Under Heat, Temperature and Energy Scope, at the explain section on Communicate Science, the students will engage in a Socratic circle discussing fire walking and strategies to avoid burning.The teacher will need to set the classroom expectations for the Socratic circle dialogue: Active listening, Wait turn to speak and Build on the discussion. Everyone must contribute to the discussion. The teacher will pose the question to be discussed. The teacher's role is to initiate and guide the discussion to ensure dialogue remains on topic. Teacher must have computers available to research fire walking. Make sure that all students participate in the discussion. Instructor needs to encourage students to 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 throughout their discussion. The key of the Socratic dialogue is to evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used in order to build up the discussion.

63. **LAFS.1112.SL.2.4:** Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.

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

Justification:
Under the Electrical Circuits scope at the acceleration tab, a project based activity is suggested. This PBL (Add Bling to My Room) asks students to create a two-room lighting system to demonstrate to biology students the advantages and disadvantages of lights wired as a series circuit, or wired as a parallel circuit. The students will also present their lighting systems to a biology class. The scope is to convince the audience that a parallel circuit is better rather than a series circuit. Students must have sufficient evidence to back up their design. A PBL entry document will be given to students to guide them.

64. **LAFS.1112.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:
Under the Electrical Circuits Scope, at the explain section on Communicate Science, students will create an informative poster about how to survive a lightning strike at an outside event. The driving question is: How can I protect myself during a lighting storm? The teacher must: Allow students to work individually or in pairs. Have computers available for students to conduct research on lightning strikes. Have students relate their poster about surviving the lightning strike to conductors, insulators, voltage, and current. A student handbook is included to guide students. The rubric is also included.

65. **LAFS.1112.WHST.1.1:** Write arguments focused on discipline-specific content.

**a.** Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
**b.** Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.
**c.** Use words, phrases, and clauses as well as varied syntax 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:
Under the Speed of Light at the acceleration tab, a model eliciting activity (MEA) is suggested on Tau Ceti. The student must produce a publishable investigative news report that probes (digs deeper) into the prolific media coverage of the five planets that might be in orbit around Tau Ceti. The guiding questions is: What is the information that is missing from the mainstream media coverage of Tau Ceti? The student must research on the topic with the internet sources recommended to write an argument focused on physics and the speed of light.

66. **LAFS.1112.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 complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
**b.** Develop the topic thoroughly by selecting the most significant and relevant 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 complex ideas and concepts.
**d.** Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
**e.** Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).

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

Justification:
Under the Atomic Theory Scope, at the explain section on Communicate Science, students are asked to present a persuasive speech about how to prevent future chemical plant explosions. The students might work individually or in pairs. The teacher must have computers available to research recent chemical plant explosions. The instructor must make sure students include information about common causes of chemical plant explosions, and precautions that can be taken. A persuasive speech should include: a call to attention, need, solution, visualization, and action. The teacher must instruct students that the speech should be 3–5 minutes in length to include information needed. A student handbook is included to facilitate the activity.

67. **LAFS.1112.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:
Under the acceleration tab at the Four Fundamental Forces Scope, a project based learning activity is included. This project-based learning (PBL) asks students to create and present an illustrated children's book written at a third-grade level, which will introduce the third-grade students to the historical development of the concepts of gravitational forces, electromagnetic forces, weak nuclear forces, and strong nuclear forces.The student is expected to research and describe the effect forces have on nearby objects; the types of changes forces can produce; and the historical development of the concepts of gravitational forces, electromagnetic forces, weak nuclear forces, and strong nuclear forces. They will then create and present an illustrated children's book, written at a third-grade level. An entry document will be provided to guide the students in this activity. The students will produce a clear writing, a story book for a specific audience which is 3rd graders.

68. **LAFS.1112.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:
Under the Four Fundamental Forces Scope at the explain tab, dragging until finding Linking Literacy, a pre-reading activity is found where students list the four fundamental forces, from weakest to strongest: weak nuclear, gravitational, strong nuclear and electromagnetic. Then students are asked to briefly explain in the space below their reasoning for the organization of forces listed. Thus students are planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

69. **LAFS.1112.WHST.2.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

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

Justification:
Under the Electromagnetic Scope at the acceleration tab, a project based learning (PBL) is suggested on the electromagnetic radiation, the question is Do You See What I See? This PBL asks students to research and describe whether the grocery store industry has applied any wave characteristics or wave behaviors to create lightning systems for their product presentation advantage. The physics students will present their conclusions and their reasoning behind the conclusions to the interested community members or to representatives of the Texas Advertising Commission. The students will present their research and experimentation, describing if the store industry has applied any wave characteristics or wave behaviors to create lightning systems for their product presentation advantage. The presentation can include Power Points slides, posters, brochures, infomercials, graphs, charts, or other representations of their predictions. An entry Document and Expert roles is included to guide students.

70. **LAFS.1112.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:
Under the Electromagnetic Scope at the acceleration tab, a model eliciting activity (MEA) is suggested on Dangerous Decibels. The student task is to produce a public service announcement (PSA) that educates teens and their parents on the actions that they can take to build appropriate and lifelong listening skills. The guiding question is: What information needs to be provided to teens to encourage appropriate and lifelong listening skills? The student must do research on the following sources: ABC News Videos: "Can Earbuds Lead to Hearing Loss?", Science Daily: "Hearing And Acoustics Researcher's Manneq...",National Institutes of Health (NIH): "Noise-Induced Heari...", NBC News: "More Headphone Use Leading To Hearing Loss", CNET: "Motorola Sued Over Potential Bluetooth Hearing Loss", eHow: "What Are the Dangers of Telephone Headsets?", Mind the Science Gap: "Can Headphones Cause Hearing Damage?", The New American: "NYC Initiative Targets Earbud Headphon..." and TIME: "How Bad Are iPods for Your Hearing?". The students must research to make their public service announcement.

71. **LAFS.1112.WHST.3.8:** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

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

Justification:
Under the acceleration tab at Heat, Temperature and Energy Scope, a project based learning activity is included. This project-based learning (PBL) asks students to determine different methods on how heat can be transferred from the standard Blind Spot coffee cup and which method has the most effect on coffee cooling. Students will then design and create a modified cup that will keep a customer's coffee hotter longer. The student is expected to analyze and describe how heat can be transferred from a cup of hot coffee into the environment through conduction, convection, and radiation. The presentation can include PowerPoint slides, posters, brochures, or a short video. The students will then demonstrate the modified cup or to-go container for the audience. PBLs generally address the 21st Century Skills of communication, innovation, collaboration, presentation, and integration of technology. Specifically assessing collaboration in the rubric, this PBL is designed to increase students' proficiency in collaboration by addressing the developmental criteria for becoming an expert. Time must be allowed for each group to practice and present their solution to the design challenge. Students must explain how their solution will solve the problem, increase the benefits, and decrease risks for this challenge. Students must have sufficient evidence to back up their design. The teacher can invite other students/groups to ask questions. It will be better to invite an authentic audience to provide feedback to each group regarding the real-world application of the solution. A PBL entry document will be given to students to guide them.

72. **LAFS.1112.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:
Under the Static Charges Scope at the explain tab, dragging it until finding Linking Literacy, a during-reading activity is included. Students are asked as you they the text (STEMscopedia), look for details that give more information about the three main ideas listed below (Electric Forces and Subatomic Particles, Charged Particles and Electric Current, Electric Force and Electric Fields, Electric Charge Rules and Charles-Augustin de Coulomb and Electric Force Calculations and Electroscopes). The students must draw evidence to write four details for every main idea from the text to support the analysis.

73. **LAFS.1112.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 linking literacy activities asks the students to reflect after the reading and revise what they had already known in contrary to what they learned. For example, under the Speed of Light scope, at the explain tab on linking literacy, the post-reading activity instructs students to reflect on the reading, to complete the nuts and bolts activity and to return to the KWL pre-reading chart and complete the L section of the chart. This exemplifies the reflection and the revision.

74. **MAFS.912.A-CED.1.4:** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

◉ **VERY GOOD ALIGNMENT** ○ GOOD ALIGNMENT ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
Under Electrical Circuits Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will characterize materials as conductors or insulators based on their electrical properties and design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations. A student handbook sheet is included with mathematical problems. For example, a heating pad has several strips of heater wire connected in parallel. Consider eight of the wires, each with 4 O resistance, connected to a 12 V power source. Given this scenario, answer the following: A. What is the total resistance of the eight wires? (Wires are in two groups of 2.) B. What is the total current?

75. **MAFS.912.F-IF.2.4:** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

◉ **VERY GOOD ALIGNMENT** ○ GOOD ALIGNMENT ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
Under Properties of Waves Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.A student handbook sheet is included with mathematical problems. For example, the students will calculate the speed of a wave using ? = f × ?. An exemplary problem is dolphins communicate using various sounds including whistles, clicks, and squeaks. Lower-frequency vocalizations are likely used in social communication, and high-frequency vocalizations are likely used in echolocation. If a dolphin is producing a vocalization with a frequency of 35 Hz, traveling at 1500 m/s, what is the wavelength of the sound? On questions 5-8, the students must use a table to graph the relationship between frequency and period. Then, they will create a function to describe the relationship between the frequency and period of a wave. At the end, the students must look at the shown graphs and their equations. Fill in the amplitude and period for each figure.

76. **MAFS.912.F-IF.3.7:** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

**a.** Graph linear and quadratic functions and show intercepts, maxima, and minima.
**b.** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
**c.** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
**d.** Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
**e.** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift.

◉ **VERY GOOD ALIGNMENT** ○ GOOD ALIGNMENT ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
Under Static Charges Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will evaluate the how the magnitude of the electrical force and field between two objects depends on their charges and the distance between them. A student handbook sheet is included with mathematical problems. For example, the students will calculate the electrical force between two objects with charges of 2.2 µC and 4.2 µC,respectively, placed at different distances apart. The students will complete the chart with their calculations. Students will graph the electrical force vs. the distance between the two objects on the grid provided. What happens to the force when the distance is doubled? quadrupled? Additional scopes cover as well in depth the standard.

77. **MAFS.912.G-GMD.1.3:** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

○ VERY GOOD ALIGNMENT ◉ **GOOD ALIGNMENT** ○ FAIR ALIGNMENT ○ POOR ALIGNMENT ○ VERY POOR/NO ALIGNMENT
Justification:
Under Kepler's Laws and Planetary Motion Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will be able to learn what Kepler's First Law is and how to apply it. The use of geometrical shapes and the application of geometric methods is relevant to this activity. A student handbook sheet is included with mathematical problems. For example, the students will calculate the aphelion distance by using the formula: a(1+e), where a is the length of the semi-major axis and e is the eccentricity. Calculate the perihelion distance for each planet and record it in the chart above using scientific notation. Also, under Scale and Motion in the Universe Scope at the Elaborate tab on Match Connections, the calculation of volume is required.

78. **MAFS.912.G-MG.1.2:** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

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

Justification:
Under Scale and Motion in the Universe Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the main idea in the scope is addressed. Gravity and inertia act together to hold everything in orbit, whether that be planets, moons, satellites, etc., in the solar system, our solar system in the Milky Way, all items in the universe. Students will use this idea to explore some difference between the terrestrial and gas planets mathematically and statistically. A student handbook sheet is included with mathematical problems. For example, the students must compute the volume (V = 4/3 × p × r3) and density (p = m / v) for each planet from the information provided.

79. **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:
This standard is addressed on most of the scopes, however we will only address the Heat, Temperature and Energy scope. At the Elaborate tab on Match Connections, it has an activity that addresses the standard. In this activity, the students will calculate the ideal thermal efficiency of different scenarios and calculate the heat given off during different reactions. A student handbook sheet is included with mathematical problems. For example, in order to solve the problems, the students must interpret the units and perform the correct calculation utilizing formulas, for example the students are asked to convert °C to Kelvin, use the equation K = 273 + °C to solve the first problem: An engine has an ideal efficiency of 37% and the cold reservoir is 15°C. What is the temperature of the hot reservoir? Convert the efficiency to a decimal before solving. Round the answer to the nearest tenth.

80. **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 addressed on most of the scopes, however we will only address the Heat, Temperature and Energy scope. At the Elaborate tab on Match Connections, it has an activity that addresses the standard. In this activity, the students will calculate the ideal thermal efficiency of different scenarios and calculate the heat given off during different reactions. A student handbook sheet is included with mathematical problems. For example, in most of the problems the students must round in order to chose the correct level of accuracy. Like in the following problem: Given that a steam turbine has a hot reservoir of 115°C and a sink at 37°C, what is the ideal efficiency of the steam turbine? Round to the nearest hundredth.

81. **MAFS.912.N-VM.1.1:** Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v).

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

Justification:
Under Two Dimensional Motion Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will analyze and describe accelerated motion in two dimensions using equations, including projectile and circular examples. A student handbook sheet is included with mathematical problems. For example, the knowledge and comprehension of vectors is vital to solve the following problem found in the student handbook: If two vectors have magnitudes of 5 and 12, respectively, and are at right angles to each other, then what is their resultant? Draw the two vectors and their resultant as a right triangle, and use the Pythagorean theorem to solve for the resultant.

82. **MAFS.912.N-VM.1.2:** Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

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

Justification:
Under Two Dimensional Motion Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will analyze and describe accelerated motion in two dimensions using equations, including projectile and circular examples. A student handbook sheet is included with mathematical problems. For example, the knowledge and comprehension of vectors is vital to solve the following problem found in the student handbook: Given a 17-unit vector that makes a 38° angle with the x-axis, find the magnitude of the horizontal and vertical components, respectively. Round to three decimal places. Hint: Use the Vx-dir and Vy-dir formulas.

83. **MAFS.912.N-VM.1.3:** Solve problems involving velocity and other quantities that can be represented by vectors.

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

Justification:
This standard is addressed on several scopes, however we will only address the Two Dimensional Motion scope. At the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will analyze and describe accelerated motion in two dimensions using equations, including projectile and circular examples. A student handbook sheet is included with mathematical problems. For example, the knowledge and comprehension of vectors is vital to solve the following problem found in the student handbook: A cannonball is shot a velocity of 100 m/s out of a cannon at a 50° angle with the ground. Find the following: a. Vx-dir (round to the nearest ten thousandth) b. Vy-dir (round to the nearest ten thousandth) c. Write an equation to find the height of the cannon ball at any time. Hint, you are looking for y, the vertical component. d. Draw a graphical representation of this scenario. What type of graph does this represent? Label the graph as you answer the following questions. e. What is the time the ball takes to reach maximum height? Hint: Vy-dir = Vyi + gt, where Vy-dir = ? (Round to the nearest tenth.) f. What is the ball's maximum height? Hint: y = Vyit + ½ gt2 , and plug in the above answer for t. (Round to the nearest tenth.) g. What is the height of the cannon ball at t = 5.2 s? (Round to the nearest tenth.) h. Determine the Domain and Range of the graphical representation. Why are they restricted? Solve algebraically, and use a graphing calculator to check your answer. Hint: For the Range, factor the original equation, and solve for t.

84. **MAFS.912.S-IC.2.6:** Evaluate reports based on data.

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

Justification:
Under Matter and Its Properties Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will read through the investigation and plot the data, following the color-coded instructions in the questions. A student handbook sheet is included with mathematical problems. For example, based on the data given and plotted by the students, the students must answer evaluative questions like: Use a green colored pencil to represent the part of the graph that shows the water boiling. What is the equation of the line that represents the boiling water?, Are the boiling point and melting point of water extensive or intensive properties?, Use a yellow colored pencil to represent the part of the graph from 17–20 minutes., Describe the state of the water from 17–20 minutes. How are the water molecules spaced and what is their energy level?, Describe the shape of the water and the compressibility of the molecules. molecules.

85. **MAFS.912.S-ID.1.1:** Represent data with plots on the real number line (dot plots, histograms, and box plots).

**Remarks/Examples:**

In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.

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

Justification:
Under the Atomic Theory Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will construct electron models of elements and look at the mathematical patterns connected with electron configurations. A student handbook sheet is included with mathematical problems. On the student handbook, data is presented in a graph. The students must interpret the graph to answer questions like: How does the data in this graph compare to how the periodic table is designed?, Create the Bohr model for neon., Create the Bohr model for calcium. and Based on the Bohr Models of each element, which one would be more reactive to other elements? Why? elements? Why?

86. **MAFS.912.S-ID.1.2:** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

**Remarks/Examples:**

In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.

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

Justification:
Under Scale and Motion in the Universe Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the main idea in the scope is addressed. Gravity and inertia act together to hold everything in orbit, whether that be planets, moons, satellites, etc., in the solar system, our solar system in the Milky Way, all items in the universe. Students will use this idea to explore some difference between the terrestrial and gas planets mathematically and statistically. A student handbook sheet is included with mathematical problems. For example, statistics are used in the handbook to shape the planetary data like in the following math problem: Create a statistical curve graph of planet diameter versus planet density. Label the axes and planet data points. Pluto has been given for you and find and label the mean, median, and mode of the diameter vs. density curve.

87. **MAFS.912.S-ID.1.3:** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

**Remarks/Examples:**

In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.

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

Justification:
Under Scale and Motion in the Universe Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the main idea in the scope is addressed. Gravity and inertia act together to hold everything in orbit, whether that be planets, moons, satellites, etc., in the solar system, our solar system in the Milky Way, all items in the universe. Students will use this idea to explore some difference between the terrestrial and gas planets mathematically and statistically. A student handbook sheet is included with mathematical problems. For example, the interpretation of graphs are key to account for possible outliers like in the following math problem: Create a bar graph of the terrestrial and gas planet densities by plotting the calculations made on the previous table. The students must observe the trend and identify any outliers in their graphs.

88. **MAFS.912.S-ID.1.4:** Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

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

Justification:
Under Static Charges Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will evaluate the how the magnitude of the electrical force and field between two objects depends on their charges and the distance between them. A student handbook sheet is included with mathematical problems. For example, the use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages is being addressed.

89. **MAFS.912.S-ID.2.5:** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

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

Justification:
Under Static the Four Fundamental Forces Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will use ratios and mathematical relationships to derive the Inverse Square Law in regards to gravity. A student handbook sheet is included with mathematical problems. The students must recognize trends or possible associations in the data. Two problems in the handbook asks for: What relationship do you see between the ratio of the accelerations due to gravity (Fgrav) in Question 1 and the ratio of the distances in Question 2? and What is the relationship between the change in electrical forces and the change in distances?

90. **MAFS.912.S-ID.2.6:** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

**a.** Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, and exponential models.

**b.** Informally assess the fit of a function by plotting and analyzing residuals.

**c.** Fit a linear function for a scatter plot that suggests a linear association.

**Remarks/Examples:**

Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals.

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

Justification:
Under Properties of Waves Scope at the Elaborate tab on Match Connections, it has an activity that addresses the standard. In the activity, the students will use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. A student handbook sheet is included with mathematical problems. For example, the students will look at the graph provided and answer: What is the amplitude? How do you know? and also it will asks for plotting the points on the grid provided.

91. **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:
The standard can be found under several scopes. Under the Static Charges at the explore tab teacher guide, a four corner strategy is suggested to communicate the information and the ideas. The activity is as follows: after the students have had the opportunity to explore through the investigation, have them form groups by counting off from one to four. On chart paper, label four sheets from one to four, and place each in its own corner of the classroom. Students will need to go to the chart paper with their corresponding number. Each of these corners will be associated with one of the following questions: Question 1: How are charges on an object produced? Question 2: How would you describe Coulomb's law? Question 3: Can you explain how to calculate the magnitude of the electrical force between two objects? Question 4: What is the difference between like and opposite charges? After the students walk over to the number they counted out, provide the group with markers to write down their ideas. Each group will be responsible for presenting to the other groups.

92. **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:
The standard can be found under several scopes. Under Electric Circuits at the explore tab teacher guide, a think, pair and share activity is suggested. In this activity students will communicate for instructional purposes. The activity is as follows: After the students have gone through the Explore part of the investigation, allow them to regroup with their 3:00 partner. Give them time to think about their questions, answer them in the journals, then discuss their answers. Possible questions and sentence stems could be the following: Level 1 Knowledge Question: How would you describe an insulator? Stem: I would describe an insulator as _____. Level 2 Comprehension Question: What can you say about conductors? Stem: Conductors are _____. Level 3 Application Question: How would you show your understanding of an electric current? Stem: I would show my understanding of an electric current by _____. Level 4 Analysis Question: What is the relationship between voltage and current? Stem: The relationship between voltage and current is _____. Level 5 Synthesis Question: How would you test an electric circuit? Stem: I would test an electric circuit by _____. Level 6 Evaluation Question: How could you determine whether a circuit is series or parallel? Stem: I could determine whether a circuit is series or parallel by _____.